TECHNICAL MANUAL

Of

Intel H61 Express Chipset

Based Mini-ITX M/B

NO. G03-NC9F-F

Revision: 2.0

Release date: June 14, 2013

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.

TABLE OF CONTENT

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

Manual Revision Information

Reversion	Revision History	Date
2.0	Second Edition	June 14, 2013

Item Checklist

- ☑ Motherboard
- ☑ DVD for motherboard utilities
- ☑ User's Manual
- ☑ Cable(s)
- ☑ I/O Back panel shield

Chapter 1
Introduction of the Motherboard

1-1 Feature of Motherboard

- Intel® H61 express chipset
- Support LGA 1155 CPU socket Intel® Core™ i7 processors / Intel® Core™ i5 processors / Intel® Core™ i3 processors / Intel® Celeron™ processors
- Support DDRIII 1066-1333 SO-DIMM up to 16GB and dual channel function
- Integrated with Realtek RTL8111EVL Gigabit Ethernet LAN chip
- Integrated with RealTek ALC892-GR 7.1 channel HD Audio Codec
- Support USB 3.0 data transport demands.
- Support PCIE 2.0 x1 slot and Mini PCI-E slot
- Support CPU Smart FAN
- Supports ACPI S3 Function
- Compliance with ErP Standard
- Support Watchdog Timer Technology

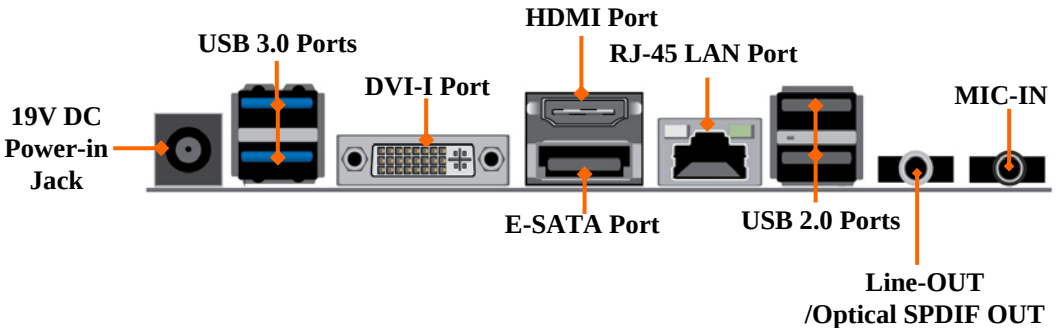
1-2 Specification

Spec	Description
Design	● Mini-ITX form factor 6 layers ; PCB size: 17.0x17.0cm
Chipset	● Intel H61 Express Chipset
CPU Socket	● Support Intel® LGA 1155 Socket Core™ i7 Processor, Intel® Core™ i5 Processor, Intel® Core™ i3 Processor, Intel® Celeron™ processors ** for detailed CPU support information please visit our website*
Memory Slot	● DDRIII SO-DIMM slot x 2 ● Support DDRIII 1066/1333 MHz SO-DIMM up to 16GB ● Support dual channel function
Expansion Slot	● 1* PCIE x 1 slot ● 1* Full-size Mini-PCIE slot/MSATA slot ● 1* Half-size Mini-PCIE slot
Gigabit LAN Chip	● Integrated with Realtek RTL8111EVL PCI-E Gigabit LAN chip ● Support Fast Ethernet LAN function of providing 10/100/1000 Mbps Ethernet data transfer rate
Audio Chip	● Realtek ALC892-GR 7.1 channel Audio Codec integrated ● Audio driver and utility included
BIOS	● 32M DIP Flash ROM
Multi I/O	● 1* 19V DC-in power jack ● 2* USB 3.0 port + ● 1* DVI-I port ● 1* HDMI port ● 1*E-SATA port ● 1* RJ-45 port ● 2* USB 2.0 port ● 1* MIC-IN jack

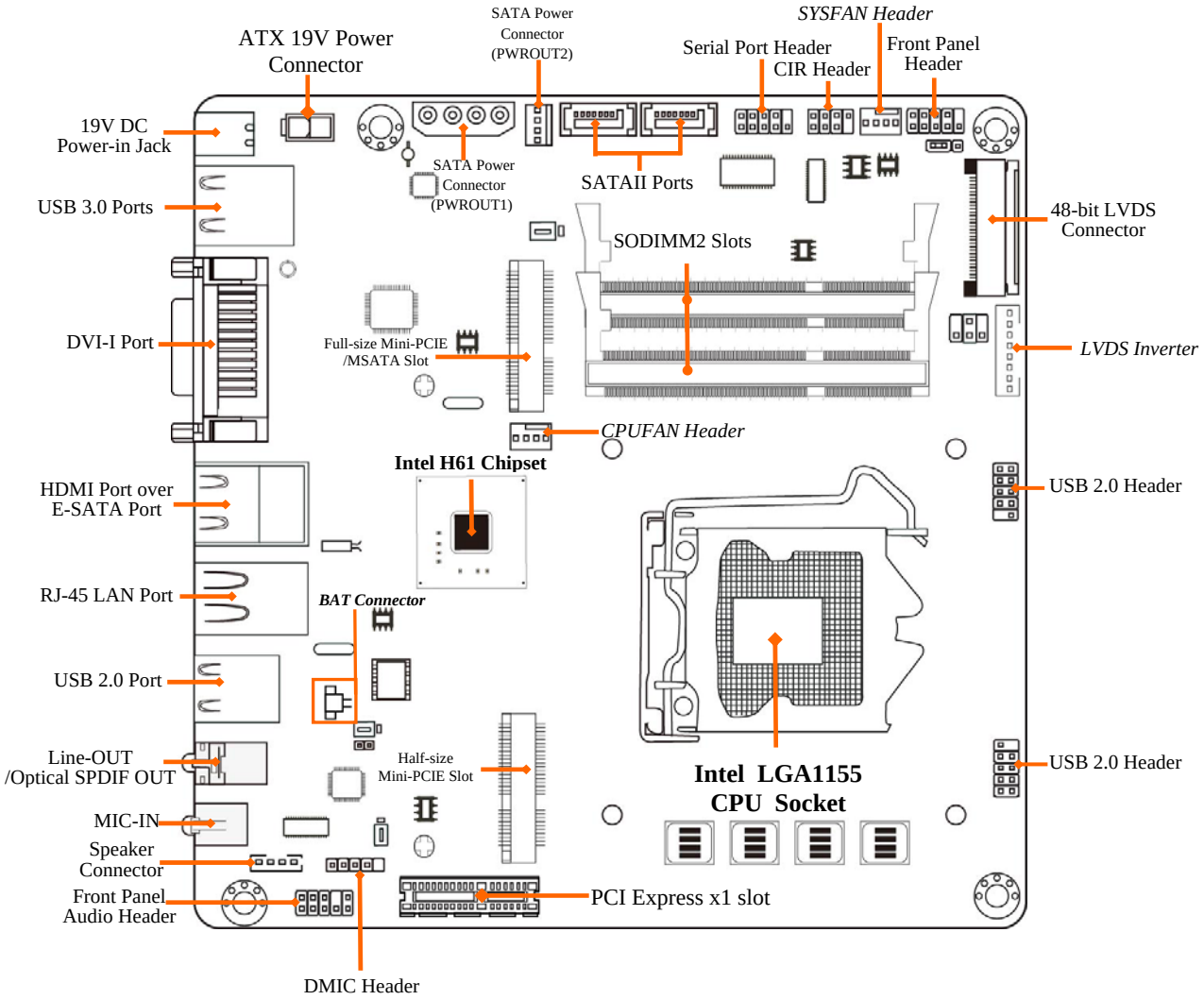
	● 1*LINE-OUT (S/PDIF) jack ● 1*LVDS connector + 1*LVDS inverter connector ● 1*EDP connector ● 1*Speaker connector ● 2* SATAII connector ● 1*Front panel audio header ● 1*DMIC header ● 2*9-pin USB 2.0 header ● 1*Front panel header ● 1*CIR header ● 1*Serial port header

