User's Manual

Sapphire Pure Platinum Z68

Intel Z68 / LGA1155 Mainboard

Manual Revision 1.0

May 05, 2011

Federal Communications Commission (FCC) Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions contained in this manual, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

If this product does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the product into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Note1: Connecting this device to peripheral devices that do not comply with Class B requirements, or using an unshielded peripheral data cable, could also result in harmful interference to radio or television reception

Note2: The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this product.

Note3: To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables

CE: Radiation of EN 55022 & Immunity of EN 55024

Waste Electrical and Electronic Equipment (WEEE) Statement

To protect the global environment, this product must be sent to separate collection facilities for recovery and recycling.

DISPOSAL

Do not dispose of this product as unsorted municipal waste. Collect such waste separately for special treatment.

Table of Contents

Chapter 1 Introduction

1-1 Mainboard Specifications

CPU

➤ Supports Intel® Core i7/i5/i3 processor in the LGA1155 package

Chipset

➤ Intel® Z68 Express chipset

Graphics

➤ Intel® HD graphic

➤ Shared Memory of max. 1024MB

➤ Four independent displays supporting concurrent display of either two combination of HDMI, DVI, VGA and Display Port

Port	Supported resolution
VGA	2048x1536@75MHz
DVI-D	1920x1200@60MHz
HDMI	1920x1200@60MHz
Display Port	2560x1600@60MHz

System Memory

➤ Four 240-pin DDR3 SDRAM DIMM sockets

➤ Supports 1.5v DDR3-1066/ 1333/ 1600(OC)/ 2133(OC) DIMMs with dual channel architecture

➤ Supports x16 and x8 DIMMs, non-ECC, unbuffered DIMMs

➤ Supports up to 16GB system memory

USB Ports

➤ From Intel® Z68 chipset:

Twelve USB 2.0 ports (four at rear panel, eight onboard headers), supporting transfer speed up to 480Mbps

➤ From Asmedia USB 3.0 controller:

Two USB 3.0 ports (at rear panel) backward compatible with USB 2.0, supporting transfer speeds up to 4.8Gbps

➤ Supports wake-up from S1, S3 and S4 modes

SATA Ports

➢ From Intel® Z68 chipset :
  - Four SATA2 ports with 3Gb/s data transfer rate
  - Two SATA3 ports with 6Gb/s data transfer rate
  - Supports Intel® Rapid Storage Technology with RAID 0, 1, 10 and 5
  - Supports AHCI (Advanced Host Controller Interface)

➢ From Marvell 9172 controller:
  - Two SATA3 ports with 6Gb/s data transfer rate
  - Supports Marvell RAID 0, 1
  - Supports AHCI (Advanced Host Controller Interface)

Onboard LAN

➢ One Gigabit Ethernet from Marvell 88E8057 Gigabit controller

Bluetooth

➢ Atheros AR3011 is a highly integrated, all-CMOS, single chip with Bluetooth® 2.1 + EDR supported

Onboard Audio

➢ Supports 8-channel High-Definition audio from Realtek ALC892 codec
➢ Supports rear panel Optical S/PDIF output
➢ Supports Jack-detection function

Expansion Slots

➢ Three PCI-Express 2.0 x16 slots
➢ Three PCI slots
➢ Supports ATI®CrossFireX™ Technology

I/O

➢ Onboard Fintek F71889A LPC bus I/O controller
➢ Supports Hardware Monitoring for fan speed monitoring, CPU and system temperature

Back Panel I/O Ports

➢ 1 x PS/2 Keyboard/Mouse port
➢ 1 x Bluetooth
➢ 4 x USB 2.0 ports

- ➢ 1 x Optical S/PDIF Out connector
- ➢ 1 x Display port
- ➢ 1 x HDMI port
- ➢ 1 x VGA port
- ➢ 1 x DVI-D port
- ➢ 1 x RJ45 LAN port
- ➢ 2 x USB 3.0 ports
- ➢ 6 audio jacks

Internal I/O Connectors

- ➢ 1 x 24-pin ATX power connector
- ➢ 1 x 4-pin ATX 12V power connector
- ➢ 1 x 4-pin Molex power connector
- ➢ 4 x SATA2 connectors
- ➢ 4 x SATA3 connectors (Two from Intel Z68 and others from Marvell controller)
- ➢ 8 x USB2.0 headers
- ➢ 1 x Front Panel header
- ➢ 1 x S/PDIF header
- ➢ 1 x Front Audio header
- ➢ 1 x CPU Fan and 5 x DC Fan connectors

BIOS

- ➢ 32Mb SPI Flash with AMI based BIOS
- ➢ Supports ACPI (Advanced Configuration and Power Interface)
- ➢ Supports dual BIOS switch

Special Features

- ➢ Onboard diagnostic 7-Segment LED with CPU temperature display
- ➢ Onboard buttons include Clear CMOS, RESET and POWER
- ➢ Supports CPU Power Vcore Load-line adjust function
- ➢ Supports Windows based OC utility "Trixx" and Win7 HW monitor gadget tool

Form Factor

- ➢ ATX form factor of 305mm x 245mm

Operating systems:

- ➢ Supports Windows Vista and Windows 7

1-2 Package Contents

Your Sapphire mainboard comes with the following accessories.

1. Mainboard

2. Quick Installation Guide	3. Driver DVD

4. I/O Shield	5. SATA Data Cable *6

1-3 Mainboard Layout

The following figure shows the location of components on the mainboard.   See following page for description.
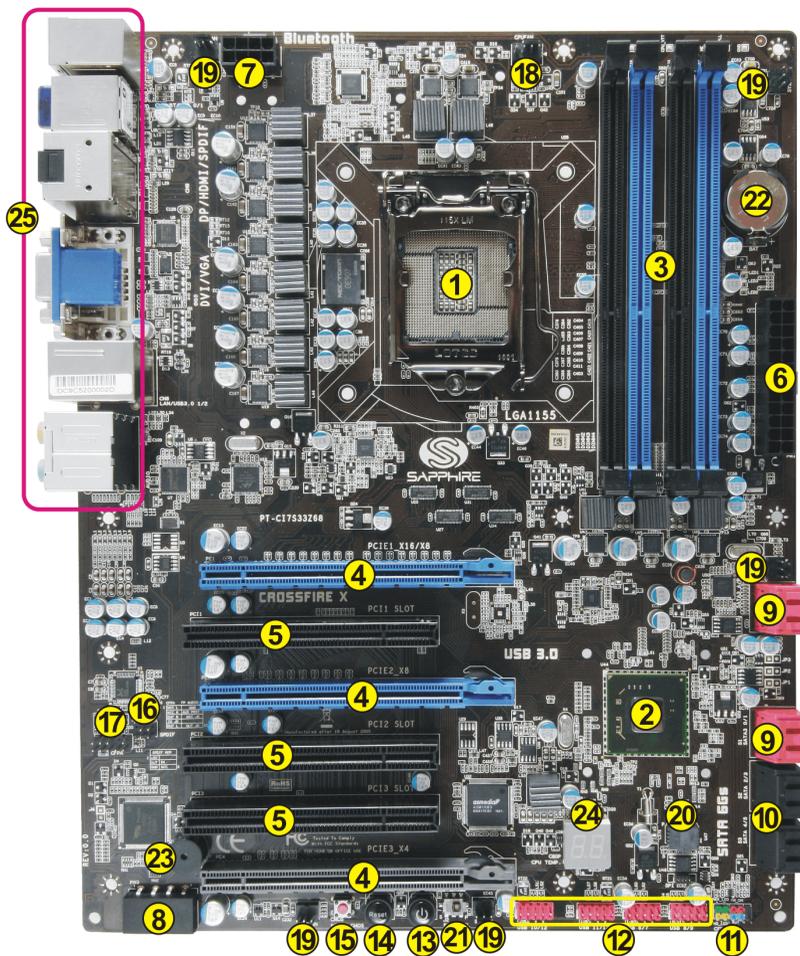
Item	Component description
1	CPU Socket 1155
2	Intel Z68 Chipset
3	DDR3 DIMM Slots 1-4
4	PCI-E x16 2.0 Slots 1-3
5	PCI Slots 1-3
6	24-Pin ATX Power Connector
7	8-pin ATX_12V Power Connector
8	4-pin Power Connector
9	SATA 3.0 Connectors *4
10	SATA 2.0 Connectors *4
11	Front Panel Header
12	USB 2.0 Headers *8
13	Power Button
14	Reset Button
15	Clear CMOS Button
16	S/PDIF Header
17	Front Panel Audio Header
18	CPU Fan Header
19	3-pin Fan Header *5
20	32Mb SPI Flash
21	Dual BIOS Switch
22	Mainboard Battery
23	PC Speaker
24	Debug LED Display
25	Back Panel Connectors (see below for detail)

I/O Back Panel

The I/O back panel for this mainboard is shown below. When installing the mainboard into the computer case, use the bundled I/O shield to protect this back panel.
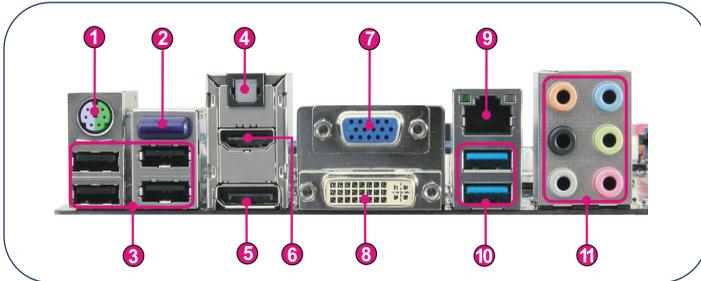
1. PS/2 Keyboard/Mouse Port
   This connector is used for a keyboard or mouse. You can plug a PS/2 keyboard or mouse directly into this connector.

2. Bluetooth
   Bluetooth wireless technology is an interface intended for wireless control/data communication

3. USB 2.0 Ports (Four)
   The mainboard provides an OHCI (Open Host Controller Interface) Universal Serial Bus root for attaching USB devices such as a keyboard, mouse or other USB-compatible devices. Supports data transfer rates up to 480Mb/s.

4. Optical S/PDIF-Out
   This SPDIF (Sony & Philips Digital Interconnect Format) connector is used for digital audio transmission to external speakers/amplifier through an optical fiber cable.

5. Display Port
   The DisplayPort is a digital display interface standard. This connector is used to connect a monitor with DisplayPort inputs.

6. HDMI Port
   The HDMI (High-Definition Multimedia Interface) provides an all-digital audio/video interface to transmit the uncompressed audio/video signals and is HDCP compliant. Connect the HDMI audio/video device to this port.

