ELF-500

Economic, Low-profile Fanless Industrial Box Computer

User's Manual

Ver. 1.00

April 13, 2009

Contents

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the box computer, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the box computer and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

The symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

About this guide

This user guide contains the information you need when installing and configuring the box computer.

How this guide is organized

This manual contains the following parts:

- **Chapter 1: Product introduction**
  This chapter describes the box computer features and specifications.
- **Chapter 2: Assembly**
  This chapter describes the procedures for installing system components.
- **Chapter 3: Getting Started**
  This chapter describes how to begin using your box computer.
- **Chapter 4: BIOS setup**
  This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. Advansus websites

The Advansus website provides updated information on Advansus hardware and software products. Please go to http://www.advansus.com.tw/.

2. Optional documentation

Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

	DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.
	CAUTION: Information to prevent damage to the components when trying to complete a task.
	IMPORTANT: Instructions that you MUST follow to complete a task.
	NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select
Italics	Used to emphasize a word or a phrase
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key Example: <Enter> means that you must press the Enter or Return key
<Key1>+<Key2>+<Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+) Example: <Ctrl>+<Alt>+<D>
Command	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets Example: At the DOS prompt, type the command line: **afudoses /ixxxxx.rom** **afudoses /iP5P800VM.ROM**

This chapter describes the box computer features and specifications.

1 Product Introduction

1 Product Introduction

1.1 Welcome!

Thank you for buying an ELF-500 Fanless Industrial Box Computer!
Before you start installing the box computer, and hardware devices on it, check the items in your package and compare with the list below.

1.2 Package Contents

Check your box computer package for the following items.
Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1x ELF-500
- 1x power adapter
- 1x power cord
- 1x VESA mount bracket
- 1x driver CD (with manual)
- 1x antenna
- 1x screw bag
    - M3 x 4.3mm (1 pcs)
    - M4 x 6mm (4 pcs)

If any of the above items is damaged or missing, contact your retailer.

1.3 Features

Product highlights

Low-profile Fanless Industrial Box Computer

The ELF-500 is an entry level Low-profile Fanless Industrial Box Computer ideal for Digital Signage, Home Automation/Surveillance, and Thin Client applications. It is based on an Atom N270 + 945GSE + ICH7M motherboard and features DVI-I, Gigabit Ethernet, wireless LAN via Mini PCIe, SD/SDHC/MS/MS Pro card reader, and 2.5" SATA hard drive.

Intel® Atom™ N270 Processor

The Intel® Atom™ processor N270, implemented in 45nm technology, is power-optimized and delivers robust performance-per-watt for cost-effective embedded solutions. Featuring extended lifecycle support, this processor offers an excellent solution for embedded market segments such as digital signage, interactive clients (kiosks, point-of-sale terminals), thin clients, digital security, residential gateways, print imaging, and commercial and industrial control. The processor remains software compatible with previous 32-bit Intel® architecture and complementary silicon.

Intel® 945GSE Chipset

The mobile Intel® 945GSE Express Chipset provides power-efficient graphics and rich I/O capabilities for cost-effective embedded solutions. It features an integrated 32-bit 3D graphics engine based on Intel® Graphics Media Accelerator 950 (Intel® GMA 950) architecture, a 533 MHz front-side bus (FSB), single-channel 400/533 MHz DDR2 system memory (2x SODIMM), and Intel® High Definition Audio interface. The chipset consists of the Intel® 82945GSE Graphics Memory Controller Hub (GMCH) and Intel® I/O Controller Hub 7-M (ICH7-M). It delivers outstanding system performance and flexibility through high-bandwidth interfaces such as PCI Express, Serial ATA, and Hi-Speed USB 2.0 connectivity.

DDR2 memory support

The box computer supports DDR2 memory to meet the bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR2 architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidths of up to 8.5 GB/s.

PCI Express Interface

The box computer fully supports PCI Express, the latest I/O interconnect technology that speeds up the PCI bus. PCI Express features point-to-point serial interconnections between devices and allows higher clock speeds by carrying data in packets.

Serial ATA Technology

The box computer supports the Serial ATA technology through the Serial ATA interfaces and the Intel® ICH7 chipset. The SATA specification allows for thinner, more flexible cables with lower pin count, reduced voltage requirement, and up to 300 MB/s data transfer rate.

S/PDIF Digital Sound Ready

The box computer supports a S/PDIF interface via a rear I/O jack. The S/PDIF technology turns your computer into a high-end entertainment system with digital connectivity to audio and speaker systems.