1-3 Layout Diagram

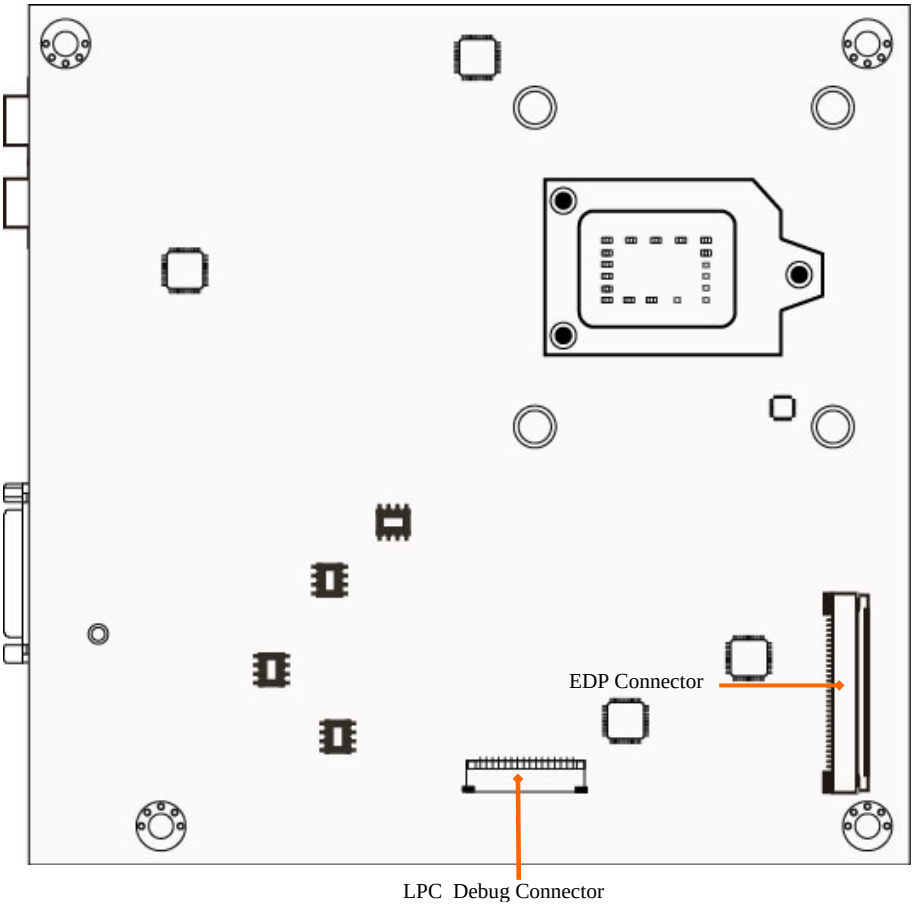
Rear IO Diagram



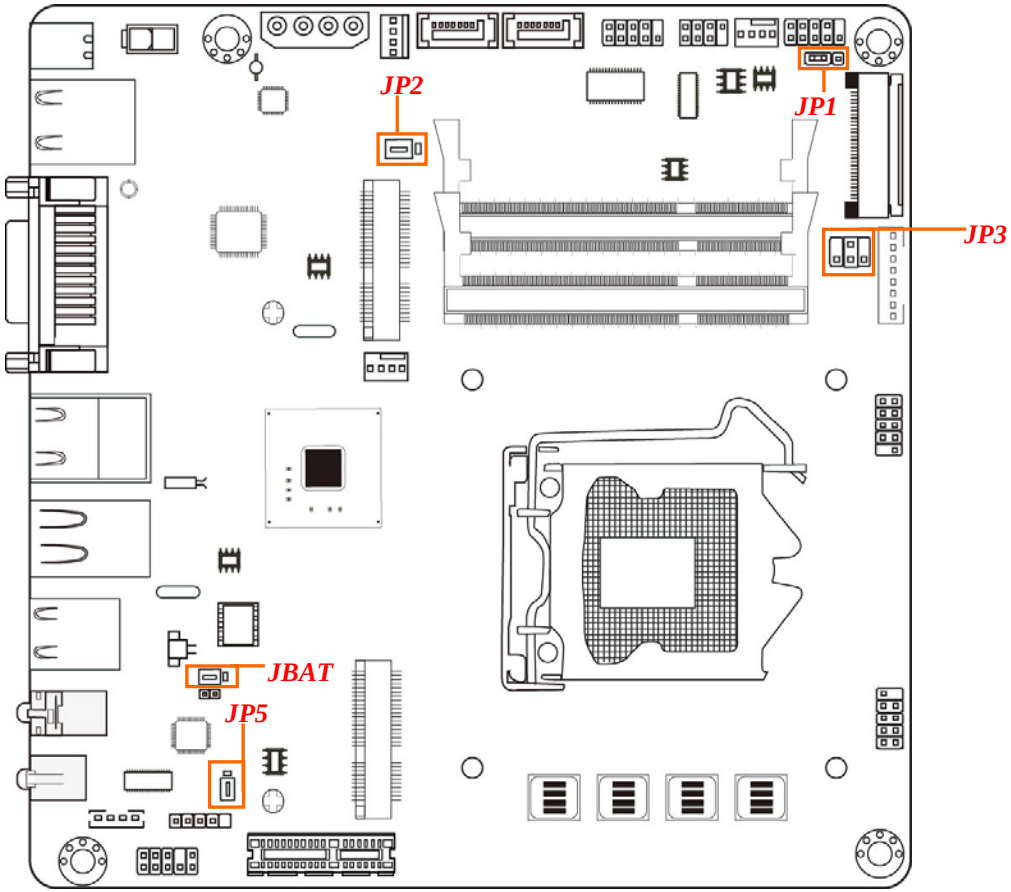
Motherboard Internal Diagram-Front



Motherboard Internal Diagram-Back



Motherboard Jumper Position



Connectors

Connector	Name
DC_IN	DC Adapter 19V
ATX2P	DC19V Power Connector
USB30	USB3.0 Connector
DVI-I	DVI with VGA
HDMI (up)	High-Definition Multimedia Interface
eSATA(down)	eSATA Connector
RJ-45 LAN	RJ-45 LAN Connector
USB20	USB2.0 Connector
FP_HP	Front panel head phone with SPDIF
FP_MIC	Front panel_MIC
PWROUT1	Mainboard power output 12V/VCC
PWROUT2	Mainboard power output 12V/VCC
SPEAK_CON	Speaker connector
INVERTER	Panel Inverter connector
LVDS	LVDS connector
EDP (Bottom side)	EDP connector

Headers

Header	Name	Description
FP_AUDIO	Front Panel Audio Header	10-pin block
DMIC_CON	DMIC Header	5-pin Block
USB1/USB2	USB Header	10-pin Block
JW_FP	Front Panel Header(PWR LED/ HD LED/ /Power Button /Reset)	10-pin Block
CPU FAN/SYSFAN	FAN Speed Header	4-pin Block
CIR_CON	CIR Header	8-pin Block
COM1	Serial Port Header	10-pin Block