7. VGA Port
   The VGA female port provides connection to analogue VGA monitors.

8. DVI-D Port
   The DVI-D (Digital Visual Interface-Digital) port provides a high-speed digital interconnection between the computer and its display device. Connect a monitor that supports DVI-D connection to this port. The DVI-D port does not support analogue VGA monitors using a passive DVI to VGA adapter.

   Dual Display Configurations:
   This mainboard provides four ports for video output: VGA, DVI-D, HDMI and Display port. It displays combination of either two. Please refer to table below for dual display configurations supported.

Supported configurations
VGA + DVI-D
VGA + Display Port
VGA + HDMI
DVI-D + Display Port
DVI-D + HDMI
Display Port + HDMI

9. LAN Ports with LEDs
   The mainboard provides one standard RJ-45 jack for connecting to a Local Area Network (LAN). Two LEDs are built into the RJ-45 LAN connector. These LEDs indicate the status of the LAN.

LED	LED Color	LED state	Indicates
A	Green	Off	LAN link is not established
		On	LAN link is established
		Blinking	LAN activity is occurring
B	N/A	Off	10 Mb/s data rate
	Green	On	100 Mb/s data rate
	Yellow	On	1000 Mb/s data rate

10. USB 3.0 ports (two)
    USB 3.0 ports are backwardly compatible with USB 2.0 devices. Supports data transfer rates up to 4.8Gb/s (SuperSpeed).

11. Audio ports

This mainboard provides 2, 6 or 8 channel audio. It is easy to differentiate between the audio functions by referring to the color of the jacks.

Ports	2 channel	6 channel	8 channel
Blue	Line-In	Line-In	Line-In
Lime	Line-Out	Front Stereo-Out	Front Stereo-Out
Pink	Min-In	Min-In	Min-In
Orange	--	Center/Subwoofer	Center/Subwoofer
Black	--	Rear Stereo-Out	Rear Stereo-Out
Gray	--	--	Side Stereo-Out

Chapter 2 Installation

2-1 Before You Begin

Please take note of all precautions before you install anything on to the mainboard or change any of the mainboard settings.

Turn off the power to your system and discharge your body's static electric charge by touching a grounded surface—for example, the metal surface of the power supply—before performing any hardware procedure.

The manufacturer assumes no liability for any damage, caused directly or indirectly, by improper installation of any components by unauthorized service personnel. If you do not feel comfortable performing the installation, consult a qualified computer technician.

Damage to system components, the mainboard, and injury to you may result if power is applied during installation.

2-2 Installing the I/O Shield

The mainboard comes complete with an I/O shield. When installed in the chassis, the shield blocks radio frequency transmissions, protects internal components from dust and foreign objects, and promotes correct airflow within the chassis.

Install the I/O shield before installing the mainboard in the chassis. Place the shield inside the chassis. Press the shield into place so that it fits tightly and securely. If the shield does not fit, obtain a properly sized shield from the chassis supplier.

2-3 Securing to the Chassis

When installing the mainboard, you have to secure the mainboard into the chassis by fastening with nine screws. Please refer to your chassis manual for instructions on installing.

2-4 Installing the CPU and Fan Heatsink

To install the CPU:

1. Open the socket lever by pushing the lever down and away from the socket. Remove the protective socket cover from the socket. Do not touch the socket contacts.

   ✿ Note:
   Do not discard the protective socket cover. Be sure to always replace the cover unless the CPU is installed.

2. Align the CPU notches to the socket protrusions. Place CPU straight down without tilting or sliding it.

3. Close the load plate and engage the socket lever.

4. To install fan heatsink, align the holes on the mainboard. Press the four hooks down to fasten the cooler. You will hear a "click" upon full engagement. Gently rotate the cap clockwise 1/4 turn to fasten the heatsink onto the mainboard

5. Connect the 4-wire fan cable to the 4-pin CPUFAN header on the mainboard.
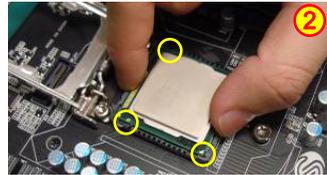
PS:
Pictures for installation reference only, the actual board may be slightly different.

2-5 Installing System Memory

This mainboard has four 240-pin DIMM sockets for DDR3 memory. These slots support 1GB, 2GB and 4GB DDR3 DIMMs up to max. 16GB

Make sure that you install memory modules of the same type and density in different channel DIMM slots for Dual-Channel mode.

There must be at least one memory bank populated to ensure normal operation and always insert the memory module into the DIMM slot 2 first.

Memory configurations

Use the following the recommendations for installing memory.

DIMM Quantity / Location	1 DIMM (Single Channel)	2 DIMMs (Dual Channel)	3 DIMMs (Dual Channel)	4 DIMMs (Dual Channel)
DIMM#1 (Black)	--	--	V	V
DIMM#2 (Blue)	V	V	V	V
DIMM#3 (Black)	--	--	--	V
DIMM#4 (Blue)	--	V	V	V

(" V" = Memory installed, "--" = No memory installed)

Memory Installation

DDR3 and DDR2 memory modules are physically different. Please only install DDR3 DIMMs in this mainboard.

To install the DIMM, follow these steps:

1. Pull both clips on either side of the slot outwards. Align the DIMM module with the slot.

2. Press straight down until the plastic clips close and the module fits tightly into the DIMM slot.

2-6 Installing Expansion Cards

The mainboard provides three PCI Express 2.0 x16 slots and three PCI slots.

PCIE1_X16/X8
PCI-E2.0 x16 slot (with x16/x8 link, Blue)

PCI1 slot (Black)

PCIE2_X8
PCI-E2.0 x16 slot (with x8 link, Blue)

PCI2 slot (Black)

PCI3 slot (Black)

PCIE3_X4
PCI-E2.0 x16 slot (with x4 link, Gray)
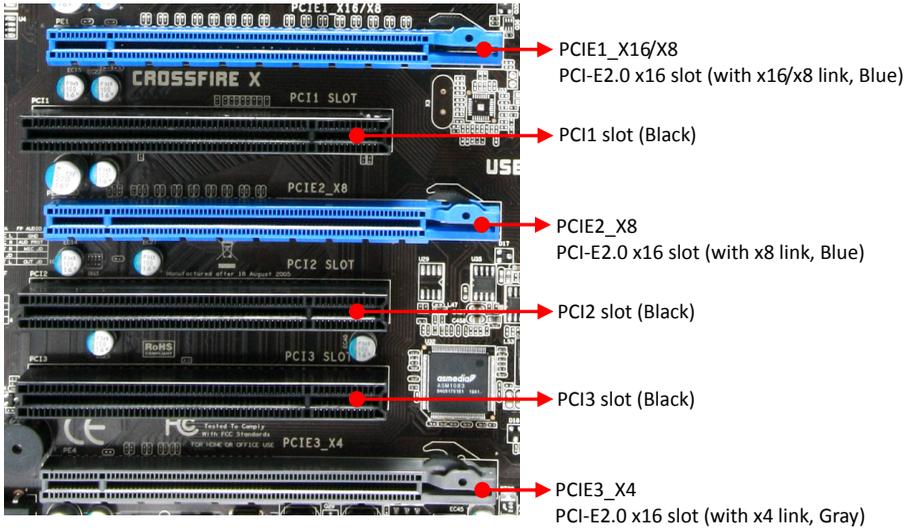
PCI-E Slots

The design of this motherboard supports ATI CrossFireX[TM] technology for multiple graphic cards. Please refer to the location of slots and recommended configuration table for PCI-E operating mode to get the best performance possible.

Recommended configuration table			
Slot location \ VGA card	PCIE1_x16/x8 (Blue)	PCIE2_x8 (Blue)	PCIE3_x4 (Gray)
1 VGA card	x16		
2 VGA cards	x8	x8	
3 VGA cards	x8	x8	x4

To install a PCI Express card:

1. Place the card in an available PCI Express slot and press down on the card until it is completely seated in the slot. If the card is not seated properly, it could cause a short across the pins.
2. Secure the card's metal bracket to the chassis back panel with a screw.

PCI Slots

The PCI slots provided supports a variety of expansion cards such as a LAN card, USB card, SCSI card and other cards that comply with PCI specifications. When installing a card into the PCI slot, be sure that it is fully seated. Secure the card's metal bracket to the chassis back panel.

2-7 Connecting Cables

This section takes you through all the necessary connections on the mainboard.

Connecting Power Supply Cables

•   24-pin ATX Power

PW1 is the main power supply connector. Make sure that the power supply cable pins are properly aligned with the connector on the mainboard. Firmly plug the power supply cable into the connector and make sure it is secure.

🔌 Note: If you'd like to use the 20-pin ATX power supply, please plug in your power supply cable aligned with pins 1 & 13. The 24-pin main power connector is backwardly compatible with ATX power supplies with 20-pin connectors.

•   8-pin ATX 12V Power

PW2, the 8-pin ATX 12V power connector, is used to provide power to the CPU. Align the power plug to the connector and press firmly until seated.

•   4-pin Molex Power

PW3, the 4-pin power connector, is used to provide extra 12V / 5V power to your system. When installing multiple graphic cards, you can connect power supply here to ensure sufficient power supply to the PCI-E slots.

24-pin ATX Power connector   8-pin ATX Power connector   4-pin Molex Power connector
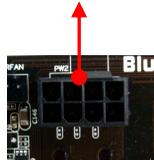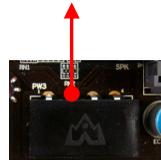
Connecting Serial ATA (SATA) Cables

SATA cables support the Serial ATA protocol. Each cable can be used to connect one internal SATA drive to the mainboard.

The black coloured connectors (S2 and S3) are controlled by the Intel Z68 Chipset and operate at speeds up to 3 Gb/s.

The red coloured connectors (S1 controlled by the Intel Z68 Chipset and S6 controlled by the Marvell 9172 chip) are SATA3 compliant and work at speeds of up to 6 Gb/s.

S3: SATA 2.0
SATA 4 (bottom)
SATA 5 (top)

S2: SATA 2.0
SATA 2 (bottom)
SATA 3 (top)

S1: SATA 3.0
SATA 0 (bottom)
SATA 1 (top)

S6: SATA 3.0
SATA A (bottom)
SATA B (top)
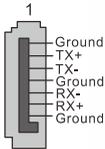
Attach one end of the SATA cable to one of the SATA connectors on the board and attach the other end of the cable to the SATA drive

Connecting to the Internal Headers and Connectors

Front Panel Header

The front panel header on this motherboard is used to connect the front panel switches and LEDs.