1.4 ELF-500 Specifications

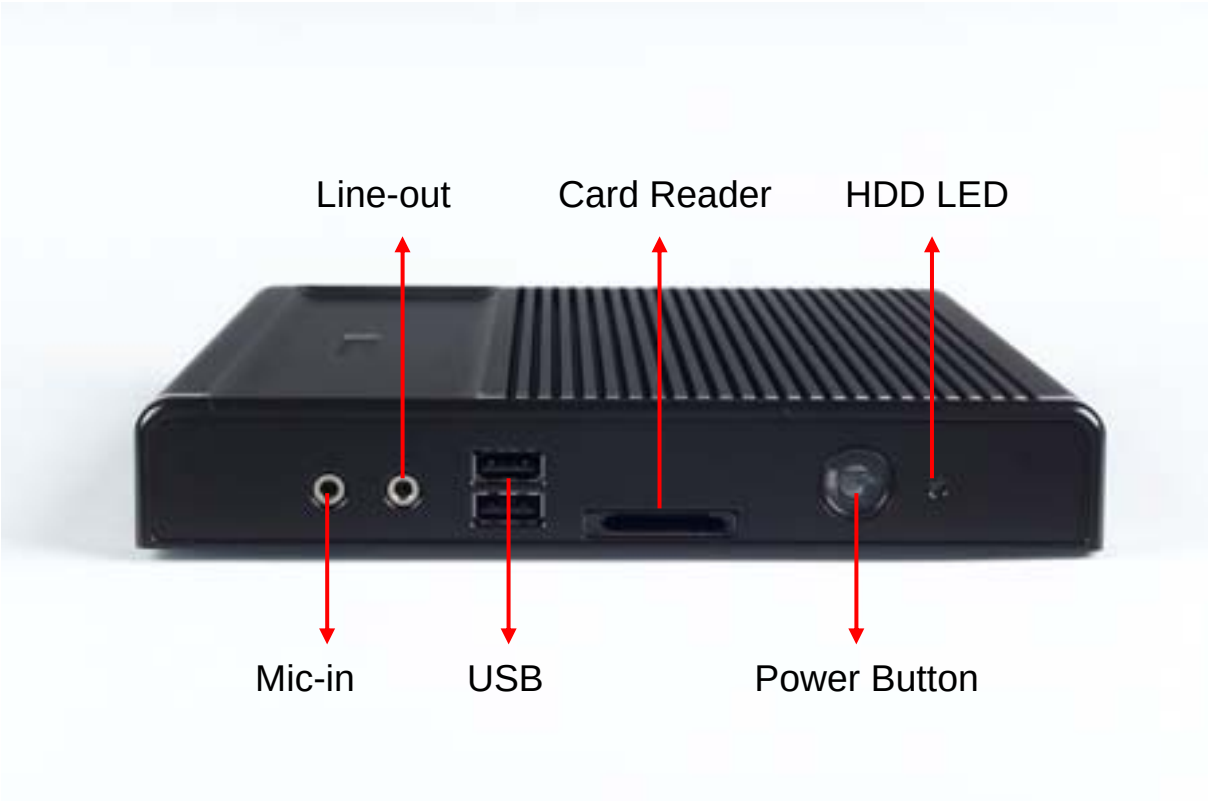
System	
CPU	Intel Atom N270 1.6GHz
Chipset	945GSE+ICH7-M
Memory	1x SODIMM DDR2-533 1GB , up to 2GB (2 slots)
Super I/O	W83627DHG-A
Storage	SATA 2.5" 80G
LAN Chip	Realtek 8111C
Audio Chip	Realtek ALC662
WLAN	802.11 b/g/n via Mini PCIe card
Front I/O	
LED	Power / HDD LED
Button	Power Button
Card reader	SD/SDHC/MS/MS Pro
USB Port	2x USB 2.0
Audio	1x line out, 1x mic-in
Rear I/O	
LAN Port	1x RJ45
USB Port	2x USB 2.0
Display	1x DVI-I
Power In	1x DC Jack
S/PDIF	1x Jack
Antenna	1x antenna (2.0db)
Power	
Power Adapter	Input:AC100-240V 50/60Hz 1.0A Output: DC12V 3A
Mechanical	
Dimensions	220.5 x 192 x 30 (mm)
Mounting	Desktop or VESA mount
Shock	Operating: 10g/11ms Storage: 30g/11ms
Vibration	Operating (IEC 60068-2-64-Fh): 5-500Hz, 1g (rms), 3-axes Storage (IEC 60068-2-64-6Fc): 5-500Hz,2g (rms), 3-axes
Temperature/Humidity	Operating: 0˚C to 45˚C, 0%~90%, non-condensing Storage: -40˚C to 60˚C, 0%~90%, non-condensing