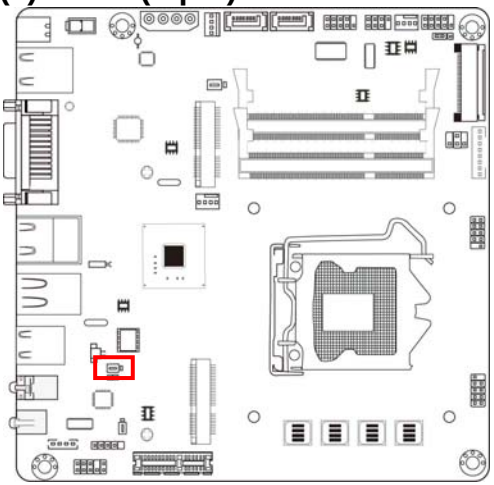
Jumper

Jumper	Name	Description
JBAT	CMOS RAM Clear Function Select	3-pin Block
JP1	Inverter VCC 12V/19V Select	3-pin Block
JP2	MINI_FULL Slot VCC 3.3V/ 3.3VSB Select	3-pin Block
JP3	LCD Power Source Setting	6-pin Block
JP5	MINI_ HALF Slot VCC 3.3V/ 3.3VSB Select	3-pin Block

Chapter 2
Hardware Installation

2-1 Jumper Setting

(1) JBAT (3-pin): Clear CMOS Function Setting



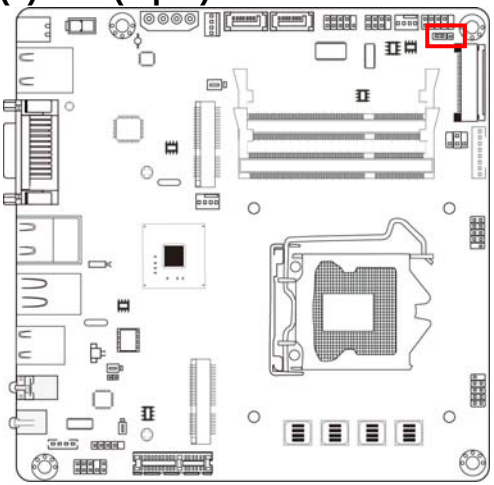
JBAT

1-2 Short: Normal;

JBAT

2-3 Short : Clear CMOS

(2) JP1 (3-pin): INVERTER VCC 12V/19V Select

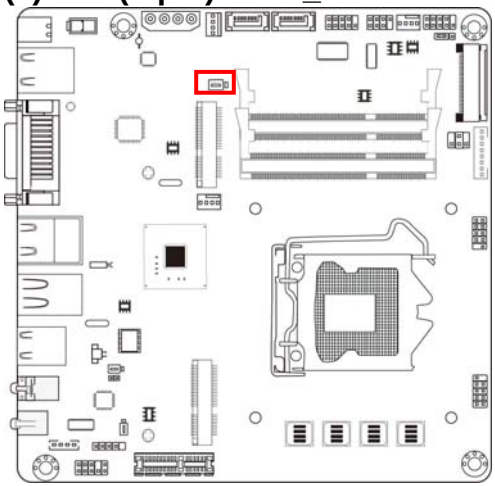


JP1

1-2 Short: Inverter VCC= 12V;

2-3 Short : Inverter VCC= 19V

(3) JP2 (3-pin): MINI_FULL Slot VCC3.3V/3.3VSB Select

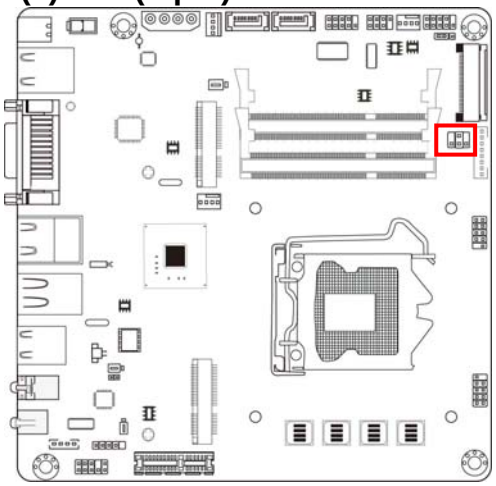


JP2

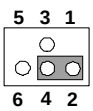
1-2 Short: MINI_FULL Slot Power = 3.3V;

2-3 Short : MINI_FULL Slot Power = 3.3VSB

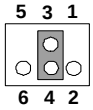
(4) JP3 (6-pin): LCD Power Source Setting



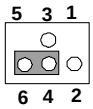
JP3



2-4 Closed: LVDS
VCC= 3.3V

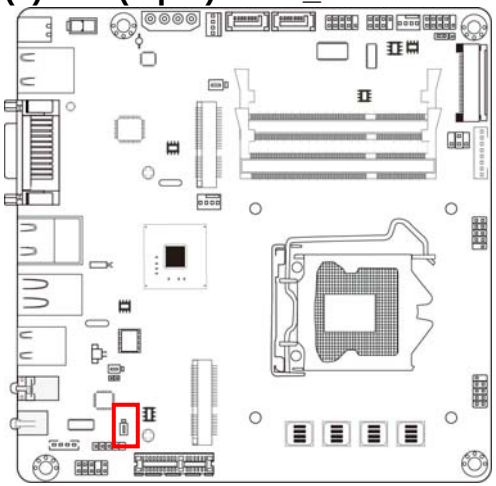


3-4 Closed: LVDS
VCC= 5V;



4-6 Closed: LVDS
VCC= 12V;

(5) JP5 (3-pin): MINI_Half Slot VCC3.3V/ 3.3VSB Select



JP5

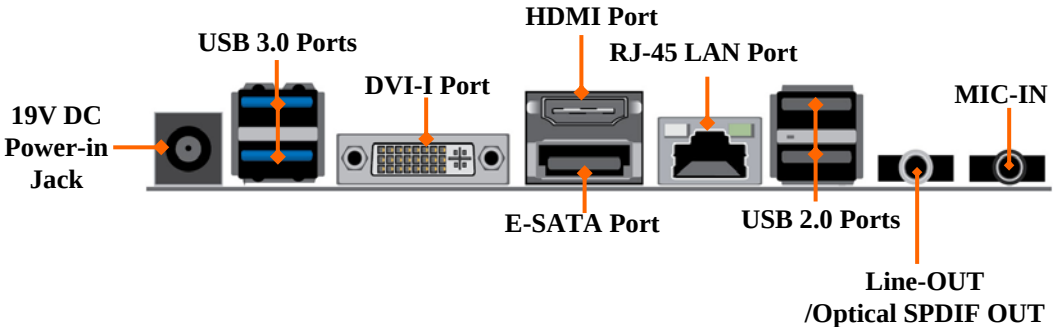
1-2 Short: MINI_HALF Slot Power = 3.3V;

2-3 Short : MINI_HALF Slot Power = 3.3VSB

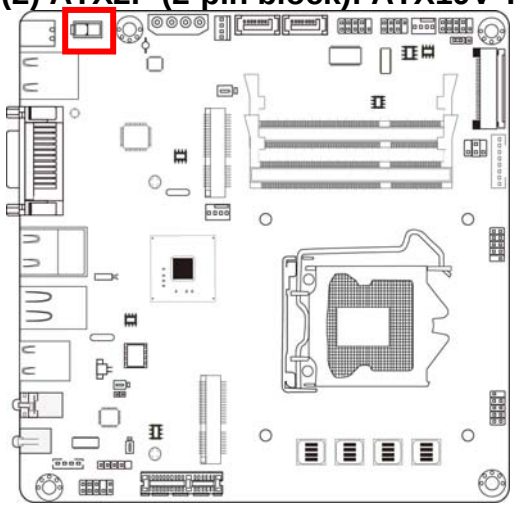
2-2 Connectors and Headers

2-2-1 Connectors

(1) Rear Panel Connectors

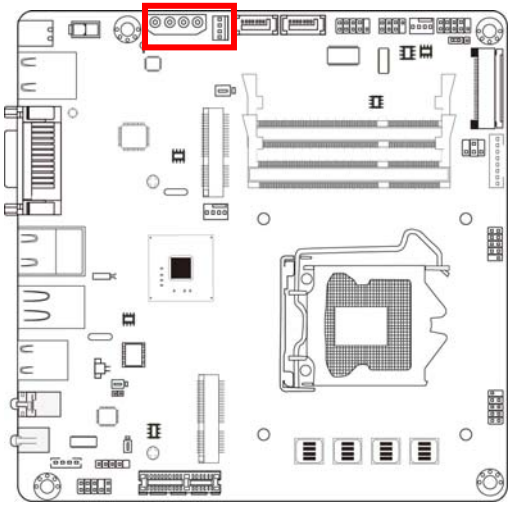


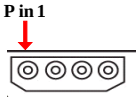
(2) ATX2P (2-pin block): ATX19V Type power connector