▶PWR_LED

Attach the front panel power LED cable to these two pins of the connector. The Power LED indicates the system's status.

System Status	Power LED indicates
On	The LED is on
Off	The LED is off
S1	The LED is on
S3	The LED will blink
S4	The LED is off

▶PW_ON

Attach the power button cable from the case to these two pins. Pressing the power button on the front panel turns the system on and off rather than using the onboard button.

▶HD_LED

Attach the hard disk drive indicator LED cable to these two pins. The HDD indicator LED indicates the activity status of the hard disks.

▶RESET

Attach the Reset switch cable from the front panel of the case to these two pins. The system restarts when the RESET switch is pressed.
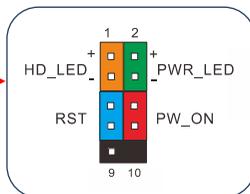
Header	Pin	Signal
HD_LED	1	HD_PWR
	3	HD Active
PWRLED	2	PWR LED+
	4	PWR LED-
RESET	5	Ground
	7	RST BTN
PWRSW	6	PWR BTN
	8	Ground
No Connect	9	+5V
Empty	10	Empty

USB2.0 Headers

This mainboard contains four (4) USB 2.0 ports that are exposed on the rear panel of the chassis. This mainboard also contains four 10-pin onboard header connectors that can be used to connect to eight (8) external USB 2.0 devices.

Refer to the following steps:
1. Secure the bracket to either the front or rear panel of your chassis (not all chassis are equipped with the front panel option).
2. Connect the cable(s) to the USB 2.0 header on the mainboard.
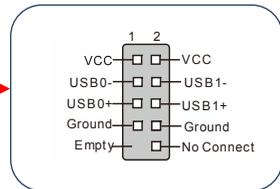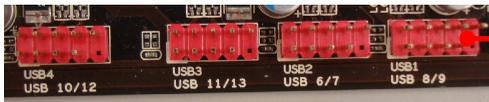
CFPA Header

This header allows you to connect the front panel audio. The audio connector supports HD audio standard.
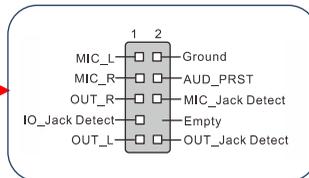
S/PDIF Header

This header is used to connect S/PDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission.
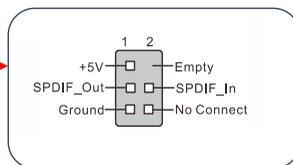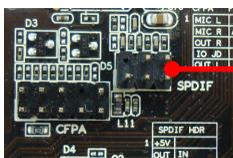
Fan Headers

There are six fan headers (CPUFAN, SYSFAN, SYSFAN1, PWRFAN, CHAFAN, AUXFAN) on the motherboard. Three of these fans (CPUFAN, PWRFAN, CHAFAN) can be speed detected/controlled and displayed in the Hardware Health Configuration section of the CMOS Setup. The fans are automatically turned off after the system enters S3, S4 or S5 mode.

PWRFAN   CPUFAN   SYSFAN1

CPUFAN
1
Ground
+12V
Sense
Control

Note:
The CPU fan cable can be either a 3-pin or a 4-pin connector. Connect a 3-pin connector to pins 1, 2, and 3on the mainboard connector.

PWRFAN / CHAFAN
1
Ground
+12V
Sense

SYSFAN / SYSFAN1 / AUXFAN
1
Ground
+12V
NC

CHAFAN   SYSFAN   AUXFAN
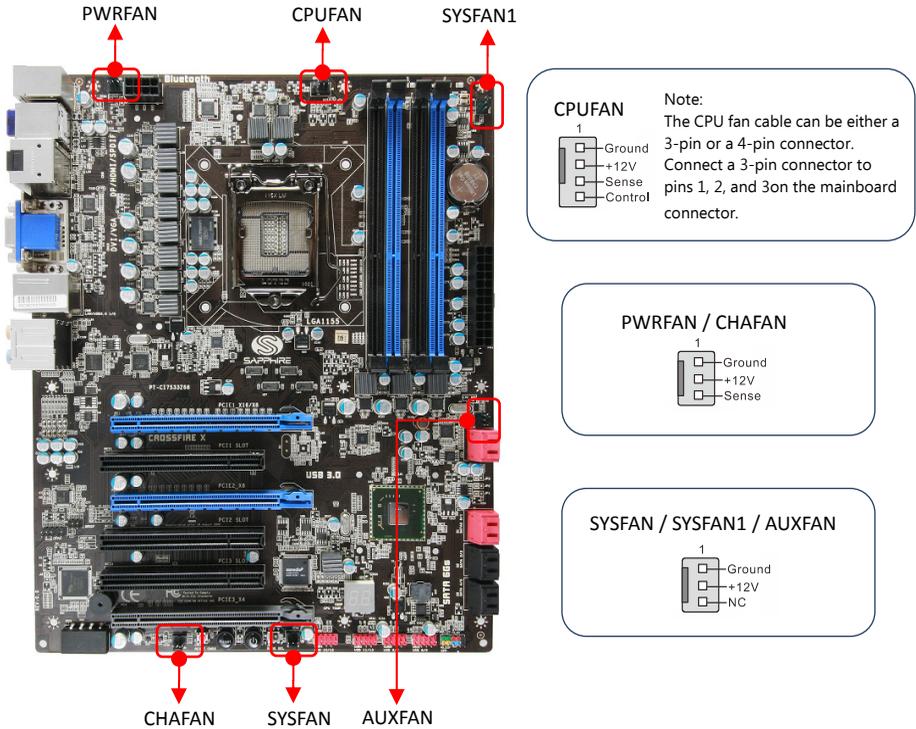
2-8 Diagnostics LED

This mainboard provides a two-digit POST code to show why the system may be failing to boot. It is useful during a troubleshooting situation. This Debug LED will also display the current CPU temperature after the system has fully booted into the operating system.

Please find a list of debug codes at the end of this manual.

Debug LED
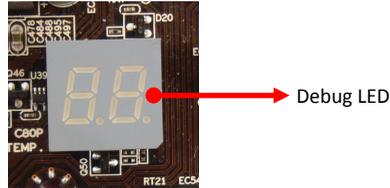
2-9 LED Status Indicators

This mainboard provides three LEDs to indicate the system's status.

- DIMM LED (LED1, Yellow): When the Memory slot is functional: This LED is on.

- STANDBY LED (LED3, Blue): When the System is in Standby Mode: This LED is on. This LED will remain on as long as the motherboard is receiving constant power.

- POWER LED (LED2, Green): When the System is powered on: This LED is on.

DIMM LED

Standby LED

Power LED

2-10 Onboard Buttons

These onboard buttons include Clear CMOS, RESET and POWER, which allow you to easily clear the CMOS, reset the system and turn on/off the system.

Clear CMOS Button

The mainboard uses the CMOS RAM to store some of the system configuration. The CMOS can be cleared by pressing the Clear CMOS button.

Reset and Power Button

These onboard buttons allow you to easily turn on/off the system and allow for easy debugging and testing of the system during troubleshooting situations.

The Reset button with LED indicates the activity status of the hard disk drives and will blink accordingly.

The Power button with LED indicates the system's status. When the system is powered on, the LED blinks red.

Clear CMOS Button   Reset Button   Power Button
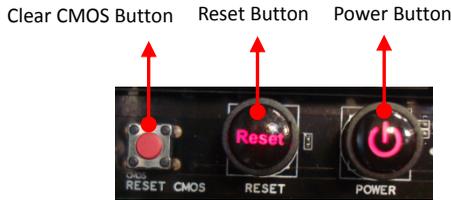
2-11 Dual BIOS Switch

This mainboard includes dual onboard BIOS, (Primary and Secondary BIOS), When the primary BIOS is corrupted or has failed, you can use the secondary BIOS to take over on the next system boot to ensure normal system operation.

To enable the secondary BIOS, please refer to the following steps:

1. Turn off the system power.
2. Change the BIOS Select jumper from "P" to "S" position.
3. Turn on the system power.

Primary BIOS
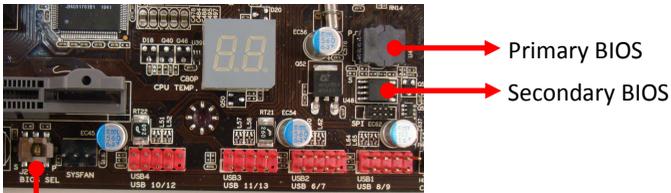
Secondary BIOS

BIOS Select Switch
(When the Secondary BIOS is in operation, the LED indicator is on.)

Chapter 3 Configuring the BIOS

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.

3-1 Select Boot Device

Select Boot Device Menu allows you to set the first boot device without entering BIOS Setup.

During Power On Self Test (POST), you can press the <**F7**> key to enter select boot device menu. The system will directly boot from the device configured in Boot Menu.

```
┌─────────────────────────────────────────┐
│                                          │
│        Please Select boot device:        │
│                                          │
│  P1: DVDRW STA 24X24X12X                 │
│  P0: WDC WD3200AAKS-00VV3A0              │
│  Enter Setup                             │
│                                          │
│      ↑ and ↓ to move selection           │
│      ENTER to select boot device         │
│      ESC to boot using defaults          │
│                                          │
└─────────────────────────────────────────┘
```
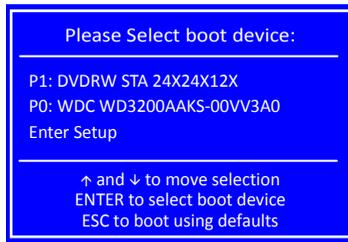
3-2 Enter BIOS Setup

The BIOS is the communication bridge between hardware and software. Correctly setting the BIOS parameters is critical to maintain optimal system performance.

Use the following procedure to change BIOS settings.

1. Power on the computer.
2. Press the <**Del>** or <**F2>** key when the following message briefly shows upon the bottom of the display during Power On Self Test (POST).

    Press F1 to continue, DEL to enter Setup.

Pressing Del takes you to the BIOS Aptio Setup Utility.

🐟 Note1: It is strongly recommended that you do not change the default BIOS settings. Changing some settings could damage your computer.

🐟 Note2: The BIOS options in this manual are for reference only. 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 from our official website

ControlKeys

Please check the following table for the function description of each Controlkey.

