TECHNICAL MANUAL
Of
INTEL 945GC
Based

Mini-ITX M/B For ATOM Processor

NO.G03-NC93-F

Rev.: 1.0

Release date: January, 2009

Trademark:

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

Environmental Protection Announcement

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

TABLE OF CONTENT

Safety Environmental 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
1.0	First Edition	January, 2009

Item Checklist

- ☑ Motherboard
- ☑ Cable(s)
- ☑ CD for motherboard utilities
- ☑ Motherboard User's Manual
- ☑ Back panel

Chapter 1

Introduction of the Motherboard

1-1　　Features of motherboard

* Intel 945GC chipset and ICH7 chipset.

* Onboard Intel ATOM CPU, with low power consumption never denies high performance.

* Support FSB 533MHz.

* Support DDRII 400/533MHz up to 2GB.

* Onboard RTL 8102E Megabit Ethernet LAN Chip (depending on the model).

* Onboard RTL 8111C Gigabit Ethernet LAN Chip (depending on the model).

* Integrated Realtek ALC662 6-Channel Audio CODEC.

* Support USB2.0 data transport demands.

1-2   Specification

Spec	Description
Design	∗ Mini-ITX form factor 4 layers PCB size: 17.0x17.0cm
Chipset	∗ Intel 945GC Northbridge chipset ∗ Intel 82801G Southbridge chipset
Embedded CPU	∗ Support FSB533 ∗ Low Power Consumption ∗ ATOM CPU
Memory Socket	∗ 240-pin DDRII DIMM socket x1 ∗ Support DDRII 400MHz /DDRII 533MHz system Module DDRII memory ∗ Expandable to 2GB.
Expansion Slots	∗ 32-bit PCI slot x 1pcs
Integrate IDE	∗ One PCI IDE controller that supports PCI Bus Mastering, ATA PIO/DMA and the ULTRA DMA 100/66 functions that deliver the data transfer rate up to 100 MB/s;
Optional LAN	∗ Integrated Realtek RTL8111C PCI-E LAN that supports Fast Ethernet LAN function of providing 10Mb/100Mb/1000Mb Ethernet data transfer rate (optional) ∗ Integrated Realtek RTL8102E PCI-E LAN that supports Fast Ethernet LAN function of providing 10Mb/100Mb Ethernet data transfer rate (optional)
Audio	∗ Realtek ALC662 6-channel Audio Codec integrated ∗ Audio driver and utility included
BIOS	∗ Award 8MB SPI Flash ROM

1-3   Layout Diagram

Keyboard Connector

Mouse Connector

Parallel Port Connector

RCA for TV-OUT Connector

RJ45 LAN

Line-In

Line-Out

MIC-IN

COM Connector

VGA Connector

S-Video Connector

USB Connector

Keyboard & Mouse Connector

JP1

CPUFAN

JBAT

Intel CPU

240pin DDRII DIMM Socket

Parallel Port over Serial Port & VGA Port Connector

ATX Power Connector

COM Header

Intel 945GC Chipset

RCA for TV-OUT Over S-Video Connector

SYS FAN1

Power LED Header

Speaker Header

Optional RTL8102E / RTL8111C   PCI-E LAN

USB Port Connector

CDIN Header

Intel 82801G ICH Chipset

Floppy Disk Drive Connector

RJ-45 LAN Port over USB Connector

ALC 662 Audio Codec

JP3

Audio Connector

USB(2, 3) Header

SATAII Connector(1,2)

IDE Connector

Audio Connector for front Panel

PCI Slot

8Mbit SPI Flash ROM BIOS

SYS FAN2

Front Panel Connector

Jumper

Jumper	Name	Description	Page
JBAT	CMOS RAM Clear Function Setting	3-pin Block	p.6
JP1	KB/USB Power On Function Setting	3-pin Block	P.6
JP3	USB2/3 Power On Function Setting	3-pin Block	P.7

Connectors

Connector	Name	Description	Page
KB1	PS2 Keyboard & Mouse Connector	6-pin Female	p.7
COM1	Serial Port Connector	9-pin Connector	p.7
VG	VGA Port Connector	D-sub15-pin Female	p.7
PARALLEL	Parallel Port Connector	25-pin Connector	p.7
RCA from CN1	TV-OUT Connector	2-pin Connector	p.7
S-Video from CN1	TV-OUT Connector	4-pin Connector	p.7
USB1	USB Port Connector	4-pin Connector	p.7
RJ-45 Connector	RJ45 LAN Connector	8-pin Connector	p.7
AUDIO1	Line-Out /MIC/Line-In Audio Connector	3 Phone Jack	p.7
SATA1, SATA2	Serial ATA Connectors	7-pin Connector	p.8
IDE1	IDE Hard Disk Drive Connector	40-pin Block	p.8
FLOPPY	Floppy Disk Drive Connector	34-pin Block	p.9

Headers

Header	Name	Description	Page
FP_AUDIO	Front Panel Speaker, MIC-in Header	9-pin Block	p.9
CDIN	CD Audio-In Header	4-pin Block	p.10
USB2,USB3	USB2.0 Port Headers	9-pin Block	p.10
SPEAK	Speaker connector	4-pin Block	p.10
PWRLED	Power LED Headers	3-pin Block	p.11
JW_FP	Front Panel Headers (PWR LED/ IDE LED/ /Power Button /Reset)	9-pin Block	P.11
CPUFAN, SYSFAN1/2	FAN Speed Headers	3-pin Block	P.12

Chapter 2

Jumper Setting, Connector and Header

2-1 Jumper Setting

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

JBAT

1-2 closed   Normal (Default)

JBAT

2-3 closed   Clear CMOS

CMOS RAM Clear Setting

(2) KB/USB Power On Function Setting: JP1

JP1

1-2Closed: K.B&USB POWER-ON Disacled(default)