Pin No.	Definition
1	GND
2	+19V

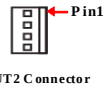
(3) PWOUT1/ PWOUT2 (4-pin block): Mainboard power output 12V/VCC





PWOUT1 Connector

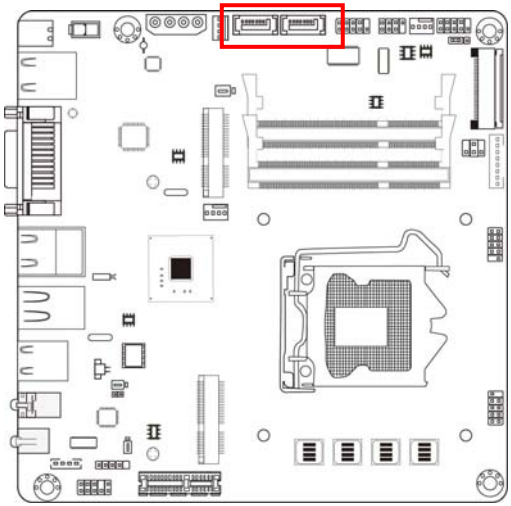
Pin No.	Definition
1	+12V
2	GND
3	GND
4	VCC



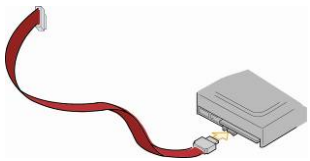
PWOUT2 Connector

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

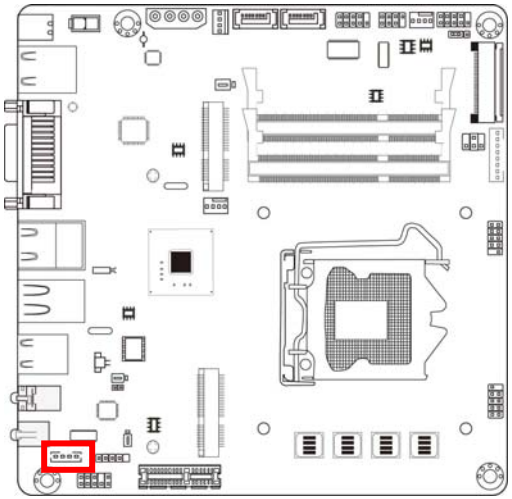
(4) SATA1/SATA2(7-pin): SATA II Port connector



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

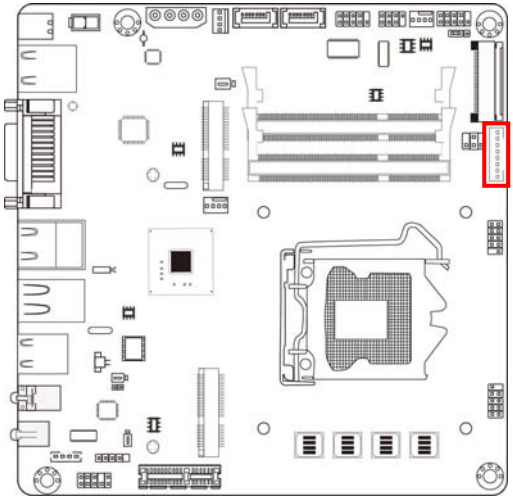


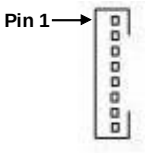
(5)SPEAK_CON (4-pin block): Speaker Connector



Pin No.	Definition
1	L-
2	L+
3	R+
4	R-

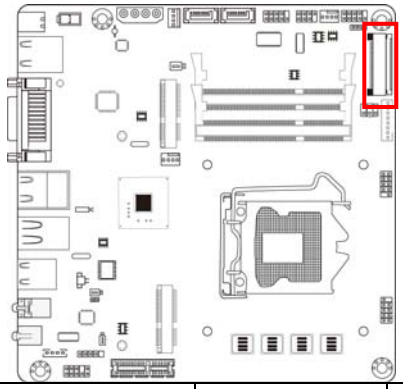
(6) INVERTER (8-pin): LVDS Inverter Connector





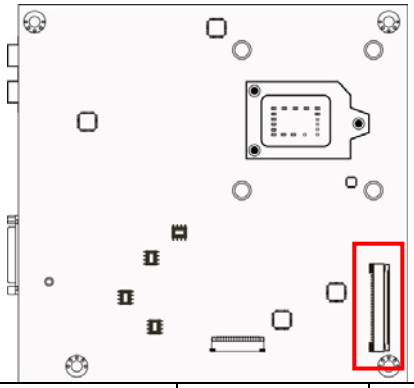
Pin No.	Definition
1	Backlight Enable
2	Backlight Duty
3	PVCC
4	PVCC
5	GND
6	GND
7	Backlight +SW
8	Backlight -SW

(7) LVDS(40-pin): 48-bit LVDS Header



Pin NO.	Pin Define	Pin NO.	Pin Define
Pin 1	LVDSA_DATAP3	Pin 2	LVDSA_DATAN3
Pin 3	LVDSA_DATAP2	Pin 4	LVDSA_DATAN2
Pin 5	LVDSA_DATAP1	Pin 6	LVDSA_DATAN1
Pin 7	LVDSA_DATAP0	Pin 8	LVDSA_DATAN0
Pin 9	LVDSB_DATAP3	Pin 10	LVDSB _DATAN3
Pin 11	LVDSB_DATAP2	Pin 12	LVDSB _DATAN2
Pin 13	LVDSB_DATAP1	Pin 14	LVDSB _DATAN1
Pin 15	LVDSB_DATAP0	Pin 16	LVDSB _DATAN0
Pin 17	GND	Pin 18	LCD_VCC
Pin 19	LCD_VCC	Pin 20	LCD_VCC
Pin 21	NC	Pin 22	EDID_3V3
Pin 23	GND	Pin 24	GND
Pin 25	GND	Pin 26	LVDS_CLKAP
Pin 27	LVDS_CLKAN	Pin 28	GND
Pin 29	GND	Pin 30	GND
Pin 31	LVDS_DDC_CLK	Pin 32	LCD_BKLT_EN
Pin 33	LCD_BKLT_PWM	Pin 34	LVDS_CLKBP
Pin 35	LVDS_CLKBN	Pin 36	BKLT_PWR
Pin 37	BKLT_PWR	Pin 38	BKLT_PWR
Pin 39	NC	Pin 40	LVDS_DDC_DATA