Control Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Enter>	To bring up the selected screen
<F1>	To display the General Help Screen
<F2>	To load previous values for all the settings
<F3>	To load optimal default values for all the settings
<F4>	To save changes and exit the SETUP UTILITY
<ESC>	To jump to the Exit Screen or exit the current screen

3-3 Main Menu

When entering the Aptio Setup Utility, the main menu screen appears. This main menu includes the system overview and displays the basic system configuration, such as BIOS information, memory size and system date/time.

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main    Performance   Advanced    Chipset    Boot    Security    Save & Exit

 BIOS Information                                          Set the Date. Use Tab to
 BIOS Vendor              American Megatrends              switch between Data
 Core Version             4.6.4.0                          elements.
 Compliance               UEFI 2.0
 Project Version          1APHG 0.67 x64
 Build Date and Time      03/25/2011 11:38:13

 Memory Information                                       →←:   Select Screen
 Total Memory             4096 MB (DDR3 1333)             ↑↓:   Select Item
                                                          Enter: Select
 System Date              [Fri 03/25/2011]                +/-:   Change Opt.
 System Time              [13:33:51]                      F1:    General Help
                                                          F2:    Previous Values
 Access Level             Administrator                   F3:    Optimized Defaults
                                                          F4:    Save and Exit
                                                          ESC:   Exit

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```

BIOS Information

This field displays the current BIOS version, build date and ID information etc..

Memory Information

Displays current system memory size.

System Date

Allows you to set the system date.The format is <Day><Month><Date><Year>.

  [Day]   Weekday from Sun. to Sat., this is automatically displayed by BIOS.

  [Month] The month from 1 to 12.

  [Date]   The date from 1 to 31 can be keyed by numeric function keys.

  [Year]   The year can be adjusted by users.

System Time

Allows you to set the system time. The time format is
<hour>:<minute>:<second>.

Access Level

This item is used to limit the user access level.

3-4 Performance Menu

The Performance menu allows you to specify your settings for CPU, memory, voltage control and overclocking. Press <Enter> to display the configuration options.

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main    Performance    Advanced    Chipset    Boot    Security    Save & Exit

   ▶ CPU/GPU Configuration                              CPU/GPU Configuration
   ▶ Memory Configuration
   ▶ Voltage Configuration


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

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```

▶ **CPU/GPU Configuration**

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
            Performance

   Intel Graphics Configuration                         Graphics Core Ratio Limit
   Graphics Core Ratio Limit          22
   Graphics Voltage                   [+0.000V]

   Intel Graphics Configuration
   Internal PLL Overvoltage           [Disabled]
   Non Turbo Ratio Override           33
   Host Clock Override(1/100 MHz)     10000
   Host Clock Spread Control          [Disabled]      →←:   Select Screen
   CPU C6 Report                      [Enabled]       ↑↓:   Select Item
   Enhanced Intel SpeedStep Technology [Enabled]      Enter: Select
   Turbo Mode                         [Enabled]       +/-:  Change Opt.
   1 Core Ratio Limit                 37              F1:   General Help
   2 Core Ratio Limit                 36              F2:   Previous Values
   3 Core Ratio Limit                 35              F3:   Optimized Defaults
   4 Core Ratio Limit                 34              F4:   Save and Exit
                                                      ESC:  Exit

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```

Graphics Core Ratio Limit
Allows you to set a core ratio limit for graphics.

Graphics Voltage
Allows you to adjust the on board graphics voltage.
Options: +0.0000V ~+1.000V in 0.004V increments.

Internal PLL Overvoltage
This feature is only support on K-SKU CPUs for overclocking.
Options: Enabled, Disabled.

Non Turbo Ratio Override
This is used to select the Ratio or Multiplier of the CPU, this varies depending on what CPU you have.

Host Clock Override(1/100 MHz)
Selects the value for Host Clock Override. The value range is 100MHz ~300MHz. The 1000 means 100MHz.

Host Clock Spread Control
Select Enabled for EMI control.
Options: Enabled, Disabled.

CPU C6 report
Enable/Disable CPU C6(ACPI C3) report to OS
Options: Enabled, Disabled.

Enhanced Intel SpeedStep Technology
Enables the Intel®SpeedStep technology (EIST).
Options: Enabled, Disabled.

Turbo Mode
Enables the processor cores to run faster than marked frequency in specified condition.
Options: Enabled, Disabled.

▶ Memory Configuration

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
              Performance

Memory SPD Profile                 [Standard]        Memory SPD Profile
Memory Multiplier                  [13.33]
CAS# Latency (tCL)                 9
RAS# to CAS# Delay(tRCD)           9
Row Precharge Time(tRP)            9
RAS# Active Time(tRAS)             24
Write Recovery Time(tWR)           10               →←:   Select Screen
Row Refresh Cycle Time(tRFC)       74               ↑↓:   Select Item
Write to Read Delay(tWTR)          5                Enter: Select
Active to Active Delay(tRRD)       4                +/-:   Change Opt.
Read CAS# Precharge(tRTP)          5                F1:    General Help
Four Active Windows Delay(tFAW)    20               F2:    Previous Values
Command Rate                       [Auto]           F3:    Optimized Defaults
                                                    F4:    Save and Exit
                                                    ESC:   Exit

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```

Memory SPD Profile

Allows the BIOS to read the SPD data on memory module to enhance memory performance.

Options: Standard, Profile 1, Profile 2.

Memory Multiplier

Allows you to select the system memory multiplier.

Options: Auto, 10.67, 13.33, 16, 18.67, 21.33.

CAS# Latency (tCL)

Set the CAS latency time.

Options: 3 ~ 15.

RAS# to CAS# Delay(tRCD)

Set the RAS to CAS Delay time for Read/Write commands to the same bank.

Options: 3 ~ 15.

Row Precharge Time(tRP)

Set the Row Precharge time. This is the Precharge-to-Active or Auto-to-Refresh of the same bank.

Options: 3 ~ 15.

RAS# Active Time(tRAS)

Set the minimum RAS# active time.

Options: 9 ~ 63.

Write Recovery Time(tWR)
Set the internal Write to Read recovery time.
Options: 3 ~ 31.

Row Refresh Cycle Time(tRFC)
Set the minimum refresh recovery time.
Options: 15 ~ 255.

Write to Read Delay(tWTR)
Set the internal Write to Read command delay.
Options: 3 ~ 31.

Active to Active Delay(tRRD)
Set the Row Active to Row Active delay.
Options: 4 ~ 15.

Read CAS# Precharge(tRTP)
Set the Read to Precharge delay.
Options: 4 ~ 15.

Four Active Windows Delay(tFAW)
Set the Four Active Windows Delay.
Options: 4 ~ 63.

Command Rate
This setting controls the DRAM command rate.
Options: Auto, 1T, 2T.

▶ **Voltage Configuration**

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
              Performance

    Voltage Configuration                                  Loadline Control

    Loadline Control               [Enabled]
    CPU Thermal                    [Enabled]
    CPU Vcore                      [Auto]
    DIMM Voltage                   [Auto]
    DIMM DQA Voltage               [Auto]
    DIMM DQB Voltage               [Auto]
    PCH VCore                      [Auto]         →←:  Select Screen
    CPU VSA                        [Auto]         ↑↓:  Select Item
    CPU PLL VCore                  [Auto]         Enter: Select
    CPU VTT                        [Auto]         +/-:  Change Opt.
    CPU PWM Frequency              [340KHz]       F1:   General Help
    PWM PWM Frequency              [250KHz]       F2:   Previous Values
    VTT PWM Frequency              [250KHz]       F3:   Optimized Defaults
                                                  F4:   Save and Exit
                                                  ESC:  Exit

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```

Loadline Control

Loadline Control function is a safety measure to protect the CPU.
Options: Enabled, 75%, 62% , 50% , 37%, 25% ,12%, Disabled.

CPU Thermal

When enabled, the CPU core frequency and voltage will be reduced if the CPU is overheated.
Options: Enabled, Disabled.

CPU Vcore
Allows you to adjust the CPU Vcore voltage.
Options: Auto, 1.000V ~2.100V in 0.01V increments.

DIMM Voltage
Allows you to adjust the DIMM Slot voltage.
Options: Auto, 1.10V ~1.50V in 0.05V increments and 1.51V ~2.00V in 0.01V increments.

DIMM DQA Voltage
Allows you to adjust the DQA Voltage of DIMM Slot voltage.
Options: Auto, 0.75V ~1.38V in 0.01V increments.

DIMM DQB Voltage
Allows you to adjust the DIMM DQB of DIMM Slot voltage.
Options: Auto, 0.75V ~1.38V in 0.01V increments.

CPU VTT

Allows you to adjust the CPU VTT voltage.

Options: 1.100V ~2.000V in 0.025V increment

PCH VCore

Allows you to adjust the Intel PCH VCore Voltage.

Options: Auto, 1.050V ~2.625 in 0.025V increments.

CPU VSA

Allows you to adjust the CPU VSA Voltage.

Options: Auto, 0.925V ~2.5 in 0.025V increments.

CPU PLL VCore

Allows you to adjust the CPU PLL VCore Voltage .

Options: 1.050V ~1.675V in 0.125V increments and 1.800V ~2.680V in 0.025V increments.

CPU VTT

Allows you to adjust the CPU VTT Voltage.

Options: 1.100V ~2.500V in 0.025V increment

CPU PWM Frequency

Allows you to adjust the CPU PWM Frequency.

Options: 340KHz, 380KHz, 430KHz, 480KHz, 600MHz.

DIMM PWM Frequency

Allows you to adjust the DDR PWM Frequency

Options: 250KHz, 500KHz.

VTT PWM Frequency

Allows you to adjust the VTT PWM Frequency

Options: 250KHz, 500KHz.

3-5 Advanced Menu

The Advanced menu items allow you to change the settings for the CPU, USB and other system devices. Press <Enter> to display the configuration options.