Other	
Operating System	Windows XP Embedded
Certifications	CE/EN 300-440 (or EN 300328) + CE/EN 301-489 CE/EN 55022 + EN55024 FCC Part 15C, FCC Part 15B CE/EN 60950-1 CB CCC SRMC UL + CUL

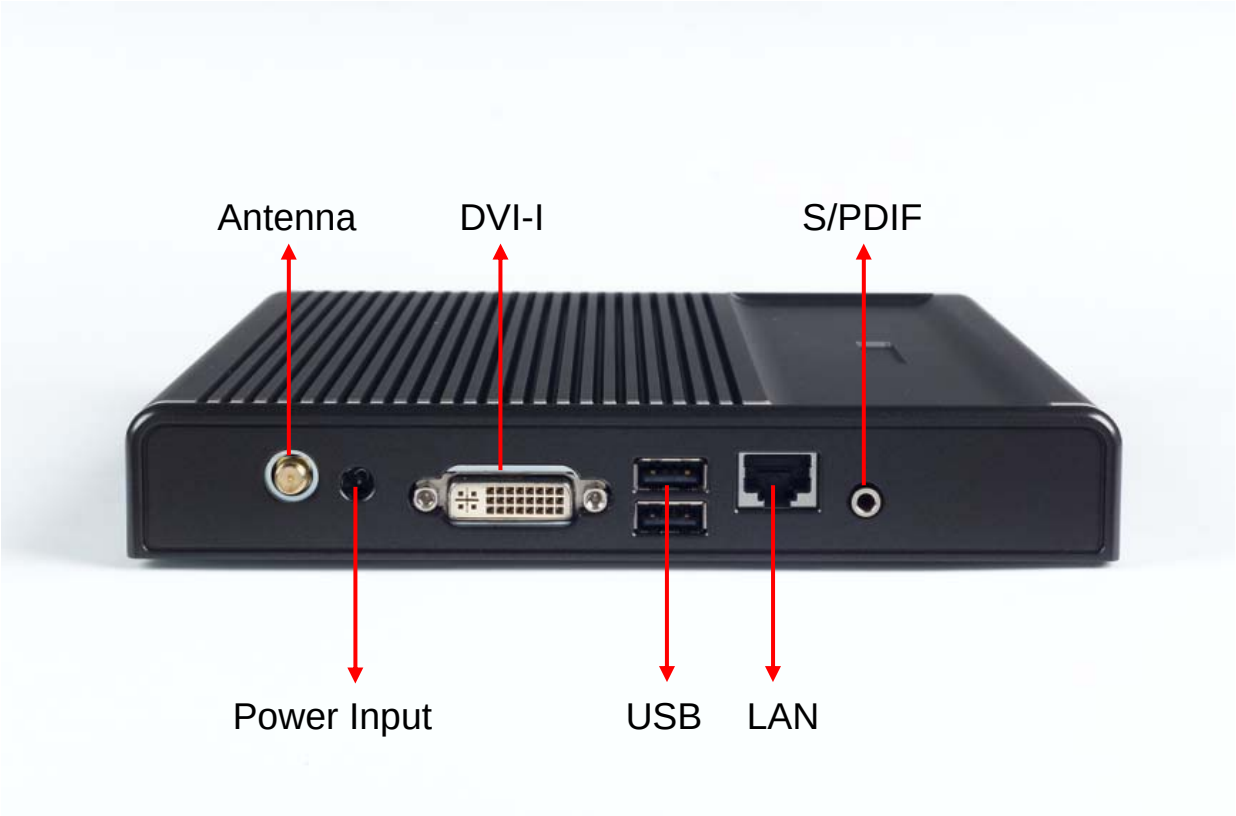
* Specifications are subject to change without notice.