(8) EDP(40-pin): EDP Connector

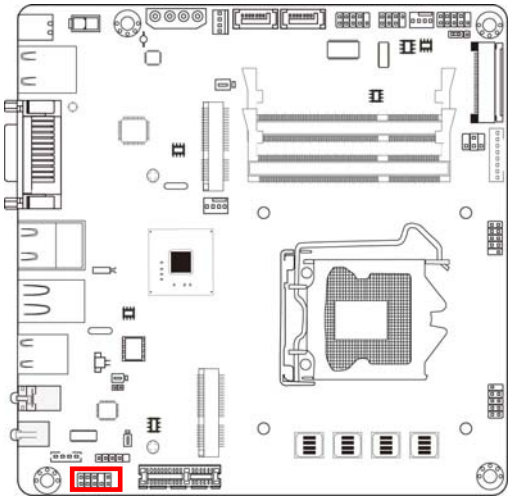


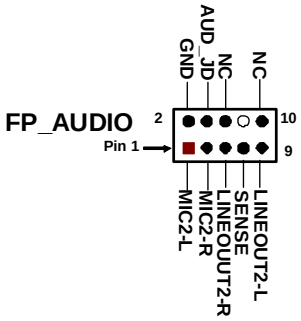
Pin NO.	Pin Define	Pin NO.	Pin Define
Pin 1	NC	Pin 2	GND
Pin 3	EDP_DATA3N	Pin 4	EDP_DATA3P
Pin 5	GND	Pin 6	EDP_DATA2N
Pin 7	EDP_DATA2P	Pin 8	GND
Pin 9	EDP_DATA1N	Pin 10	EDP_DATA1P
Pin 11	GND	Pin 12	EDP_DATA0N
Pin 13	EDP_DATA0P	Pin 14	GND
Pin 15	EDP_AUXP	Pin 16	EDP_AUXN
Pin 17	GND	Pin 18	LCD_VCC
Pin 19	LCD_VCC	Pin 20	LCD_VCC
Pin 21	LCD_VCC	Pin 22	NC
Pin 23	GND	Pin 24	GND
Pin 25	GND	Pin 26	GND
Pin 27	EDP_HPD	Pin 28	GND
Pin 29	GND	Pin 30	GND
Pin 31	GND	Pin 32	LCD_BKLT_EN
Pin 33	LCD_BKLT_PWM	Pin 34	NC
Pin 35	NC	Pin 36	BKLT_PWR
Pin 37	BKLT_PWR	Pin 38	BKLT_PWR
Pin 39	BKLT_PWR	Pin 40	NC

2-2-2 Headers

(1) FP_AUDIO (10-pin): Line-Out, MIC-In Header

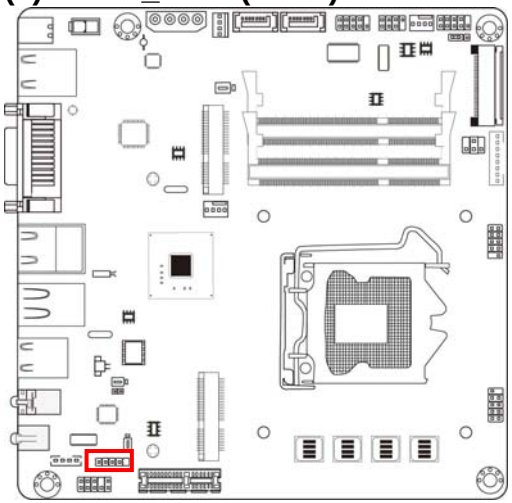
This header connects to Front Panel Line-out, MIC-In connector with cable.