JP1
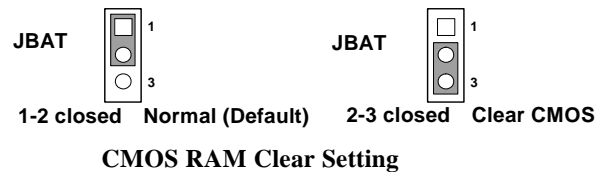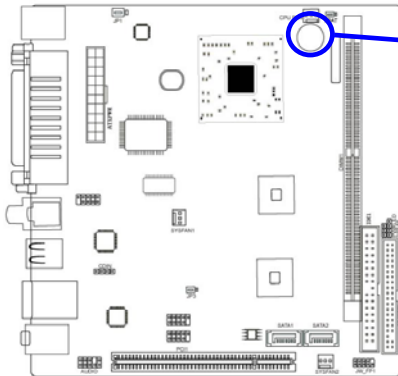
2-3 closed: K.B& USB POWER-ON Enabled
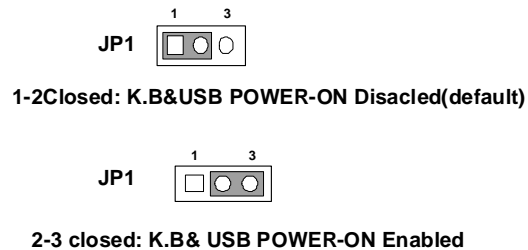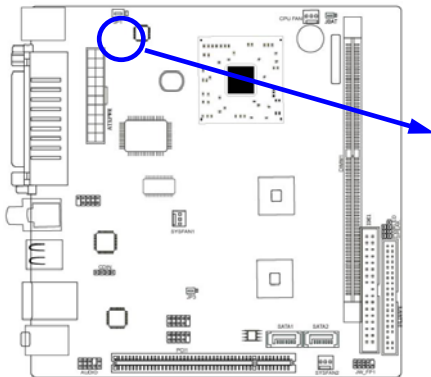
(3) USB 2/3 Power On Function Setting: JP3

JP3
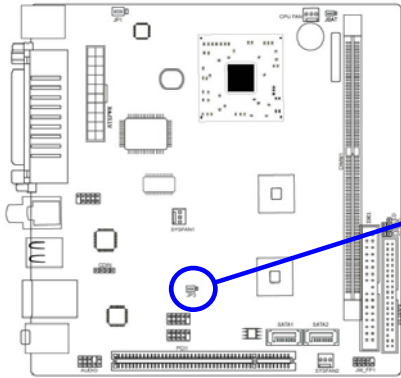
1-2 closed : USB 2/3 Header POWER-ON Disacled(default)

JP3

2-3 closed: USB 2/3 Header POWER-ON Enabled

2-2　Connectors and Headers

2-2-1 Connectors
(1) I/O Back Panel Connectors

Keyboard Connector
Parallel port Connector
RCA for TV-OUT Connector
RJ45 LAN
Line-In
Line-Out
MIC-IN
Mouse Connector
COM Connector
VGA Connector
S-Video Connector
USB Connector
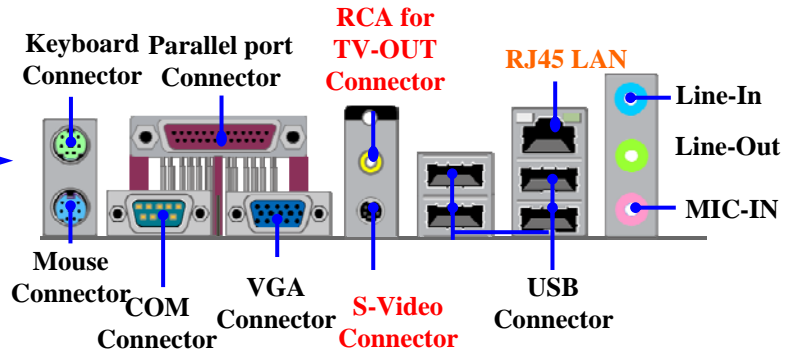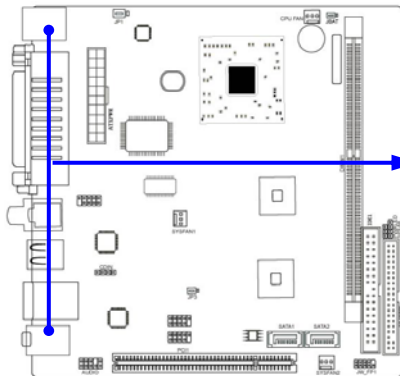
(2) Serial ATA Connector (7-pin female): SATA1/SATA2

SATA1 | SATA2

Serial-ATA2 Port Connector
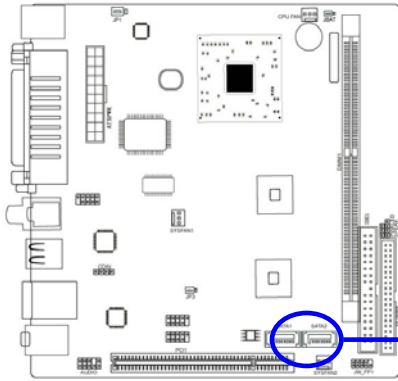
(3) IDE Connector：IDE1

IDE1

Pin 1
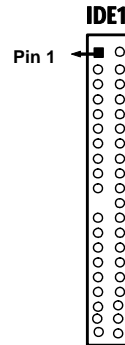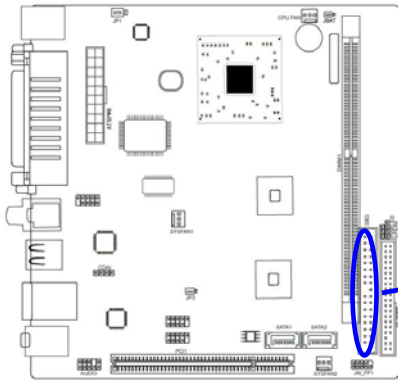
(4) Floppy drive Connector (34-pin block): FLOPPY