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
──────────────────────────────────────────────────────────────────────────
 Main    Performance    Advanced    Chipset    Boot    Security    Save & Exit
──────────────────────────────────────────────────────────────────────────
 Legacy OpROM Support                              Enables or disable Boot option
 Launch PXE OpROM           [Disabled]             for legacy network devices
 Launch Storage OpROM       [Enabled]

 ▶ PCI Subsystem Settings
 ▶ ACPI Settings
 ▶ CPU Configuration                               →←:  Select Screen
 ▶ SATA Configuration                              ↑↓:  Select Item
 ▶ USB Configuration                               Enter: Select
 ▶ F71889 Super IO Configuration                   +/-:  Change Opt.
 ▶ H/W Monitor                                     F1:   General Help
 ▶ Onboard Device                                  F2:   Previous Values
                                                   F3:   Optimized Defaults
                                                   F4:   Save and Exit
                                                   ESC:  Exit
──────────────────────────────────────────────────────────────────────────
        Version 2.11.1210.   Copyright (C) 2011 American Megatrends, Inc.
```

Launch PXE OpROM
Enables the Boot option for legacy network devices.
Options: Enabled, Disabled.

Launch Storage OpROM
Enables the Boot option for mass storage devices with option ROM.
Options: Enabled, Disabled.

▶ PCI Subsystem Settings

```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                            Advanced

  PCI Bus Driver Version          V 2.03.00            Value to be programmed into
                                                       PCI Latency Timer Register.
  PCI Common Settings
  PCI Latency Timer               [32 PCI Bus Clocks]
  VGA Palette Snoop               [Disabled]

  PCI Express Device Settings
  Relaxed Ordering                [Disabled]          →←:  Select Screen
  Extended Tag                    [Disabled]          ↑↓:  Select Item
  No Snoop                        [Enabled]           Enter: Select
  Maximum Payload                 [Auto]              +/-:  Change Opt.
  Maximum Read Request            [Auto]              F1:   General Help
                                                      F2:   Previous Values
  PCI Express Link Settings                           F3:   Optimized Defaults
  ASPM Support                    [Disabled]          F4:   Save and Exit
  WARNING: Enabling ASPM may cause some               ESC:  Exit
           PCI-E devices to fail
  Extended Synch                  [Disabled]

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```

PCI Latency Timer

Allows you to select the value in units of PCI clocks for PCI device latency timer.
Options: 32/64/96/128/160/192/224/248 PCI Bus Clocks

VGA Palette Snoop

When set to [Enabled], the palette snooping feature informs the PCI devices that
an ISA graphics device is installed in the system so that the latter can function
correctly.
Options: Enabled, Disabled

Relaxed Ordering

Enables the PCI Express device Relaxed Ordering.
Options: Enabled, Disabled.

Extended Tag

Allows device to use 8-bit TAG field as a requester.
Options: Enabled, Disabled

No Snoop

Enables the No Snoop function of PCI Express device.
Options: Enabled, Disabled.

Maximum Payload

Sets the Maximum Payload size of PCI Express Device or allows the system BIOS
to select the value.

Options: Auto, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes.

Maximum Read Request
Sets the Maximum Read Request of PCI Express Device or allows the System BIOS to select the value.
Options: Auto, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes.

ASPM Support
Sets the ASPM level, select "Force L0" can force all links to L0 state.
Options: Disabled, Auto, Force L0.

Extended Synch
If select "Enabled", allows generation of Extended Synchronization patterns.
Options: Enabled, Disabled.

▶ **ACPI Settings**

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
ACPI Settings	Enables or Disables System ability to Hibernate (OS/S4 Sleep state). This option may be not effective with some OS.
Enable Hibernation [Enabled] ACPI Sleep State [S3 (Suspend to RAM)]	
	→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save and Exit ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.	

Enable Hibernation
Enables system ability to Hibernate (OS/S4 Sleep Sate). This option may be not effective with some OS.
Options: Enabled, Disabled.

ACPI Sleep State
Selects the power saving modes for ACPI function.
Options: Suspend Disabled, S1 (CPU Stop Clock), S3 (Suspend to RAM).

▶ **CPU Configuration**

Advanced

CPU Configuration		Number of cores to enable in each processor package.
Intel (R) Core (TM) i5-2500 CPU @ 3.30GHz		
EMT64	Supported	
Max Processor Speed	3300 MHz	
Min Processor Speed	1600MHz	
Processor Speed	3300MHz	
Processor Stepping	206a7	
Microcode Revision	14	
Processor Cores	4	→←: Select Screen
Intel HT Technology	Not Supported	↑↓: Select Item
		Enter: Select
Active Processor Cores	[All]	+/-: Change Opt.
Limit CPUID Maximum	[Disabled]	F1: General Help
Execute Disable Bit	[Enabled]	F2: Previous Values
Hardware Prefetcher	[Enabled]	F3: Optimized Defaults
Adjacent Cache Line Prefetch	[Enabled]	F4: Save and Exit
Intel Virtualization Technology	[Disabled]	
Local X2APIC	[Disabled]	

Active Processor Cores
Use this item to select the number of cores to enable in each processor package.
Options: All, 1, 2, 3.

Limit CPUID Maximum
We recommend leaving it disabled, unless you are using a very old OS or experiencing problems related to CPU identification/compatibility.
Options: Enabled, Disabled.

Execute Disable Bit
When this function is disabled, it forces the XD feature flag to always return to zero (0).
Options: Enabled, Disabled.

Hardware Prefetcher
This item enables L2 Cache (Mid Level Cache) stream prefetcher for tuning performance of the specific application.
Options: Enabled, Disabled.

Adjacent Cache Line Prefetch
This item enables Adjacent Cache Line Prefetch function.
Options: Enabled, Disabled.

Intel Virtualization Technology
When this function is enabled, it allows a VMM to utilize the additional hardware

capabilities provided by Intel Virtualization Technology.
Options: Enabled, Disabled.

Local X2APIc

This item enables Local X2APIC function. Some OSes do not support this.
Options: Enabled, Disabled.

▶ **SATA Configuration**
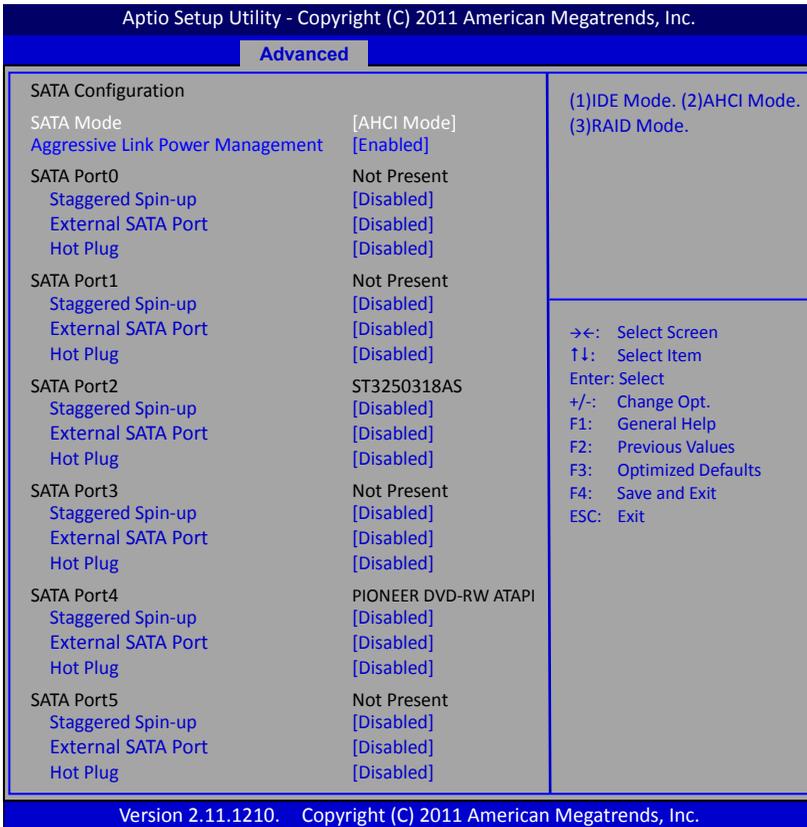
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Advanced		
SATA Configuration		(1)IDE Mode. (2)AHCI Mode. (3)RAID Mode.
SATA Mode	[AHCI Mode]	
Aggressive Link Power Management	[Enabled]	
SATA Port0	Not Present	
Staggered Spin-up	[Disabled]	
External SATA Port	[Disabled]	
Hot Plug	[Disabled]	
SATA Port1	Not Present	
Staggered Spin-up	[Disabled]	
External SATA Port	[Disabled]	
Hot Plug	[Disabled]	
SATA Port2	ST3250318AS	→←: Select Screen
Staggered Spin-up	[Disabled]	↑↓: Select Item
External SATA Port	[Disabled]	Enter: Select
Hot Plug	[Disabled]	+/-: Change Opt.
SATA Port3	Not Present	F1: General Help
Staggered Spin-up	[Disabled]	F2: Previous Values
External SATA Port	[Disabled]	F3: Optimized Defaults
Hot Plug	[Disabled]	F4: Save and Exit
SATA Port4	PIONEER DVD-RW ATAPI	ESC: Exit
Staggered Spin-up	[Disabled]	
External SATA Port	[Disabled]	
Hot Plug	[Disabled]	
SATA Port5	Not Present	
Staggered Spin-up	[Disabled]	
External SATA Port	[Disabled]	
Hot Plug	[Disabled]	
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.		

SATA Mode

Allows you to set the onboard Serial SATA mode.

- IDE Mode: Use the SATA hard disk drivers as Parallel ATA storage devices.
- RAID Mode: Create a RAID 0, 1, 10, 5 configuration
- AHCI Mode: Use the AHCI (Advanced Host Controller Interface) to enable advanced SATA features for improved performance with NCQ and Hot-plug features

Aggressive Link Power Management

This item enables Aggressive Link Power Management support. For Cougar Point B0 stepping onwards.
Options: Enabled, Disabled.

Staggered Spin-up

Enables the AHCI supports Staggered Spin-up function.
Options: Enabled, Disabled.

External SATA Port

Enables the external SATA port support.
Options: Enabled, Disabled.

Hot Plug

Enables the SATA port hot plug support.
Options: Enabled, Disabled.

▶ **USB Configuration**

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.	
Advanced	
USB Configuration	Enables Legacy USB support; AUTO option disables legacy support if no USB devices are connected, DISABLED option will keep USB devices available only for EFI application.
USB Devices: 1 Keyboard, 1 Mouse	
Legacy USB Support [Enabled]	
USB3.0 Support [Enabled]	
XHCI Hand-off [Enabled]	
EHCI Hand-off [Enabled]	
Part 60/64 Emulation [Enabled]	→←: Select Screen
	↑↓: Select Item
USB Hardware delays and time-outs:	Enter: Select
USB transfer time-out [20 sec]	+/-: Change Opt.
Device reset time-out [20 sec]	F1: General Help
Device power-up delay [Auto]	F2: Previous Values
	F3: Optimized Defaults
	F4: Save and Exit
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Legacy USB Support

Allows you select legacy support for USB devices.
Enabled: Enables Legacy USB support.
Disabled: Keep USB devices available only for EFI application.
Auto: Disables legacy support if no USB devices are connected.

USB3.0 Support

Enables USB3,0 (XHCI) controller support.
Options: Enabled, Disabled.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
Options: Enabled, Disabled.