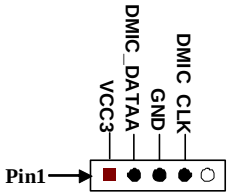




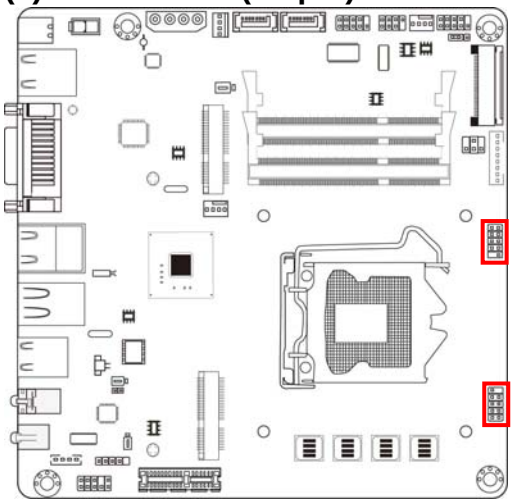
Line-Out, MIC Headers

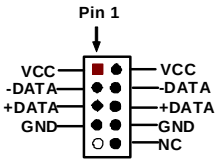
(2) DMIC_CON (5-Pin): DMIC Header



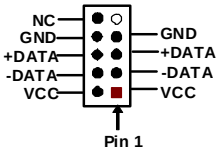


(3) USB1/USB2 (10-pin): USB 2.0 Port Headers



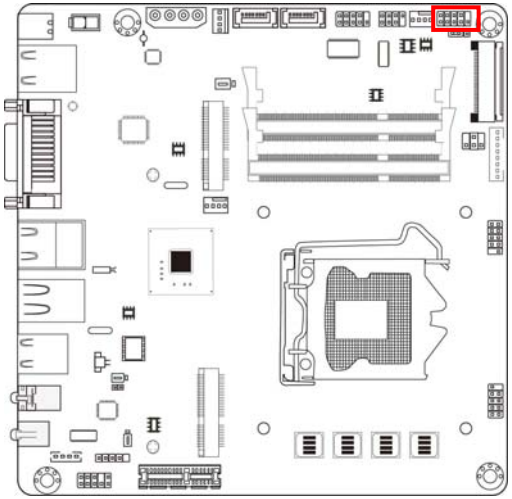


USB1 Header

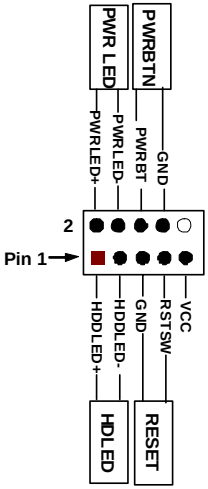


USB2 Header

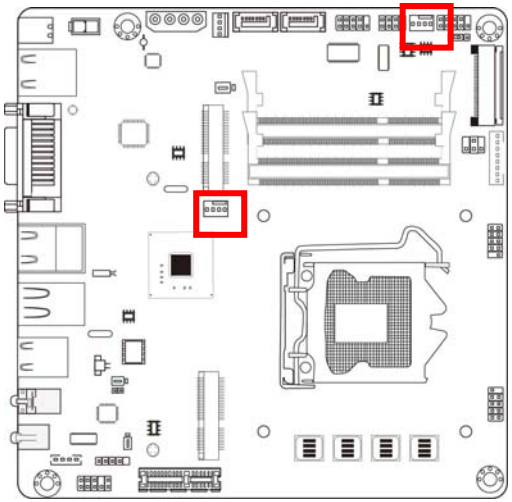
(4) JW-FP(10-pin): Front Panel Header

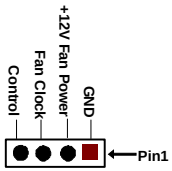


JW_FP

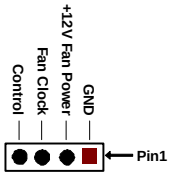


(5) CPUFAN/SYSFAN (4-pin block):Fan speed header



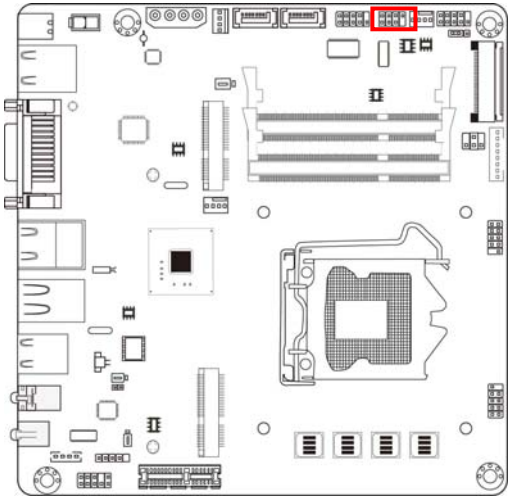


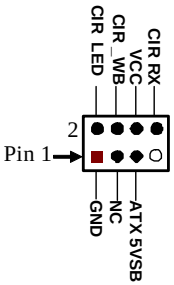
CPUFAN



SYSFAN

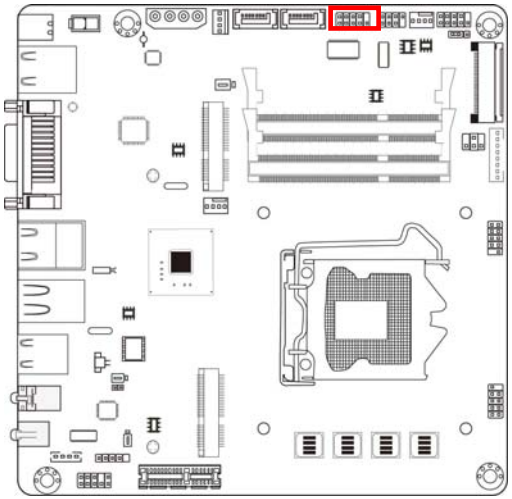
(6) CIR_CON (8-Pin): CIR Header

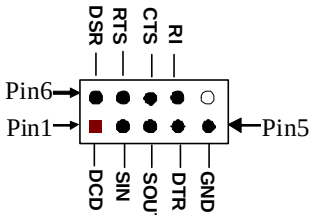




CIR Header

(7) COM1 (10-Pin): Serial Port Header





COM 1 Header

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.

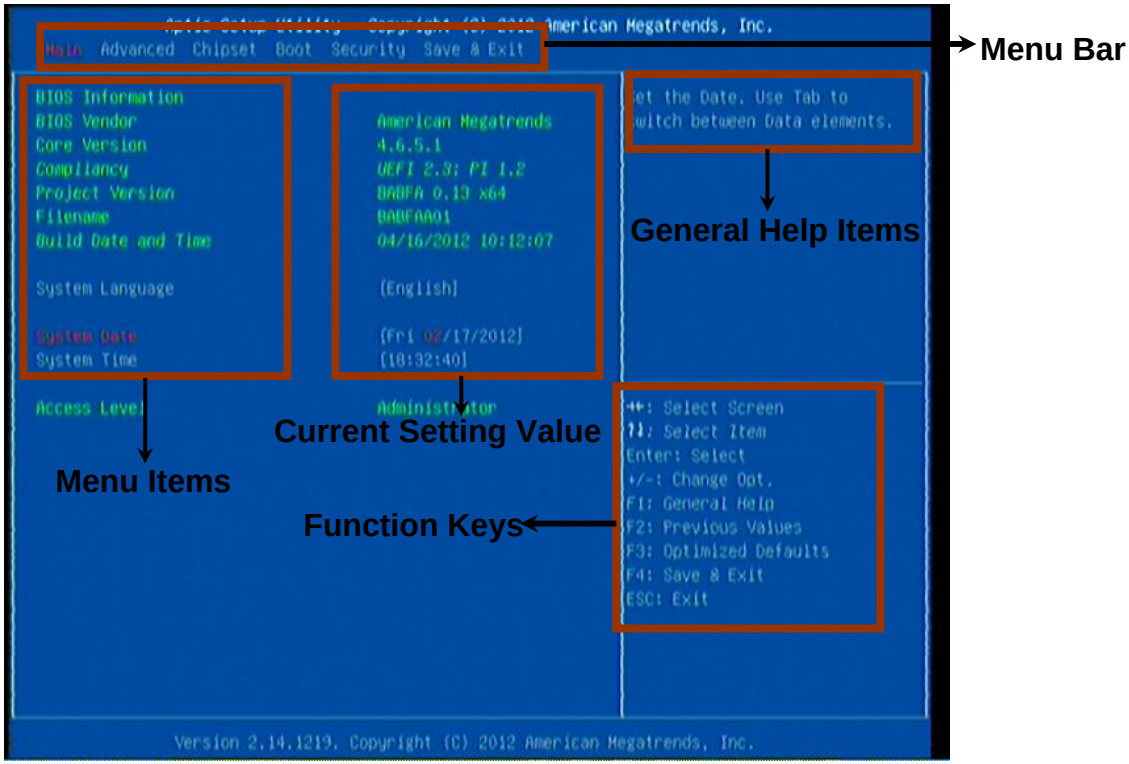
3-1 Entering Setup

Power on the computer and by pressing <Del> 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 **<Del>** to enter Setup

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 value.
- [F3]: Optimized defaults.
- [F4]: Save & Exit.
- 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 Bar

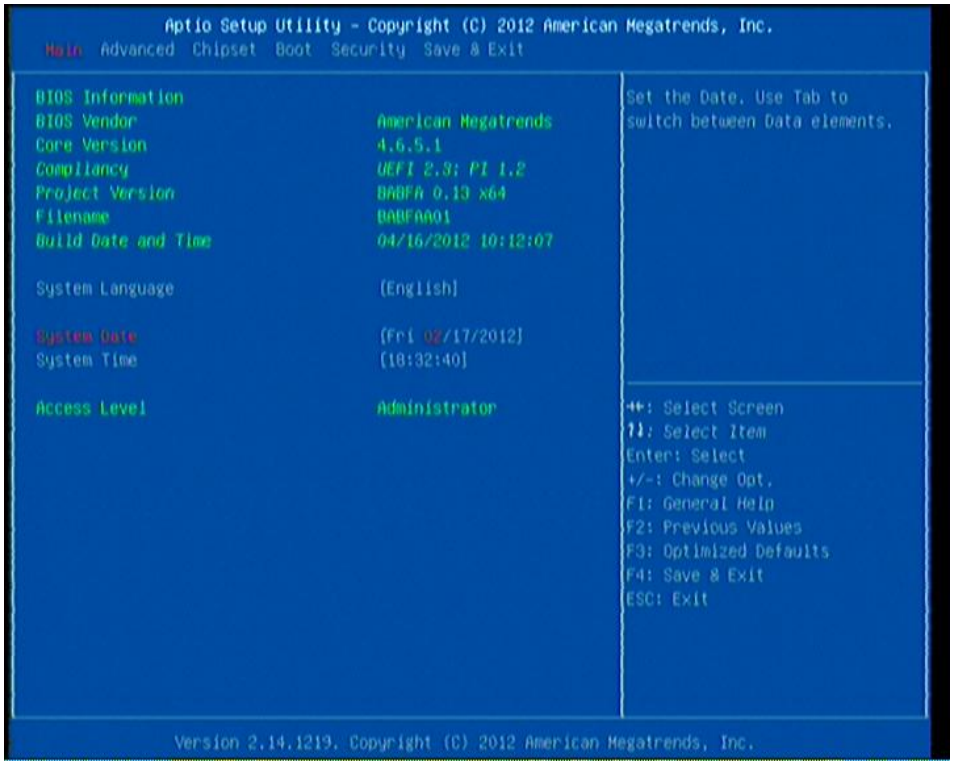
There are six menu bars on top of BIOS screen:

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
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.



Select Language

This item is for user to choose the system default language.