FLOPPY

Pin 1

Floppy Drive Connector
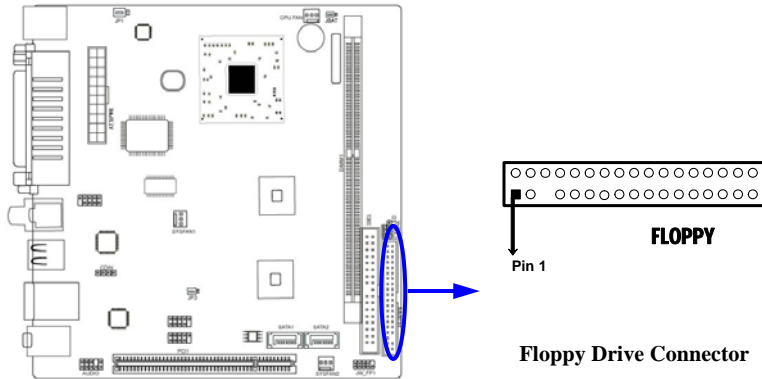
2-2-2 Headers

(1) Line-Out, MIC-In Header (9-pin): Front Panel Audio Header
This header connects to Front Panel Line-out, MIC-In connector with cable.

Line-Out, MIC Headers
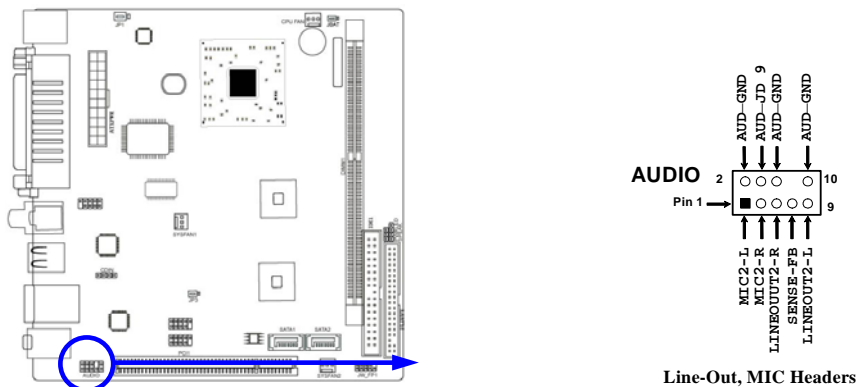
(2) CD Audio-In Headers (4-pin): CDIN

CDIN are the connectors for CD-Audio Input signal. Please connect it to CD-ROM CD-Audio output connector.
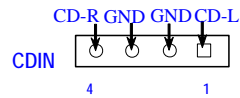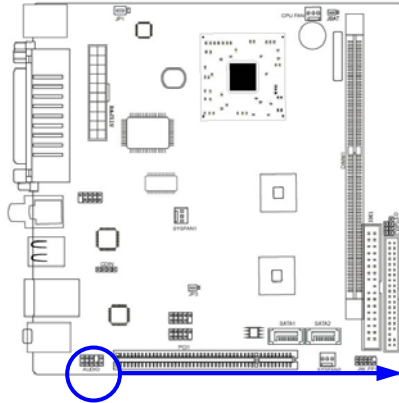
CD Audio-In Headers

(3) USB Port Headers (9-pin): USB2/USB3
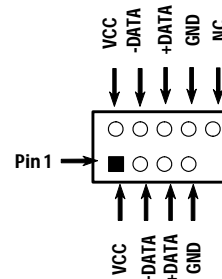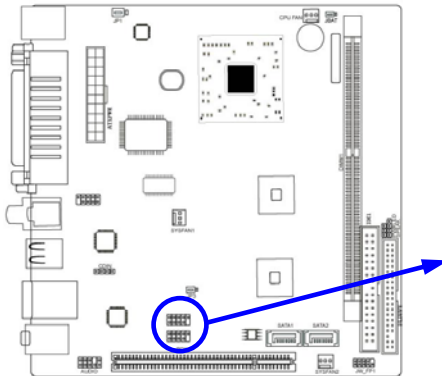
USB Port Header

(4) Speaker connector: SPEAK

This 4-pin connector connects to the case-mounted speaker. See the figure below.

(5) Power LED: PWR LED

The Power LED is light on while the system power is on.　Connect the Power LED from the system case to this pin.
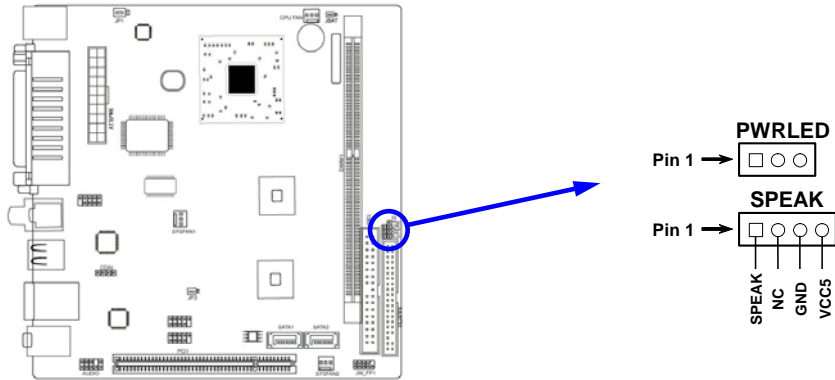
(6) Power switch: JW-FP Header

System Case Connections
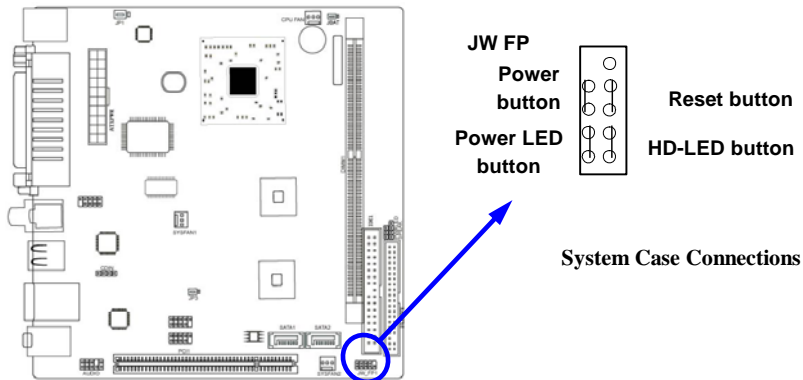
(7) FAN Speed Headers (3-pin): CPUFAN, SYSFAN1, and SYSFAN2

These connectors support cooling fans of 350mA (4.2 Watts) or less, depending on the fan manufacturer, the wire and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of connector.