EHCI Hand-off

This is a workaround for OSes without EHCI hand-off support. The XHCI ownership change should be claimed by EHCI driver.
Options: Enabled, Disabled.

Part 60/64 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
Options: Enabled, Disabled.

USB transfer time-out

The time-out value for control, bulk, and interrupt transfers.
Options: 1 sec, 5 sec, 10 sec, 20 sec.

Device reset time-out

Sets USB mass storage devices start unit command time-out.
Options: 10 sec, 20 sec, 30 sec, 40 sec.

Device power-up delay

Maximum time the device will take before it properly reports itself to the Host controller. 'Auto' uses default values; for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.
Options: Auto, Manual.

▶ Super IO Configuration

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
              Advanced

        F71889 Super IO Configuration                    Restore AC Power Loss
                                                         help.
        Super IO Chip               Fintek F71889
        Restore on AC Power Loss    [Power Off]
        EuP Function                [Disabled]


                                                         →←:   Select Screen
                                                         ↑↓:   Select Item
                                                         Enter: Select
                                                         +/-:   Change Opt.
                                                         F1:    General Help
                                                         F2:    Previous Values
                                                         F3:    Optimized Defaults
                                                         F4:    Save and Exit
            Version 2.11.1210.    Copyright (C) 2011 American Megatrends, Inc.
```

Restore on AC Power Loss

Enables your computer to automatically restart or return to its last operating status after power returns from a power failure.

Options: Power off, Power on, Last State.

EuP Function

Enables the EuP (Energy Using Products) function, allows BIOS to switch off some power at S5 state to get system ready for the EuP requirement to reduce power consumption.

Options: Enabled, Disabled.

▶ H/W Monitor

```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                           Advanced

  PC Health Status                                      PWM Fan (4 pin)
  CPU Temperature              : +54 C                  Linear Fan (3 pin)
  VREG Temperature            : +37 C
  System Temperature          : +26 C
  CPU Fan Speed               : 3042 RPM
  Power Fan Speed             : N/A
  Chassis Fan Speed           : N/A
  VCORE                       : +1.160 V
  CPU VTT                     : +1.096 V
  PCH VCore                   : +1.048 V
  VDIMM                       : +1.488 V
  +5V                         : +4.960 V               →←:   Select Screen
  +12V                        : +12.184 V              ↑↓:   Select Item
  VSB3V                       : +3.296 V               Enter: Select
  VBAT                        : +3.424 V               +/-:   Change Opt.
                                                       F1:    General Help
  CPU Fan Type                [PWM FAN (4 pin)]        F2:    Previous Values
  CPU Fan Mode Setting        [SmartFan]               F3:    Optimized Defaults
    Temperature Limit of Highest   060                 F4:    Save and Exit
    Temperature Limit of Lowest    030                 ESC:   Exit
    Fan Highest setting            100
    Fan Lowest setting             050
  Power Fan Mode Setting      [SmartFan]
    Temperature Limit of Highest   060
    Temperature Limit of Lowest    030
    Fan Highest setting            100
    Fan Lowest setting             050
  Chassis Fan Mode Setting    [SmartFan]
    Temperature Limit of Highest   060
    Temperature Limit of Lowest    030
    Fan Highest setting            100
    Fan Lowest setting             050

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```

CPU / VREG / System

Displays the current CPU,onboard regulator and system temperature.

CPU /Power /Chassis Fan Speed

Displays the current CPU, Power and ChassissFan Speed

VCore/VDimm/VTT/NB/+5V/+12V/VCC3/VBAT

The current voltages are automatically detected and displayed by the system.

CPU Fan Type

Allows you to select the CPU Fan type.
Options: PWM FAN (4 pin), Linear FAN (3 pin)

CPU Fan Mode Setting

This item controls the speed of the various fans on the motherboard. Choose

[SmartFan] when you want the speed of the fans automatically controlled based on temperature. To set the fan speed to a constant rate, select [Manual Mode] and then enter the speed from 0% to 100%.

Set the desired speed for the Power and Chassis fans from 0% to 100%. The system defaults to 100%.

▶ **Onboard Device**

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Advanced		
Marvell SATA3.0 6G Connector	[Auto]	
SATA3.0 Mode	[AHCI]	
Gigabit LAN Controller	[Auto]	
USB3.0 Controller	[Auto]	
Bluetooth	[Disabled]	
C80P Show CPU Temperature	[Enabled]	
Azaila HD Audio	[Enabled]	→←: Select Screen
		↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save and Exit
		ESC: Exit
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Marvell SATA3.0 6G Connector
Enables the onboard Marvell SATA3.0 controller.
Options: Auto, Enabled, Disabled.

SATA3.0 Mode
Allow you select the SATA3.0 Mode.
Options: AHCI, RAID.

Gigabit LAN Controller
Enables the onboard Giga Lan function for LAN.
Options: Auto, Enabled, Disabled

USB3.0 Controller
Enables the onboard USB 3.0 controller.
Options: Auto, Enabled, Disabled.

Bluetooth
Enables Bluetooth function.
Options: Enabled, Disabled.

C80P Show CPU Temperature

Enables the onboard POST Port LED to display CPU temperature.

Options: Enabled, Disabled.

Azalia HD Device

Enables the onboard High Definition Audio controller.

Options: Enabled, Disabled.

3-6 Chipset Menu

The chipset menu items allow you to change the advanced chipset settings.
Press <Enter> to display the sub-menu.

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Main	Performance	Advanced	**Chipset**	Boot	Security	Save & Exit	

▶ North Bridge
▶ South Bridge

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

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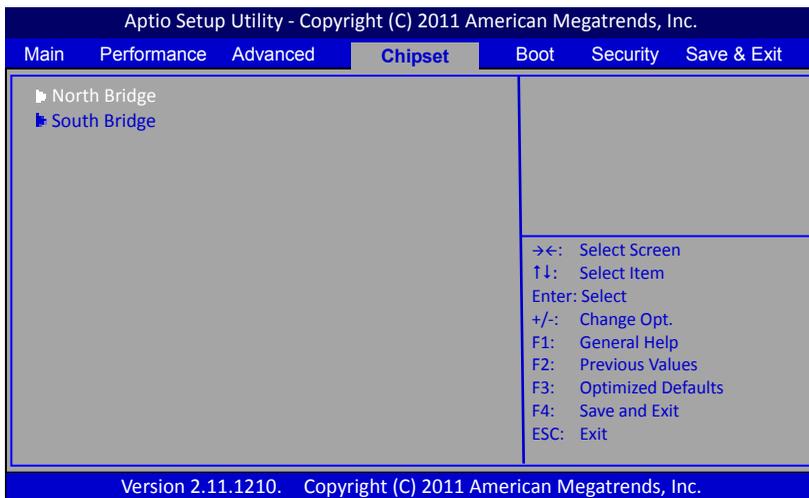
▶ North Bridge

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Chipset		
Memory Configuration		VT-d Enable/Disable
Total Memory	4096 MB (DDR3 1333)	
Memory Slot 0	2048 MB (DDR3 1333)	
Memory Slot 1	0 MB (DDR3 1333)	
Memory Slot 2	2048 MB (DDR3 1333)	
Memory Slot 3	0 MB (DDR3 1333)	→←: Select Screen
		↑↓: Select Item
VT-d	[Disabled]	Enter: Select
Initiate Graphic Adapter	[PEG/IGD]	+/-: Change Opt.
IGD Memory	[256M]	F1: General Help
Render Standby	[Enabled]	F2: Previous Values
		F3: Optimized Defaults
PEG Force Gen1	[Disabled]	F4: Save and Exit
Detect Non-Compliance Device	[Disabled]	ESC: Exit
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Total Memory
Displays current system total memory size.

Memory Slot 0/1/2/3
Displays the memory size of each individual slot.

VT-d
Allows you enable the chipset VT-d technology.
Options: Enabled, Disabled.

IGD Memory
Allows you select share memory size of internal graphics device.
Options: Disabled, 64M, 128M, 256M, 512M, 1024M.

Initiate Graphic Adapter
Select Which graphics controller to use as the primary boot device
Options: PEG/IGD, IGD/PEG.
Note: to install VIRTU, use IDG/PEG setting.

Render Standby
This item enables the Render Standby technology by internal graphics device.
It Allows the GPU to power down the render unit when idle.
Options: Enabled, Disabled.

PEG Force Gen1
When enabled, the PCI-E x16 slot will be forced to run in the PCI-E x1 mode.
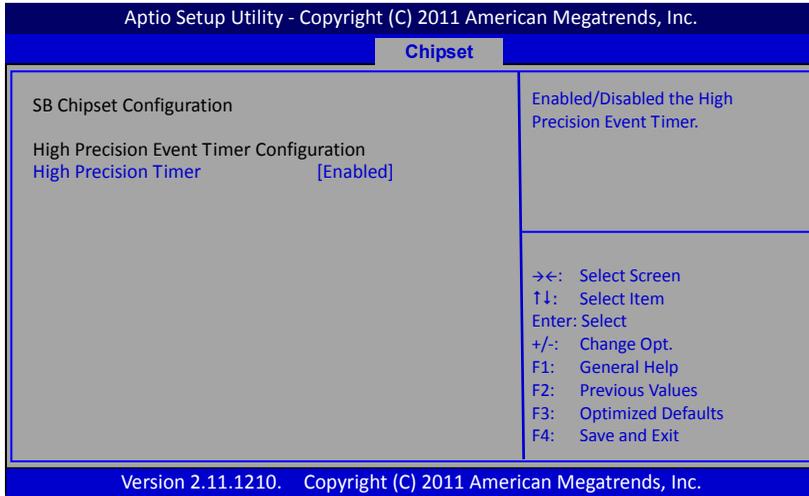Options: Enabled, Disabled.

Detect Non-Compliance Device
This item enables detect non-compliance device in PCI Express Port.
Options: Enabled, Disabled.