1.5 External I/O

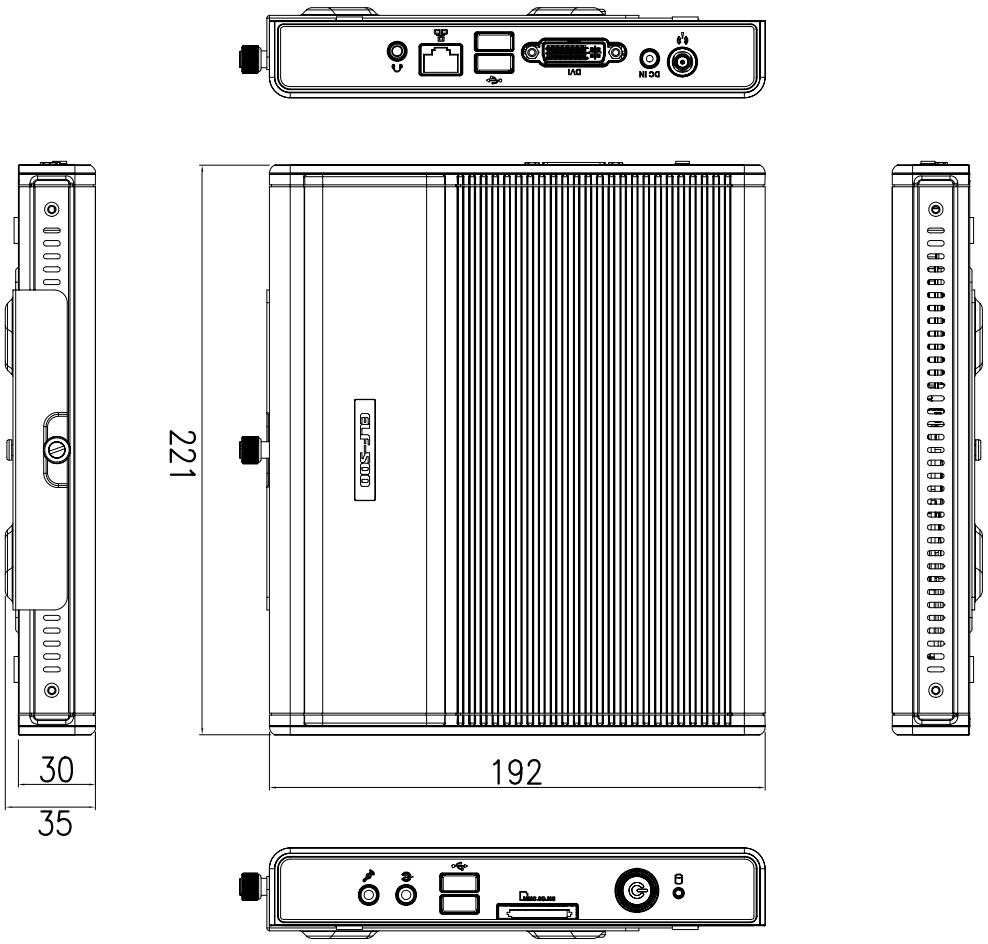
Front Panel

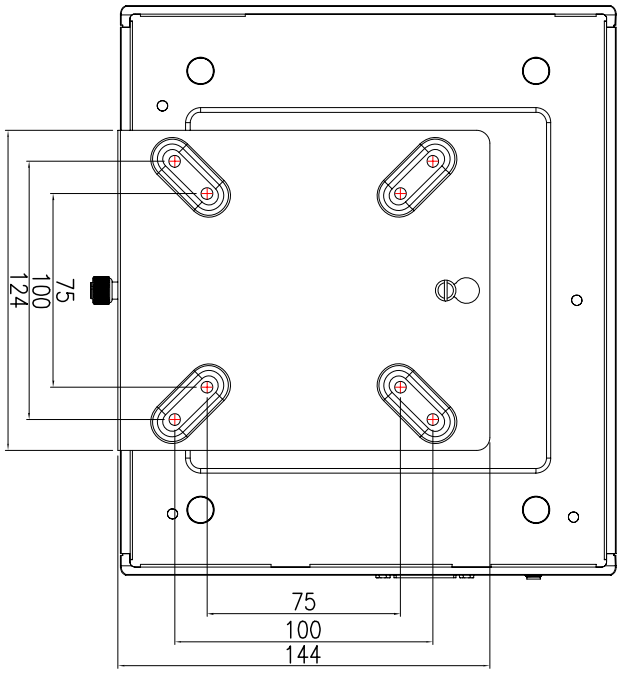


Rear Panel



1.6 Mechanical Dimensions





Dimensions in mm

1.7 Before you proceed

Take note of the following precautions before you install box computer components or change any box computer settings.

Unplug the power cord from the wall socket before touching any component.
Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity
Hold components by the edges to avoid touching the ICs on them.
Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.