Fan Headers
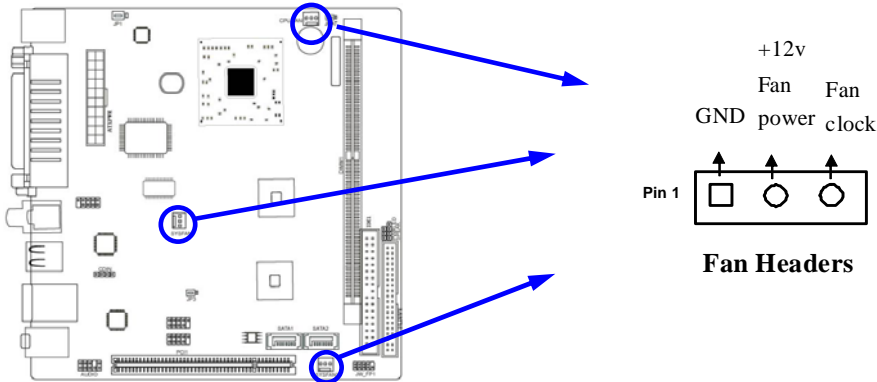
(8) Serial Port Connector (9-pin female): COM2

COM2 is a 9-pin RS232 D-Subminiature serial port connector.

Serial COM Port 9-pin Block

12
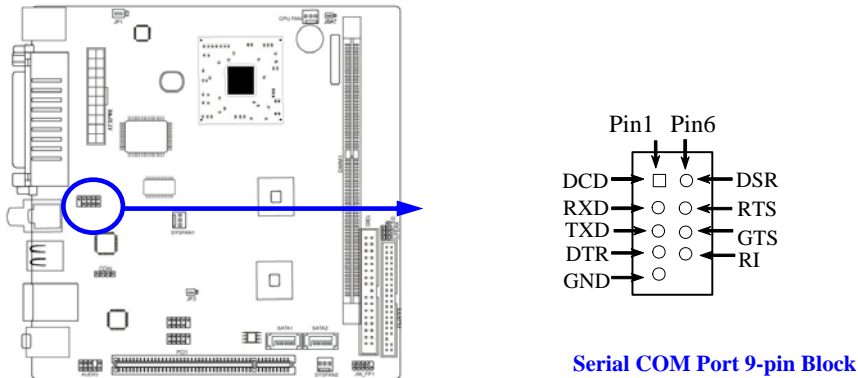
Chapter 3
Introducing BIOS

Attention:	The BIOS options shown in this manual is for reference use only. We reserve the right to update the BIOS version without advance notice.

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.

In the BIOS Setup main menu of Figure 3-1, 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 <Esc> to quit the BIOS Setup.
- Press ↑↓←→ (up, down, left, right) to choose, in the main menu, the option you want to confirm or to modify.
- Press <F10> when you have completed the setup of BIOS parameters to save these parameters and to exit the BIOS Setup menu.
- Press Page Up/Page Down or +/– keys when you want to modify the BIOS parameters for the active option.

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 <F1> to continue, <Ctrl-Alt-Esc> or <Del> to enter Setup

3-2   Getting Help

Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of 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>.

3-3   The Main Menu

Once you enter Award® BIOS CMOS Setup Utility, the Main Menu (Figure 3-1) will appear on the screen.   The Main Menu allows you to select from fourteen setup functions and two exit choices.   Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

```
              Phoenix – AwardBIOS CMOS Setup Utility

   ┌────────────────────────────────┬────────────────────────────┐
   │  Standard CMOS Features         │  Miscellaneous Control      │
   │  Advanced BIOS Features         │  Load Optimized Defaults    │
   │  Advanced Chipset Features      │  Load standard Defaults     │
   │  Integrated Peripherals         │  Set Supervisor password    │
   │  Power Management Setup          │  Set user password          │
   │  PnP/PCI Configurations         │  Save & Exit Setup          │
   │  PC Health Status               │  Exit Without Saving        │
   ├────────────────────────────────┴────────────────────────────┤
   │   Esc : Quit                      ↑↓→← : Select Item          │
   │  F10 : Save & Exit Setup                                      │
   └──────────────────────────────────────────────────────────────┘
```

Figure 3-1

Standard CMOS Features
Use this Menu for basic system configurations.

Advanced BIOS Features
Use this menu to set the Advanced Features available on your system.

Advanced Chipset Features
Use this menu to change the values in the chipset registers and optimize your system's performance.

Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.

Power Management Setup
Use this menu to specify your settings for power management.

PC Health Status

This entry shows your PC health status.

Miscellaneous Control

Use this menu to specify your settings for Miscellaneous Control.

Power User Overclock Settings

Use this menu to specify your settings (frequency, Voltage) for overclocking demand

CPU Thermal Throttling Setting

The selection is set for activating the active CPU Thermal Protection by flexible CPU loading adjustment in the arrange of temperature you define.

Load Optimized Defaults

Use this menu to load the BIOS default values these are setting for optimal performances system operations for performance use.

Password Settings

This entry for setting Supervisor password and User password

Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

Exit Without Saving

Abandon all CMOS value changes and exit setup.