▶ **South Bridge**

```
           Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                                    Chipset

  SB Chipset Configuration                   Enabled/Disabled the High
                                             Precision Event Timer.
  High Precision Event Timer Configuration
  High Precision Timer            [Enabled]


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

           Version 2.11.1210.   Copyright (C) 2011 American Megatrends, Inc.
```
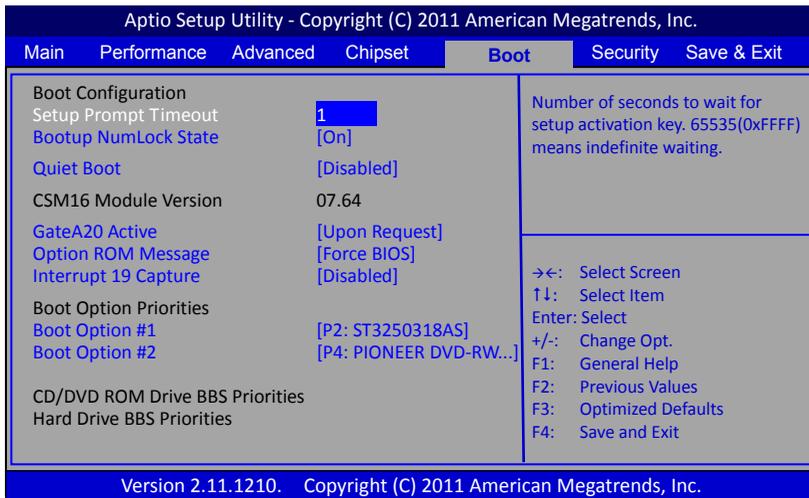
High Precision Timer
Selecting Enabled, allows the operating system and applications to use the High Precision Event Timer (HPET) for higher precision and better performance.
Options: Enabled, Disabled.

3-7 Boot Menu

The Boot menu is used to configure the boot settings and the boot priority.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.						
Main	Performance	Advanced	Chipset	**Boot**	Security	Save & Exit

Boot Configuration		Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Setup Prompt Timeout	1	
Bootup NumLock State	[On]	
Quiet Boot	[Disabled]	
CSM16 Module Version	07.64	
GateA20 Active	[Upon Request]	
Option ROM Message	[Force BIOS]	→←: Select Screen
Interrupt 19 Capture	[Disabled]	↑↓: Select Item
Boot Option Priorities		Enter: Select
Boot Option #1	[P2: ST3250318AS]	+/-: Change Opt.
Boot Option #2	[P4: PIONEER DVD-RW...]	F1: General Help
		F2: Previous Values
CD/DVD ROM Drive BBS Priorities		F3: Optimized Defaults
Hard Drive BBS Priorities		F4: Save and Exit

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Setup Prompt Timeout
This is used to set an additional time the POST should wait for the operator to press the key to enter setup. The time is entered in seconds.

Bootup NumLock State
Selects the state of the keyboard's numlock function after POST.
Options: On, Off.

Quiet Boot
Displays normal POST message. Select disable to display Logo instead of POST message.
Options: Enabled, Disabled.

GateA20 Active
This feature determines how Gate A20 is used to address memory above 1MB.
Upon Request: GA20 can be disabled using BIOS services.
Always: Do not allow disabling GA20.

Option ROM Message
Sets display mode for Option ROM.
Force BIOS: To force to a BIOS-compatible output. This will show the option ROM messages.
Keep Current: To keep the current video mode. This will suppress option ROM

messages. Option ROMs requiring interactive inputs may not work properly in this mode.

Interrupt 19 Capture
Allows specify if legacy PCI option ROMs are allowed to capture software interrupt 19h.
Options: Enabled, Disabled.

Boot Option #1/#2
These options are used to form the boot order and are dynamically generated.

CD/DVD ROM Drive BBS Priorities
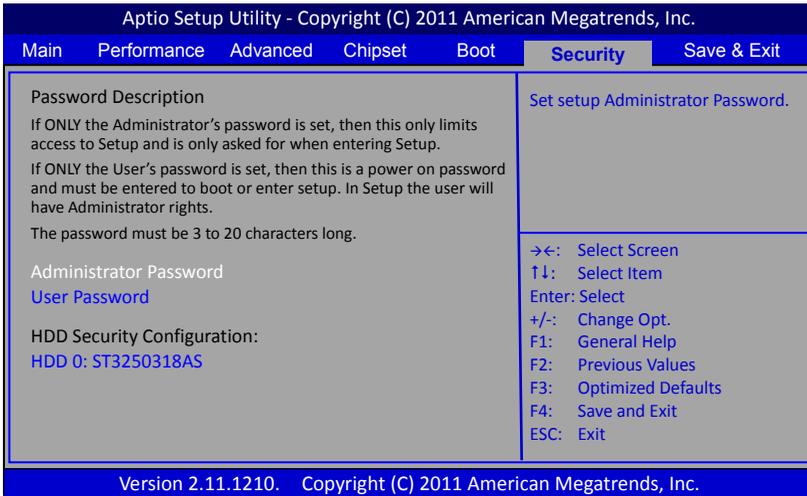Allows configure the boot order for a specific CD/DVD ROM device class.

Hard Drive BBS Priorities
Allows configure the boot order for a specific Hard Drive device class.