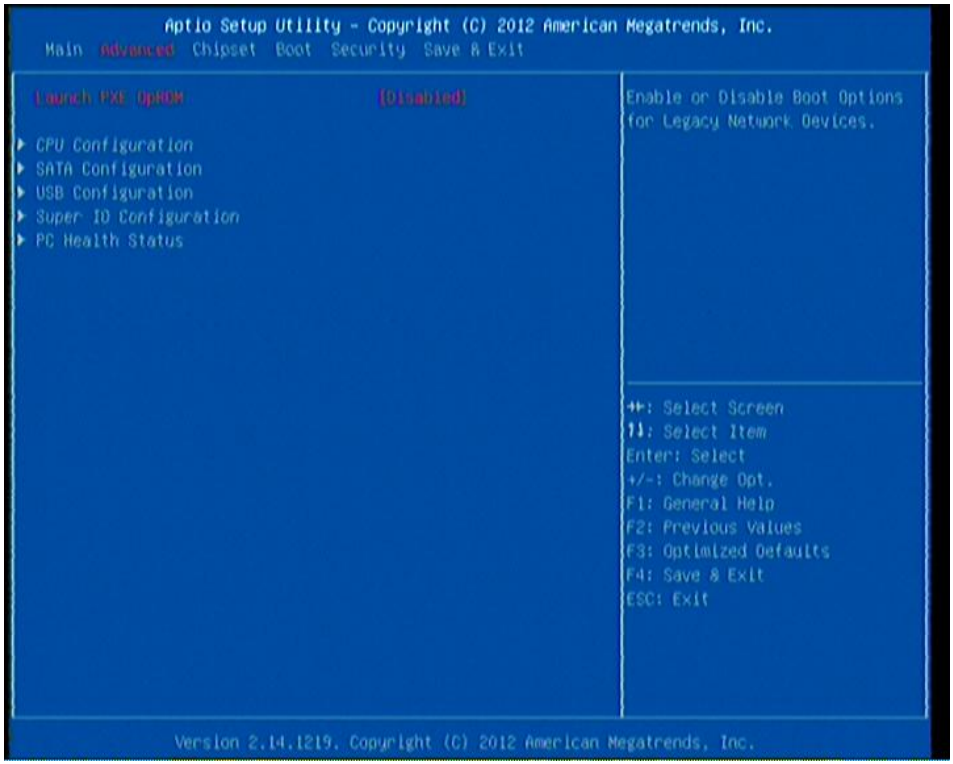
System Date

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



Launch PXE OpROM

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

CPU Configuration

Press [Enter] user can have a view of CPU basic information and make settings in sub-items.

Hyper-Threading

The optional settings are: [Disabled]; [Enabled].Set as [Enabled] for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and [Disabled] for other OS (OS not optimized for Hyper-Threading Technology). When set as [Disabled] only one thread per enabled core is enabled.

Limit CPUID Maximum

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

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

Execute Disable Bit

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

Intel Virtualization Technology

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

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

Hardware Prefetcher

Use this item to turn on/off the Mid Level Cache (L2) streamer prefetcher.

Adjacent Cache Line Prefetch

Use this item to turn on/off prefetching of adjacent cache lines.

SATA Configuration

SATA Controller (s)

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

SATA Mode Selection

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

Serial ATA Port 0 / Serial ATA Port 1

The available running disk name will show on the screen. User can choose to enable or disable the available SATA port function and choose SATA device type.

E-SATA

Use this item to enable or disable E-SATA function.

m-SATA

Use this item to enable or disable m-SATA function.

USB Configuration

Legacy USB Support

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

XHCI Hand-off

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

EHCI Hand-off

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

USB Transfer time-out

Use this item to set the time-out value for control, bulk, and interrupt transfers.

Device reset time-out

Use this item to set USB mass storage device start unit command time-out.

Device power-up delay

Use this item to set maximum time the device will take before it properly reports itself to the host controller. ‘Auto’ uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor. The optional settings: [Auto]; [Manual].Select [Manual] you can set value for the following sub-item: **Device Power-up delay in seconds,** the delay range in from 1 to 40 seconds in one second increments.

Super IO Configuration

Serial Port

Use this item to enable or disable serial port.

-Device Settings

The current device setting for serial port will show on the screen. When serial port function is set as [Disabled] this item will not appear.

-Change Settings

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

CIR Controller

Use this item to enable or disable CIR controller.

-Device Settings

The current device setting for CIR controller will show on the screen.

CIR LED

The optional settings are: [Disabled]; [Enabled].When CIR LED is enabled, the CTS of UART is disabled.

ERP Function

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.

WatchDog Timer

WatchDog Timer Control

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].

PC Health Status

Press [Enter] to view hardware health status, set SMARTFAN configuration and select system shutdown temperature.

Shutdown Temperature Configuration

Use this item to select system shutdown temperature.

CPUFAN Type/SYSFAN Type

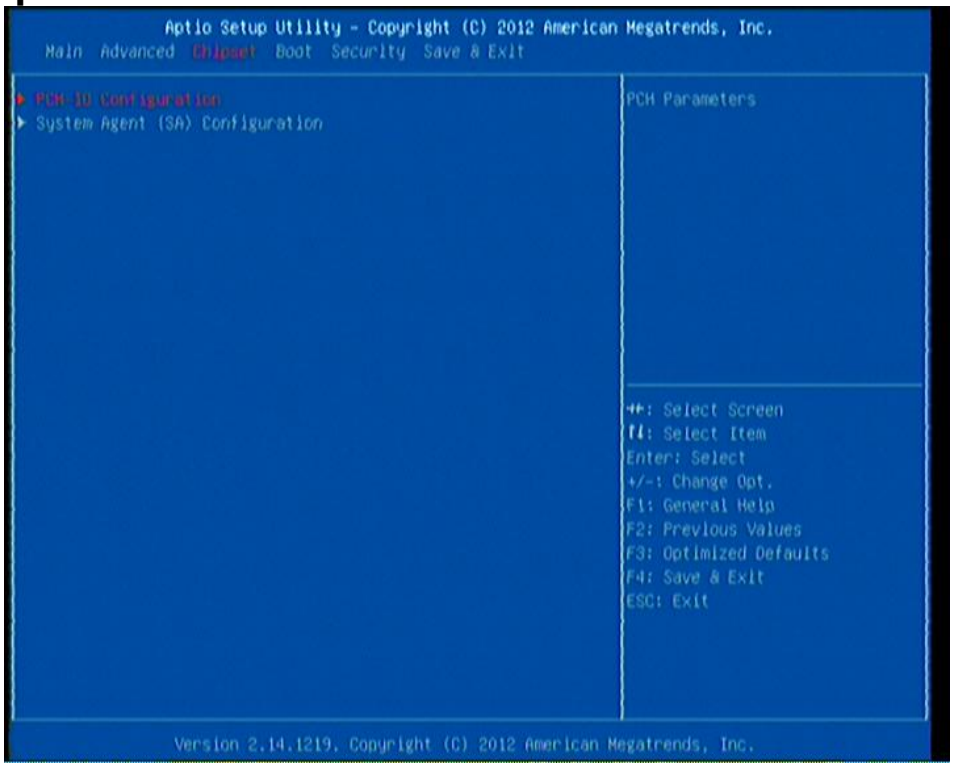
The optional settings are: [3-Pin]; [4-Pin].

SmartFan Configuration

CPUFAN Smart Mode/SYSFAN Smart Mode

Use this item to select CPUFAN smart mode and SYSFAN smart mode. When set as [Enabled], Use can set full-speed temperature, full-speed duty, idle-speed temperature and idle-speed duty for CPUFAN or SYSFAN specifically.

3-8 Chipset Menu



PCH-IO Configuration

USB 3.0 Controller

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

Mini PCIE1/ Mini PCIE2

Use this item to enable or disable Mini PCIE1 slot.

Mini-PCIE1 Speed/ Mini-PCIE2 Speed

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

Onboard PCIE LAN

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

Azalia

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

-Azalia Internal HDMI Codec

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

System State after Power Loss

The optional settings are: [Always Off]; [Always On]; [Former State].

USB Configuration

Press [Enter] to further setting USB port configuration.

EHCI1/EHCI2

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

Use this item to control USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled.

System Agent (SA) Configuration

Graphics Configuration

Press [Enter] to further setting graphics configuration.

IGFx Frequency

The current IGFx frequency will show on the screen.

GTT Size

The optional settings are: [1MB]; [2MB].

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.

DVMT Total Gfx Mem

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

DVI to CRT Dongle Support

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

Active LFP

The optional settings are: [eDP]; [LVDS]; [Disabled].

LVDS Panel Type:

Use this item to manually select LVDS panel type.