3-4   Standard CMOS Features

The items in Standard CMOS Setup Menu are divided into several categories.   Each category includes no, one or more than one setup items.   Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
                 Phoenix – AwardBIOS CMOS Setup Utility
                         Standard CMOS Features

  Date (mm:dd:yy)          Thu.,Jan.1, 2009              Item Help
  Time (hh:mm:ss)           16 : 48 : 35
  > SATA Port1  Master        None
  > SATA Port2  Master        None            Menu Level >
  > IDE Channel 1 Master      None
  > IDE Channel 1 Slave        None           Change the day, month,
  Drive A               1.44M, 3.5 in.        year and century
  Video                     EGA/VGA
  Halt On                  All Errors
  Base Memory                 639k
  Extended Memory           515072k
  Total Memory              516096k

   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help
        F5:Previous Values   F6:Optimized Defaults  F7:Standard Defaults
```

Date

The date format is <day><month><date><year>.

Day   Day of the week is from Sun to Sat, determined by BIOS. Read-only.

Month   The month is from Jan. through Dec.

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

Year   The year depends on the year of the BIOS.

Time

The time format is <hour><minute><second>.

SATA Port 1/SATA Port 2 /IDE Channel 1 Master/Slave

Press Enter and then PgUp/<+> or PgDn/<–> to select Manual, None, Auto type.   Note that the specifications of your drive must match with the drive table.   The hard disk will not work properly if you enter improper information for this category.   If the type of hard disk drives is not matched or listed, you can use Manual to define your own drive type manually.

If you select Manual, related information is asked to be entered to the following items. Enter the information directly from the keyboard.   This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

If the controller of HDD interface is SCSI, the selection shall be "None".
If the controller of HDD interface is CD-ROM, the selection shall be "None"

Access Mode   The settings are CHS, LBA, Large and Auto.
Cylinder   number of cylinders
Head   number of heads
Precomp   write precomp
Landing Zone   landing zone
Sector   number of sectors

3-5 Advanced BIOS Features

```
              Phoenix – AwardBIOS CMOS Setup Utility

                      Advanced BIOS Features
┌─────────────────────────────────────────┬──────────────────────┐
│  Virus Warning              Disabled     │                      │
│  CPU Feature                Press Enter  │      Item Help       │
│  Hard Disk Boot Priority     Press Enter │                      │
│  Hyper-Threading Technology  Enabled     ├──────────────────────┤
│  Quick power on self Test    Enabled     │                      │
│  First Boot Device            Floppy     │   Menu Level >       │
│  Second Boot Device          Hard Disk   │                      │
│  Third Boot Device           CDROM       │                      │
│  Boot other  Device          Enabled     │                      │
│  Boot Up Floppy Seek          Enabled    │                      │
│  Boot Up NumLock Status      On          │                      │
│  Typematic Rate Setting      Disabled    │                      │
│  Typematic Rate (Chars/Sec)  6           │                      │
│  Typematic Delay (Msec)       250        │                      │
│  Security Option             Setup       │                      │
│  APIC Mode                   Enabled     │                      │
│  MPS Version Control For OS  1.4         │                      │
│  OS Select For DRAM > 64MB   Non-OS2     │                      │
│  HDD S.M.A.R.T. Capability   Disabled    │                      │
│  Report No FDD For windows    Yes        │                      │
├─────────────────────────────────────────┴──────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values  F6:Optimized Defaults    F7:Standard Defaults    │
└─────────────────────────────────────────────────────────────────┘
```

Hard Disk Boot Priority

The selection is for you to choose the hard disk drives priorities to boot from.

Virus Warning

The selection Allow you to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.

Disabled (default) No warning message to appear when anything attempts to access the boot sector or hard disk partition table.

Enabled Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector of hard disk partition table.

Quick Power On Self-Test

This category speeds up Power On Self Test (POST) after you power on the computer.   If this is set to Enabled, BIOS will shorten or skip some check items during POST.

Enabled (default) Enable quick POST

Disabled Normal POST

First/Second/Third Boot Device

The BIOS attempts to load the operating system from the devices in the sequence selected in these items. The settings are Floppy, LS/ZIP, HDD-0/HDD-1/HDD-3, SCSI, CDROM, LAD and Disabled.

Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K type is 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

Boot Up NumLock Status

The default value is On.

On (default) Keypad is numeric keys.

Off Keypad is arrow keys.

Typematic Rate Setting

Keystrokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected.   The settings are: Enabled/Disabled.

Typematic Rate (Chars/Sec)

Sets the number of times a second to repeat a keystroke when you hold the key down.   The settings are: 6, 8, 10, 12, 15, 20, 24, and 30.

Typematic Delay (Msec)

Sets the delay time after the key is held down before   beginning to repeat the keystroke. The settings are 250, 500, 750, and 1000.

Security Option

This category allows you to limit access to the system and Setup, or just to Setup.

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup (default)	The system will boot, but access to Setup will be denied if the correct password is not entered prompt.

MPS Version Control For OS   1.4

This option is only valid for multiprocessor motherboards as it specifies the version of the Multiprocessor Specification (MPS) that the motherboard will use.

OS Select For DRAM > 64MB

Allows OS2$^{®}$ to be used with >64MB or DRAM. Settings are Non-OS/2 (default) and OS2. Set to OS/2 if using more than 64MB and running OS/2$^{®}$.

HDD S.M.A.R.T Capability

This option allow you to enable the HDD S.M.A.R.T Capability (Self-Monitoring, Analysis and Reporting Technology) . You can choose from Enabled and Disabled.

3-6   Advanced Chipset Features

The Advanced Chipset Features Setup option is used to change the values of the chipset registers.   These registers control most of the system options in the computer.