3-8 Security Menu

The Security menu allows you to change the system security settings.

```
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Main    Performance   Advanced    Chipset    Boot    Security    Save & Exit

Password Description                               Set setup Administrator Password.

If ONLY the Administrator's password is set, then this only limits
access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password
and must be entered to boot or enter setup. In Setup the user will
have Administrator rights.
The password must be 3 to 20 characters long.
                                                   →←:   Select Screen
Administrator Password                             ↑↓:   Select Item
User Password                                      Enter: Select
                                                   +/-:  Change Opt.
HDD Security Configuration:                        F1:   General Help
HDD 0: ST3250318AS                                 F2:   Previous Values
                                                   F3:   Optimized Defaults
                                                   F4:   Save and Exit
                                                   ESC:  Exit

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```

Administrator Password

This function is used to set, change or delete the Administrator password. If there is already a password installed, the system asks for this first. To clear a password, simply enter nothing and acknowledge by pressing Return. To set a password, enter it twice and acknowledge by pressing Return. The password must be 3 to 20 characters long.
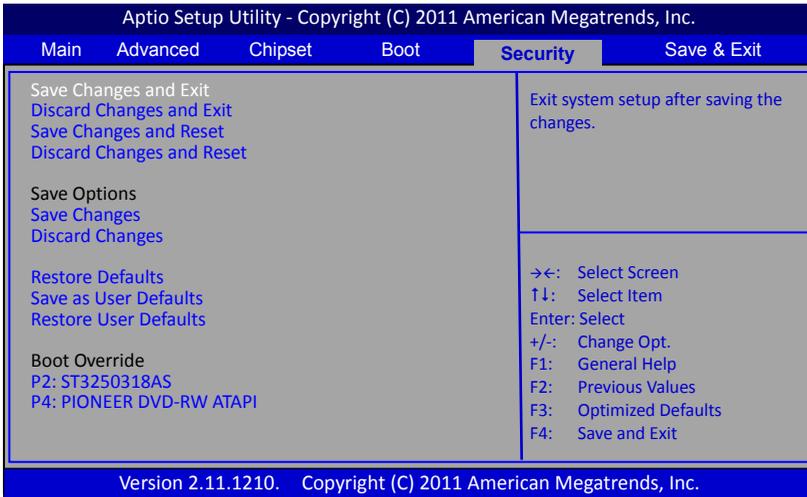
User Password

This function is used to set, change or delete the User password. If there is already a password installed, the system asks for this first. To clear a password, simply enter nothing and acknowledge by pressing Return. To set a password, enter it twice and acknowledge by pressing Return. The password must be 3 to 20 characters long.

HDD Security Configuration

Allows you to set password for hard drive security configuration

3-9 Save & Exit Menu

The Save & Exit menu allows you to load the optimal default values for BIOS, and save or discard your changes to the BIOS items.

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Main      Advanced      Chipset       Boot      Security      Save & Exit

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

  Save Options
  Save Changes
  Discard Changes
                                                 →←:  Select Screen
  Restore Defaults                               ↑↓:  Select Item
  Save as User Defaults                          Enter: Select
  Restore User Defaults                          +/-:  Change Opt.
                                                 F1:   General Help
  Boot Override                                  F2:   Previous Values
  P2: ST3250318AS                                F3:   Optimized Defaults
  P4: PIONEER DVD-RW ATAPI                       F4:   Save and Exit

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```

Save Changes and Exit
This saves the changes to the CMOS RAM and exits the BIOS Setup program.

Discard Changes and Exit
This exits the BIOS Setup without saving the changes made in BIOS Setup to the CMOS.

Save Changes and Reset
This resets system after saving the changes.

Discard Changes and Reset
This resets system without saving the changes.

Save Option
Allows you to save the options you made to the CMOS RAM.

Save Change
Allows you to save the changes you made to the CMOS RAM.

Discard Changes
Allows you to discard the selections you made.

Restore Defaults
The restore defaults are the factory settings of this motherboard.

Save as User Defaults

This is used to save all current settings as user default. The current setup state can later be restored using Restore User Defaults.

Restore User Defaults

This is used to restore all tokens to settings previously stored by Save as User Defaults.

Boot Override

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

Chapter 4   Driver Installation

After the operating system has been installed, you need to install drivers for this mainboard.

The support DVD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard features.

4-1 Driver Install

Insert the bundled driver DVD into your optical drive and the main menu will be displayed on your PC screen. Click each item button and select the item you want to install.

<Main Page>
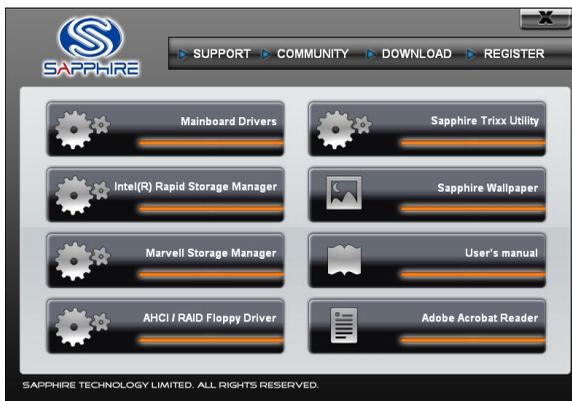
The Mainboard Drivers item shows the available device drivers. Install the necessary drivers to use the devices.

<Mainboard Drivers page>
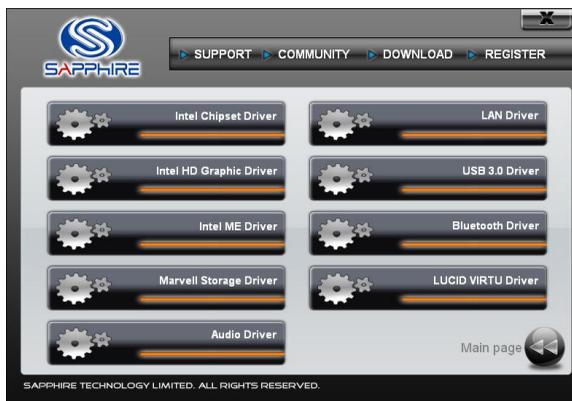
📌 Note: If Autorun function is not enabled in your computer, browse the contents of the support DVD to locate the file autorun.exe, and click this file to run the DVD.

4-2 TRIXX Utility

TRIXX is a simple and easy-to-use utility that allows users to adjust system settings for overclocking in a Windows environment. The TRIXX utility includes three configurations for frequency, voltage and hardware monitoring.

To install TRIXX Utility, run it from the Sapphire Utility page from the bundled DVD. A TRIXX Utility shortcut will be created on the Desktop.


Display current CPU information

Adjust frequency for CPU and PCI-E.

Adjust voltage for CPU, DIMM etc.

Displays system hardware monitor status

Apply the chosen settings.

4-3 Hardware monitor gadget

This Hardware monitor gadget directly appears in windows screen after TriXX installation is completed. It can be used to help keep track of temperatures of CPU, System and fan speed of CPU, System and voltages of CPU, System.
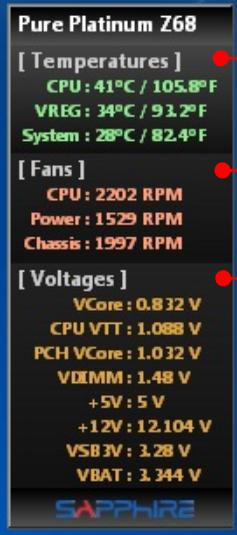
Pure Platinum Z68

[Temperatures] ← Displays hardware monitor temperature.
CPU : 41°C / 105.8° F
VREG : 34°C / 93.2° F
System : 28°C / 82.4° F

[Fans] ← Displays fan speeds.
CPU : 2202 RPM
Power : 1529 RPM
Chassis : 1997 RPM

[Voltages] ← Displays voltages of system.
VCore : 0.832 V
CPU VTT : 1.088 V
PCH VCore : 1.032 V
VDIMM : 1.48 V
+5V : 5 V
+12V : 12.104 V
VSB3V : 3.28 V
VBAT : 3.344 V

SAPPHIRE

Chapter 5   POST Code

This chapter provides the Aptio POST Codes List for the mainboard during the BIOS pre-boot process.

The POST Codes are displayed on the Debug LED readout located directly onboard the mainboard.

Please refer to following "boot phases", which may apply to various status code & checkpoint descriptions:

- ♦ Security (SEC) – initial low-level initialization
- ♦ Pre-EFI Initialization (PEI) – memory initialization
- ♦ Driver Execution Environment (DXE) – main hardware initialization
- ♦ Boot Device Selection (BDS) – system setup, pre-OS user interface & selecting a bootable device (CD/DVD, HDD, USB, Network, Shell,..)

Checkpoint Ranges

Status Code Range	Description
01 – 0B	SEC execution
0C – 0F	SEC errors
10 – 2F	PEI execution up to and including memory detection
30 – 4F	PEI execution after memory detection
50 – 5F	PEI errors
60 – 8F	DXE execution up to BDS
90 – CF	BDS execution
D0 – DF	DXE errors
E0 – E8	S3 Resume (PEI)
E9 – EF	S3 Resume errors (PEI)
F0 – F8	Recovery (PEI)
F9 – FF	Recovery errors (PEI)

Standard Checkpoints

♦ **SEC Phase**

Status Code	Description
00	Not used
Progress Codes	
01	Power on. Reset type detection (soft/hard).
02	AP initialization before microcode loading
03	North Bridge initialization before microcode loading
04	South Bridge initialization before microcode loading
05	OEM initialization before microcode loading

06	Microcode loading
07	AP initialization after microcode loading
08	North Bridge initialization after microcode loading
09	South Bridge initialization after microcode loading
0A	OEM initialization after microcode loading
0B	Cache initialization
SEC Error Codes	
0C – 0D	Reserved for future AMI SEC error codes
0E	Microcode not found
0F	Microcode not loaded

♦ PEI Phase

Status Code	Description
Progress Codes	
10	PEI Core is started
11	Pre-memory CPU initialization is started
12– 14	Pre-memory CPU initialization (CPU module specific)
15	Pre-memory North Bridge initialization is started
16	Pre-Memory North Bridge initialization (North Bridge module specific)
17	Pre-Memory North Bridge initialization (North Bridge module specific)
18	Pre-Memory North Bridge initialization (North Bridge module specific)
19	Pre-memory South Bridge initialization is started
1A	Pre-memory South Bridge initialization (South Bridge module specific)
1B	Pre-memory South Bridge initialization (South Bridge module specific)
1C	Pre-memory South Bridge initialization (South Bridge module specific)
1D – 2A	OEM pre-memory initialization codes
2B	Memory initialization. Serial Presence Detect (SPD) data reading
2C	Memory initialization. Memory presence detection
2D	Memory initialization. Programming memory timing information
2E	Memory initialization. Configuring memory
2F	Memory initialization (other).
30	Reserved for ASL (see ASL Status Codes section below)
31	Memory Installed
32	CPU post-memory initialization is started
33	CPU post-memory initialization. Cache initialization
34	CPU post-memory initialization. Application Processor(s) (AP) initialization
35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
36	CPU post-memory initialization. System Management Mode (SMM) initialization
37	Post-Memory North Bridge initialization is started
38	Post-Memory North Bridge initialization (North Bridge module specific)
39	Post-Memory North Bridge initialization (North Bridge module specific)
3A	Post-Memory North Bridge initialization (North Bridge module specific)
3B	Post-Memory South Bridge initialization is started
3C	Post-Memory South Bridge initialization (South Bridge module specific)

3D	Post-Memory South Bridge initialization (South Bridge module specific)
3E	Post-Memory South Bridge initialization (South Bridge module specific)
3F-4E	OEM post memory initialization codes
4F	DXE IPL is started
PEI Error Codes	
50	Memory initialization error. Invalid memory type or incompatible memory speed
51	Memory initialization error. SPD reading has failed
52	Memory initialization error. Invalid memory size or memory modules do not match.
53	Memory initialization error. No usable memory detected
54	Unspecified memory initialization error.
55	Memory not installed
56	Invalid CPU type or Speed
57	CPU mismatch
58	CPU self test failed or possible CPU cache error
59	CPU micro-code is not found or micro-code update is failed
5A	Internal CPU error
5B	reset PPI is not available
5C-5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
E0	S3 Resume is stared (S3 Resume PPI is called by the DXE IPL)
E1	S3 Boot Script execution
E2	Video repost
E3	OS S3 wake vector call
E4-E7	Reserved for future AMI progress codes
S3 Resume Error Codes	
E8	S3 Resume Failed
E9	S3 Resume PPI not Found
EA	S3 Resume Boot Script Error
EB	S3 OS Wake Error
EC-EF	Reserved for future AMI error codes
Recovery Progress Codes	
F0	Recovery condition triggered by firmware (Auto recovery)
F1	Recovery condition triggered by user (Forced recovery)
F2	Recovery process started
F3	Recovery firmware image is found
F4	Recovery firmware image is loaded
F5-F7	Reserved for future AMI progress codes
Recovery Error Codes	
F8	Recovery PPI is not available
F9	Recovery capsule is not found
FA	Invalid recovery capsule
FB – FF	Reserved for future AMI error codes

♦ DXE Phase

Status Code	Description
60	DXE Core is started
61	NVRAM initialization
62	Installation of the South Bridge Runtime Services
63	CPU DXE initialization is started
64	CPU DXE initialization (CPU module specific)
65	CPU DXE initialization (CPU module specific)
66	CPU DXE initialization (CPU module specific)
67	CPU DXE initialization (CPU module specific)
68	PCI host bridge initialization
69	North Bridge DXE initialization is started
6A	North Bridge DXE SMM initialization is started
6B	North Bridge DXE initialization (North Bridge module specific)
6C	North Bridge DXE initialization (North Bridge module specific)
6D	North Bridge DXE initialization (North Bridge module specific)
6E	North Bridge DXE initialization (North Bridge module specific)
6F	North Bridge DXE initialization (North Bridge module specific)
70	South Bridge DXE initialization is started
71	South Bridge DXE SMM initialization is started
72	South Bridge devices initialization
73	South Bridge DXE Initialization (South Bridge module specific)
74	South Bridge DXE Initialization (South Bridge module specific)
75	South Bridge DXE Initialization (South Bridge module specific)
76	South Bridge DXE Initialization (South Bridge module specific)
77	South Bridge DXE Initialization (South Bridge module specific)
78	ACPI module initialization
79	CSM initialization
7A – 7F	Reserved for future AMI DXE codes
80 – 8F	OEM DXE initialization codes
90	Boot Device Selection (BDS) phase is started
91	Driver connecting is started
92	PCI Bus initialization is started
93	PCI Bus Hot Plug Controller Initialization
94	PCI Bus Enumeration
95	PCI Bus Request Resources
96	PCI Bus Assign Resources
97	Console Output devices connect
98	Console input devices connect
99	Super IO Initialization
9A	USB initialization is started
9B	USB Reset
9C	USB Detect
9D	USB Enable
9E – 9F	Reserved for future AMI codes
A0	IDE initialization is started

A1	IDE Reset
A2	IDE Detect
A3	IDE Enable
A4	SCSI initialization is started
A5	SCSI Reset
A6	SCSI Detect
A7	SCSI Enable
A8	Setup Verifying Password
A9	Start of Setup
AA	Reserved for ASL (see ASL Status Codes section below)
AB	Setup Input Wait
AC	Reserved for ASL (see ASL Status Codes section below)
AD	Ready To Boot event
AE	Legacy Boot event
AF	Exit Boot Services event
B0	Runtime Set Virtual Address MAP Begin
B1	Runtime Set Virtual Address MAP End
B2	Legacy Option ROM Initialization
B3	System Reset
B4	USB hot plug
B5	PCI bus hot plug
B6	Clean-up of NVRAM
B7	Configuration Reset (reset of NVRAM settings)
B8 – BF	Reserved for future AMI codes
C0 – CF	OEM BDS initialization codes
DXE Error Codes	
D0	CPU initialization error
D1	North Bridge initialization error
D2	South Bridge initialization error
D3	Some of the Architectural Protocols are not available
D4	PCI resource allocation error. Out of Resources
D5	No Space for Legacy Option ROM
D6	No Console Output Devices are found
D7	No Console Input Devices are found
D8	Invalid password
D9	Error loading Boot Option (Load Image returned error)
DA	Boot Option is failed (Start Image returned error)
DB	Flash update is failed
DC	Reset protocol is not available