Note:** ***LVDS Panel Type *item is only available when* ***Active LFP*** *is set as [LVDS].*

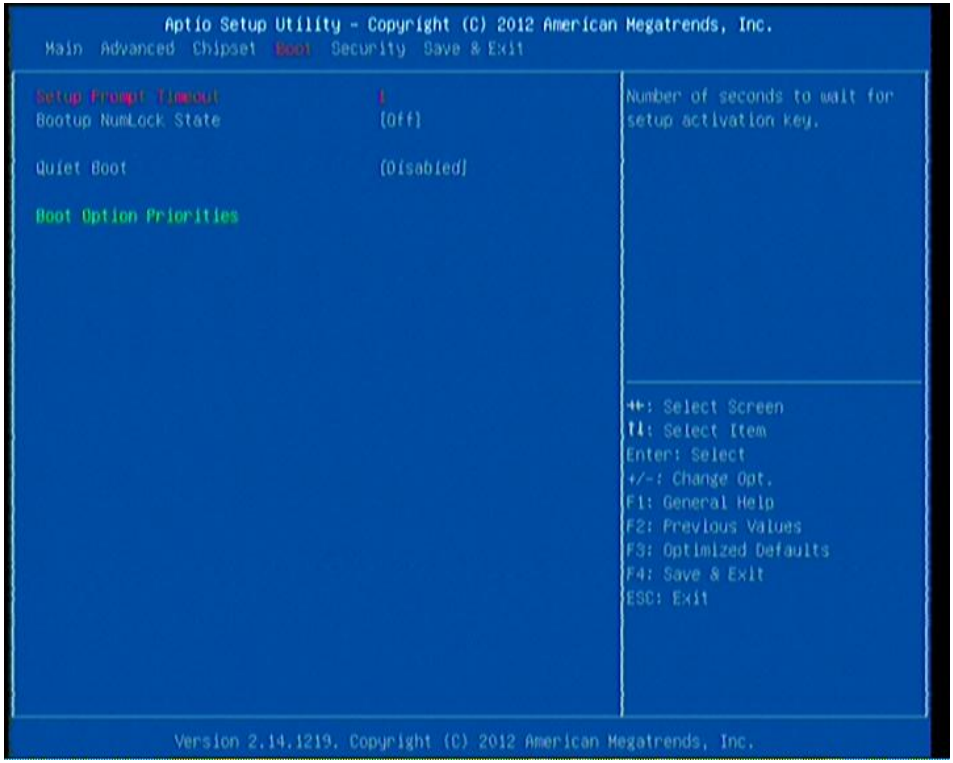
Backlight Control

The optional settings are: [PWM Inverted]; [PWM Normal].

Memory Configuration

This item is for user to press [Enter] to view current memory configuration.

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].

Quiet Boot

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

Boot Option Priorities

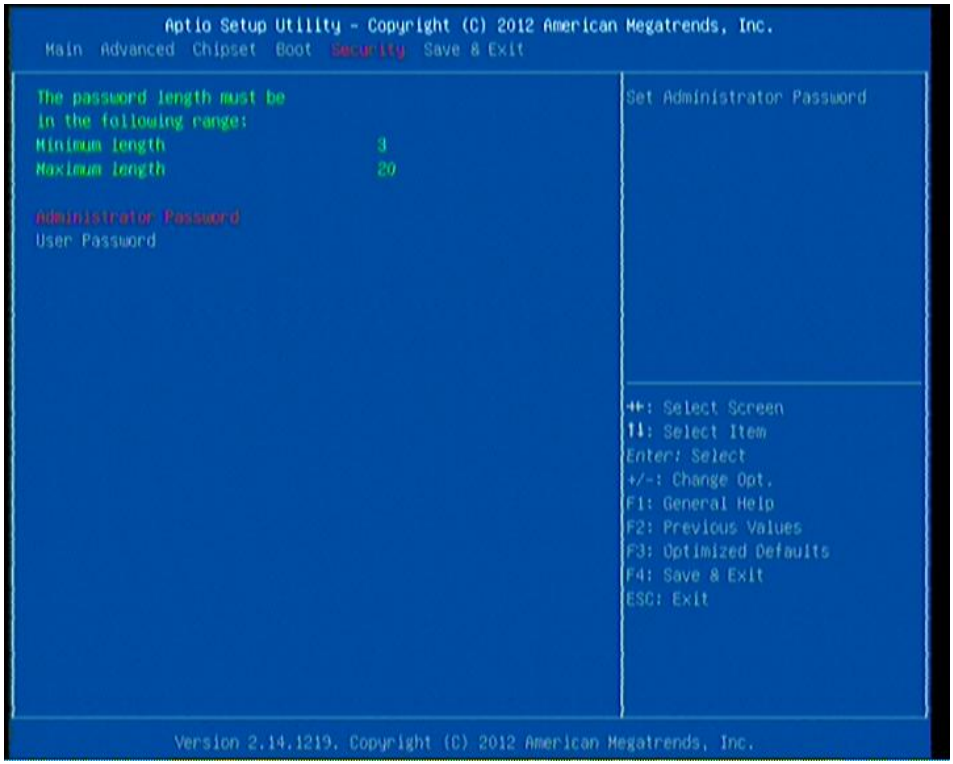
Boot Option #1

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

Hard Drive BBS Priorities

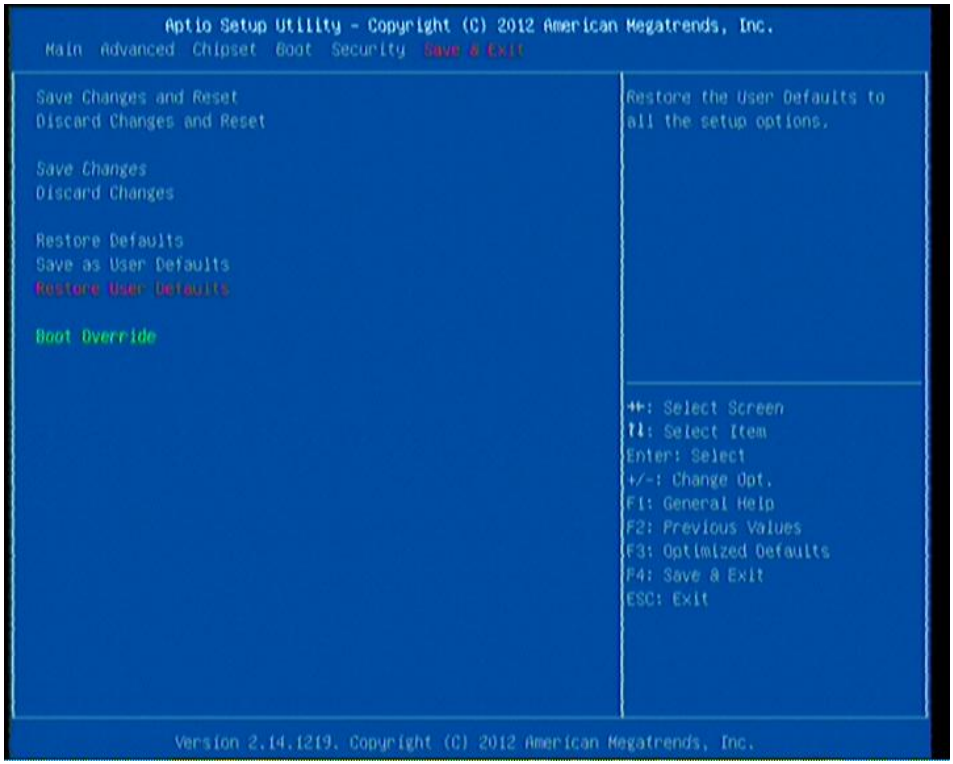
Use this item to set the order of the legacy devices in this group.

3-10 Security Menu



Security menu allow users to change administrator password and user password settings.

3-11 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 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.