```
            Phoenix – AwardBIOS CMOS Setup Utility
                    Advanced Chipset Features
 ┌──────────────────────────────────────────┬─────────────────────────┐
 │ DRAM Timing Selectable        By SPD      │                         │
 │* SDRAM CAS Latency Time         Auto      │      Item Help          │
 │* SDRAM Cycle  Time              Auto      │                         │
 │* SDRAM RAS-to-CAS Delay         Auto      ├─────────────────────────┤
 │* SDRAM RAS Precharge Time       Auto      │   Menu Level >          │
 │ System BIOS Cacheable         Disabled    │                         │
 │ Video BIOS Cacheable          Disabled    │                         │
 │ Memory Hole at 15M-16M         Disabled   │                         │
 │           ** VGA Setting**                │                         │
 │ Onchip Frame Buffer Size        8MB       │                         │
 │ DVMT Mold                       DVMT       │                        │
 │ DVMT/FIXED Memory Size          128MB     │                         │
 ├──────────────────────────────────────────┴─────────────────────────┤
 │   ↑↓→←  Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
 │      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults  │
 └─────────────────────────────────────────────────────────────────────┘
```

SDRAM CAS Latency Time

When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing.   The settings are: Auto, 3, 4 and 5.

SDRAM RAS-to-CAS Delay

This field let's you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed.   *Fast* gives faster performance; and *Slow* gives more stable performance.   This field applies only when synchronous DRAM is installed in the system.

SDRAM Ras Precharge Time

If an insufficient number of cycles is allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain date.   Fast gives faster performance; and Slow gives more stable performance.   This field applies only when synchronous DRAM is installed in the system.

System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance.   However, if any program writes to this memory area, a system error may result.   The settings are: Enabled and Disabled.

Onchip Frame Buffer Size

Use this item to set onchip frame buffer size. The optional settings are: 1MB and 8MB.

DVMT Mold

The optional settings are: FIXED, DVMT and BOTH.

DVMT/FIXED Memory Size

The optional settings are: 64MB, 128MB and 224 MB.

3-7   Integrated Peripherals

```
           Phoenix – AwardBIOS CMOS Setup Utility
                   Integrated Peripherals

 ┌──────────────────────────────────────────┬─────────────────────┐
 │ > Onboard IDE Function       Press Enter  │                     │
 │ > Onboard Device Function    Press Enter  │      Item Help      │
 │ > Onboard Super IO Function  Press Enter  ├─────────────────────┤
 │   PWR  status after PWR Failure  Always Off │   Menu Level >    │
 │   Init Display First             PCI Slot   │                   │
 ├──────────────────────────────────────────┴─────────────────────┤
 │   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
 │        F5:Previous Values  F6:Optimized Defaults    F7:Standard Defaults    │
 └─────────────────────────────────────────────────────────────────┘
```

Onboard IDE Function
Please refer to section 3-7-1

Onboard Device Function
Please refer to section 3-7-2

Onboard Super IO Function
Please refer to section 3-7-3

PWR Status after PWR Failure
The settings are: Former Status; Always On; Always Off.

Init Display First

This item allows you to decide to whether activate PCI Slot or Onchip VGA first. The settings are: PCI Slot, Onchip VGA.

3-7-1   Onboard IDE Function

```
              Phoenix – AwardBIOS CMOS Setup Utility

                      Onboard IDE Function
 ┌─────────────────────────────────────────┬──────────────────────┐
 │ OnChip IDE Channel          Enabled      │                      │
 │ IDE Channel  Master PIO       Auto       │      Item Help       │
 │ IDE Channel  Slave  PIO       Auto       │                      │
 │ IDE Channel  Master UDMA      Auto       ├──────────────────────┤
 │ IDE Channel  Slave  UDMA      Auto       │  Menu Level >>       │
 │ IDE DMA Transfer Access     Enabled      │                      │
 │ IDE HDD Block Mode          Enabled      │                      │
 │ *SATA Port Speed Settings    Disabled    │                      │
 ├──────────────────────────────────────────┴──────────────────────┤
 │   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
 │        F5:Previous Values   F6:Optimized Defaults   F7:Standard Defaults    │
 └─────────────────────────────────────────────────────────────────┘
```

IDE Channel Master/Slave PIO

The two IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-2) for each of the two IDE devices that the onboard IDE interface supports. Modes 0 through 2 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device. The settings are: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Channel Master/Slave UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33 and Ultra DMA/66, select Auto to enable BIOS support. The settings are: Auto, Disabled.

IDE DMA transfer access

The integrated peripheral controller contains an IDE interface with support for one IDE channels. Select *Enabled* to activate each channel separately. The settings are: Enabled and Disabled.

IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write.   If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.   The settings are: Enabled, Disabled.

SATA Port Speed Settings

The optional settings are: Disabled, Force GEN1 and Force GEN2.

3-7-2   Onboard Device Function

```
                Phoenix – AwardBIOS CMOS Setup Utility

                       Onboard Device Function
┌──────────────────────────────────────────────┬───────────────────────────┐
│   Onboard PCIE LAN Controller      Enabled     │                           │
│   Onboard PCIE LAN BootROM         Disabled    │         Item Help         │
│   High Definition Audio            Enabled     │                           │
│   USB Host Controller              Enabled     ├───────────────────────────┤
│   USB 2.0 Function                 Enabled     │                           │
│   USB Keyboard Legacy Support      Disabled    │    Menu Level >>          │
│   USB Mouse   Legacy Support       Disabled    │                           │
│   USB Storage Legacy Support       Disabled    │                           │
│   **USB Mass Storage Device Boot Setting**     │                           │
├──────────────────────────────────────────────┴───────────────────────────┤
│   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│        F5:Previous Values  F6:Optimized Defaults   F7:Standard Defaults     │
└────────────────────────────────────────────────────────────────────────────┘
```

Onboard PCIE LAN Controller

Setting to [Enabled] allows the BIOS to auto-detect the LAN controller and enable it. Setting options:[Enabled] and [Disabled] .

High Definition Audio

The selection for you to choose the embedded Audio function or 3rd party audio interface installed.   The settings are: Enabled and Disabled.

USB 2.0 Function Keyboard/Mouse /Storage Latency Support

Select *Enabled* if your system contains a Universal Serial Bus (USB) controller and you have a USB Mouse /keyboard.   The settings are: Enabled, Disabled.

3-7-3　　Onboard Super IO Function

```
              Phoenix – AwardBIOS CMOS Setup Utility
                     Onboard Super IO Function
┌─────────────────────────────────────────┬───────────────────────────┐
│  Onboard FDD Controller       Enabled    │                           │
│  Onboard Serial Port1         3F8/IRQ4   │        Item Help          │
│  Onboard Serial Port2         2F8/IRQ3   │                           │
│  UART2 Mode Select            Normal     ├───────────────────────────┤
│  * IR Duplex Mode             Half       │    Menu Level >>          │
│   Onboard Parallel Port       378/IRQ7   │                           │
│   Parallel Port Mode          SPP        │                           │
│  *ECP Mold Use DMA            3          │                           │
│   WatchDog Timer Select       Disabled   │                           │
│  *WatchDog Timer Value        255        │                           │
│  *WatchDod Timer Unit          Sec.      │                           │
├─────────────────────────────────────────┴───────────────────────────┤
│   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│       F5:Previous Values  F6:Optimized Defaults   F7:Standard Defaults │
└──────────────────────────────────────────────────────────────────────┘
```

Onboard FDD Controller

Select Enabled if your system has a floppy disk controller (FDD) installed on the system board and you wish to use it.　If you install add-on FDC or the system has no floppy drive, select Disabled in this field.　The settings are: Enabled and Disabled.

Onboard Serial Port 1

The optional settings are：Disabled, 3F8/IRQ4，2F8/IRQ3, 3E8/IRQ4，2E8/IRQ3.

Onboard Serial Port 2

The optional settings are：Disabled, 3F8/IRQ4，2F8/IRQ3, 3E8/IRQ4，2E8/IRQ3.

UART2 Mode Select

This item allows you to determine which InfraRed(IR) function of the onboard I/O chip. The optional settings are Normal and IrDA.

IrDA Duplex Mode

This field is available when UART Mode is set to either ASKIR or IrDA. This item enables you to determine the infrared function of the onboard infrared chip. The options are Full and Half

(default). Full-duplex means that you can transmit and send information simultaneously. Half-duplex is the transmission of data in both directions, but only one direction at a time.

Onboard Parallel Port

The optional settings are: Disabled, 378/IRQ7, 278/IRQ5 and 3BC/IRQ7.

Parallel Port Mode

  SPP : Standard Parallel Port

  EPP : Enhanced Parallel Port

  ECP : Enhanced Com Port

  SPP/EPP/ECP/ECP+EPP

To operate the onboard parallel port as Standard Parallel Port only, choose "SPP." To operate the onboard parallel port in the EPP modes simultaneously, choose "EPP." By choosing "ECP", the onboard parallel port will operate in ECP mode only. Choosing "ECP+EPP" will allow the onboard parallel port to support both the ECP and EPP modes simultaneously. The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: "ECP Mode Use DMA" at this time, the user can choose between DMA channels 3 to 1.

Watchdog Timer Select

This item is used to activate the watchdog function. The optional settings are: Enabled; Disabled. When set it as Enabled user can choose configuration figures in sub items.

Watchdog Timer Value

This item is only activated when Watchdog Timer Select is set as Enabled and users can set a value from the range of 0~255

Watchdog Timer Unit

This item is only activated when Watchdog Timer Select is set as Enabled and the optional units are: Sec. and Min..

Attention:	User needs an additional Watchdog Programming Reference Code to make use of this BIOS function. Detailed procedures please download from our website if necessary.

3-8 Power Management Setup

The Power Management Setup allows you to configure your system to most effectively save energy saving while operating in a manner consistent with your own style of computer use.

```
              Phoenix – AwardBIOS CMOS Setup Utility

                       Power Management Setup

  ACPI function                Enabled
  Power Management             User Define            Item Help
  Video off Method             V/H SyNC + BlANK
  Video off in Suspend         Yes
  Suspend Type                 Stop Grant
  Modem USE IRQ                3                   Menu Level >
  Suspend Mode                 Disabled
  Soft-OFF by PWRBTN           Instant off
  Wake-up by PCI Card          Disabled
  Power on by ring             Disabled
  Wake-up by USB KB from S4    Disabled
  PS2 KB/MS Wake-up from s4-s5 Disabled
  Resume by alarm              Disabled
  Date (of month)alarm           0
  Time(hh:mm:ss) alarm          0:0:0
  PM Timer Reload Events       Press Enter
  PCI Express PM Function      Press Enter


   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help
       F5:Previous Values   F6:Optimized Defaults  F7:Standard Defaults
```

ACPI Function

This item allows you to Enabled/Disabled the Advanced Configuration and Power Management (ACPI).   The settings are Enabled and Disabled.

Video Off Method

This determines the manner in which the monitor is blanked.

DPMS (default) Initial display power management signaling.

Blank Screen This option only writes blanks to the video buffer.

V/H SYNC+Blank   This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.

Suspend Type

The settings are: Stop and PWR On Suspend.

MODEM Use IRQ

If you want an incoming call on a modem to automatically resume the system from a power-saving mode, use this item to specify the interrupt request line (IRQ) that is used by the modem. You might have to connect the fax/modem to the motherboard Wake On Modem connector for this feature to work.

Soft-Off by PWRBTN

Under ACPI (Advanced Configuration and Power management Interface) you can create a software power down. In a software power down, the system can be resumed by Wake up Alarms. This item lets you install a software power down that is controlled by the power Button on your system. If the item is set to Instant-Off, then the power button causes a software power down. If the item is set to Delay 4 Sec, then you have to hold the power button down for four seconds to cause a software power down.

Power On by Ring

During Disabled, the system will ignore any incoming call from the modem. During Enabled, the system will boot up if there's an incoming call from the modem.

Resume by Alarm

When set to Enabled, additional fields become available and you can set the date (day of the month), hour, minute and second to turn on your system. When set to 0 (zero) for the day of the month, the alarm will power on your system every day at the specified time .

   Date (of month)

   You can choose which month the system will boot up.   Set to 0, to boot every day.

   Time (hh:mm:ss)

   You can choose what hour, minute and second the system will boot up.

   Note: If you have change the setting, you must let the system boot up until it goes to the operating system, before this function will work.

PM Timer Reload Event

In this item users can either select Enabled or Disabled to enable or disable Primary IDE 0; Primary IDE 1;Secondary IDE 0; Secondary IDE 1; FDD, COM, LPT Port or PCI PIRQ(A-D).

PCI Express PME Function
Press Enter to either set Enabled or Disabled the PCI Express PM Function.

3-9 PnP/PCI Configuration

```
            Phoenix – AwardBIOS CMOS Setup Utility

                   PnP/PCI Configuration
```

IRQ Resources	Press Enter	Item Help
PCI/ VGA Palette Snoop	Disabled	
**********PCI Express Relative Items*********		
Maximum Payload Size	128	Menu Level >

```
   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help
      F5:Previous Values   F6:Optimized Defaults   F7:Standard Defaults
```

PCI/VGA Palette Snoop
This item is designed to overcome problems that can be caused by some non-standard VGA cards. This board includes a built-in VGA system that does not require palette snooping so you must leave this item disabled.

IRQ Resources
Names the interrupt request (IRQ) line assigned to the USB on your system. Activity of the selected IRQ always awakens the system.

3-10 PC Health Status

This section shows the Status of you CPU, Fan, and Warning for overall system status.   This is only available if there is Hardware Monitor onboard.

```
              Phoenix – AwardBIOS CMOS Setup Utility

                        PC Health Status

   Shutdown Temperature            Enabled
   CPU Thermal-Throttling          Enaled            Item Help
 * CPU Thermal-Throttling Temp       70℃
 * CPU Thermal-Throttling Duty       50.00%
 * CPU Thermal-Throttling Beep      Enabled      Menu Level >
   Show PC Health in Post            Enabled
   Smart fan configurations        Press Enter
  VCC3v                            3.31V
  Vcore                            1.28V
  NB                               1.26V
  +5V                               5.12V
  +12V                             11.88V
  5VSB                              5.00V
  VDIMM                             1.87V
  VSB3V                             3.37V
  Vbat                             3.28V
  CPU Temperature                  64°C147°F
  System  Temperature              38°C/96°F
  CPUFAN Speed                      0RPM
  SYSFAN1 Speed                    4643 RPM
  SYSFAN2 Speed                     0  RPM

    ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help
         F5:Previous Values   F6:Optimized Defaults  F7:Standard Defaults
```

Show PC Health in Post

During Enabled, it displays information list below.   The choice is either Enabled or Disabled

CPU Thermal – Throttling

User can enable the CPU-Throttling function by setting it as Enabled. The optional setting is :

Disabled; Enabled. When set as enabled, certain values can be set in the following sub items.

-CPU Thermal-Throttling Temp

The optional setting is from 40 to 90 °C

-CPU Thermal-Throttling Duty

User can set the Thermal-Throttling Duty by select a specific percentage.

-CPU Thermal-Throttling Beep

The optional settings are：Disabled; Enabled.

Smart FAN Configurations

User can select CPU smart FAN by pressing Enter to set relative configurations in the CPU FAN Smart Mode:

-CPU FAN Smart FAN Mode

The optional settings are: Disabled; Enabled. When set as Enabled, users can select values for smart fan function by entering the following sub items

-CPU Full-Speed Temp

Choose full-speed temperature in the range of 30~100 °C

-CPU Idle Temp

Choose full-speed temperature in the range of 30~100 °C

CPUFAN Idle-Speed Duty

-Select CPU FAN Idle-Speed Duty from 0% ~100 %

CPU Temperature/ System Temperature/CPU FAN Speed, SYS FAN1, SYSFAN2 Speed/VCC 3V/Vcore/ NB/+5V/+12V/5VSB(V)/VDIMM/VSB3V/Vbat

This will show the CPU/FAN/System voltage chart and FAN Speed.

3-11 Miscellaneous Control

Miscellaneous Control

```
 Auto Detect PCI Clock            Disabled
 Spread Spectrum                  Disabled                     Item Help
*** Current Host/PCI Clock is 133/33MHz***
 Host/PCI Clock at Next Boot      133/33MHz
*** Current DRAM Clock is 533MHz ***                      Menu Level >
 DRAM Clock at next Boot           BY SPD(DDR 533)
 CPU Vcore 7-shift                Normal
 VCC 1.05 Select                  1.0667V(default)
 VCCP Select                      1.1213V(default)
 NB Select                        1.5080V(default)
 VCC 2.5V Select                  2.5021V(default)
 VDIMM Select                     1.863v(default)


   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help
        F5:Previous Values    F6:Optimized Defaults  F7:Standard Defaults
```

Auto Detect PCI Clock

This item allows you to enable/disable auto detect PCI Clock.

The settings are: Enabled, Disabled.

Spread Spectrum

This item allows you to set the Spread Spectrum as Enable or Disabled.

Host/PCI Clock at Next Boot

This item allows you to select the CPU/PCI Clock.

DRAM Clock at Next Boot

This item allows you to set DRAM clock.

CPU Vcore 7-Shift

This item is for user to add value to CPU voltage by 7 selectable stage.

VCC 1.05 Select

This item allows you to set the voltage for Southbridge.

VCCP Select
This item allows you to set the voltage for CPU.
NB Select
This item allows you to set Northbridge voltage.
VCC 2.5 V Select
This item allows you to set the voltage for VGA DAC.
VDIMM Select
This item allows you to set the voltage of DRAM DIMM.

3-12 Password Setting

You can set either supervisor or user password, or both of them.   The differences are:

Supervisor password: Can enter and change the options of the setup menus.

User password: Can only enter but do not have the right to change the options of the setup menus.   When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

   ENTER PASSWORD:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory.   You will be asked to confirm the password.   Type the password again and press <Enter>.   You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password.   A message will confirm that the password will be disabled.   Once the password is disabled, the system will boot and you can enter Setup freely.

   PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password

every time your system is rebooted.   This would prevent unauthorized use of your computer. You determine when the password is required within the BIOS Features Setup Menu and its Security option.   If the Security option is set to "System", the password will be required both at boot and at entry to Setup.   If set to "Setup", prompting only occurs when trying to enter Setup.

3-13 Load Standard/Optimized Defaults

Load Standard Defaults

When you press <Enter> on this item, you get confirmation dialog box with a message similar to:

   Load Standard Defaults (Y/N)? N

Pressing <Y> loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

   Load Optimized Defaults (Y/N)? N

Pressing <Y> loads the default values that are factory settings for optimal performance system operations.