- **Before you install or remove any component, ensure that the power supply is switched off or the power cord is detached from the power supply.** Failure to do so may cause severe damage to the box computer, peripherals, and/or components.

This chapter describes the procedures for installing system components.

2 Assembly

2 Assembly

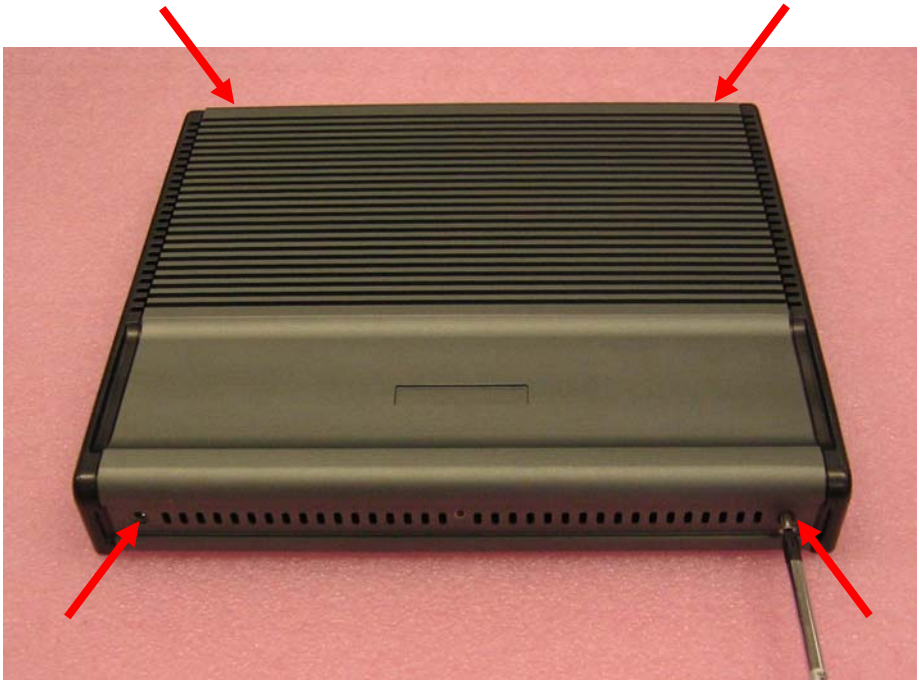
Make sure to unplug the power cord before opening the cover of the box computer. Failure to do so can cause you physical injury and damage system components.

2.1 Accessing Internal Components

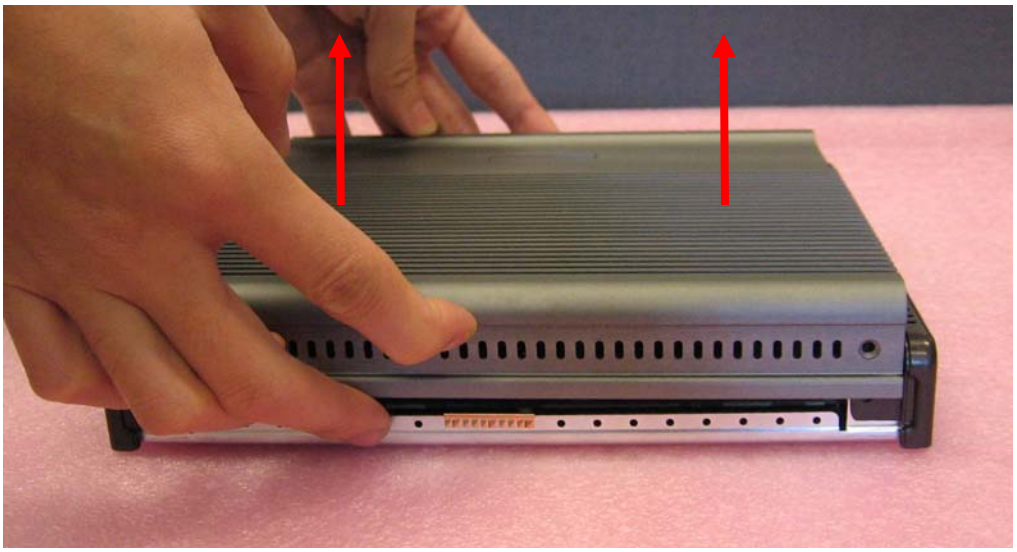
Follow the procedure below to access the system's internal components.

Removing the Cover

1. Remove the four (4) screws securing the chassis cover as shown below.



2. Lift the chassis cover as shown below.

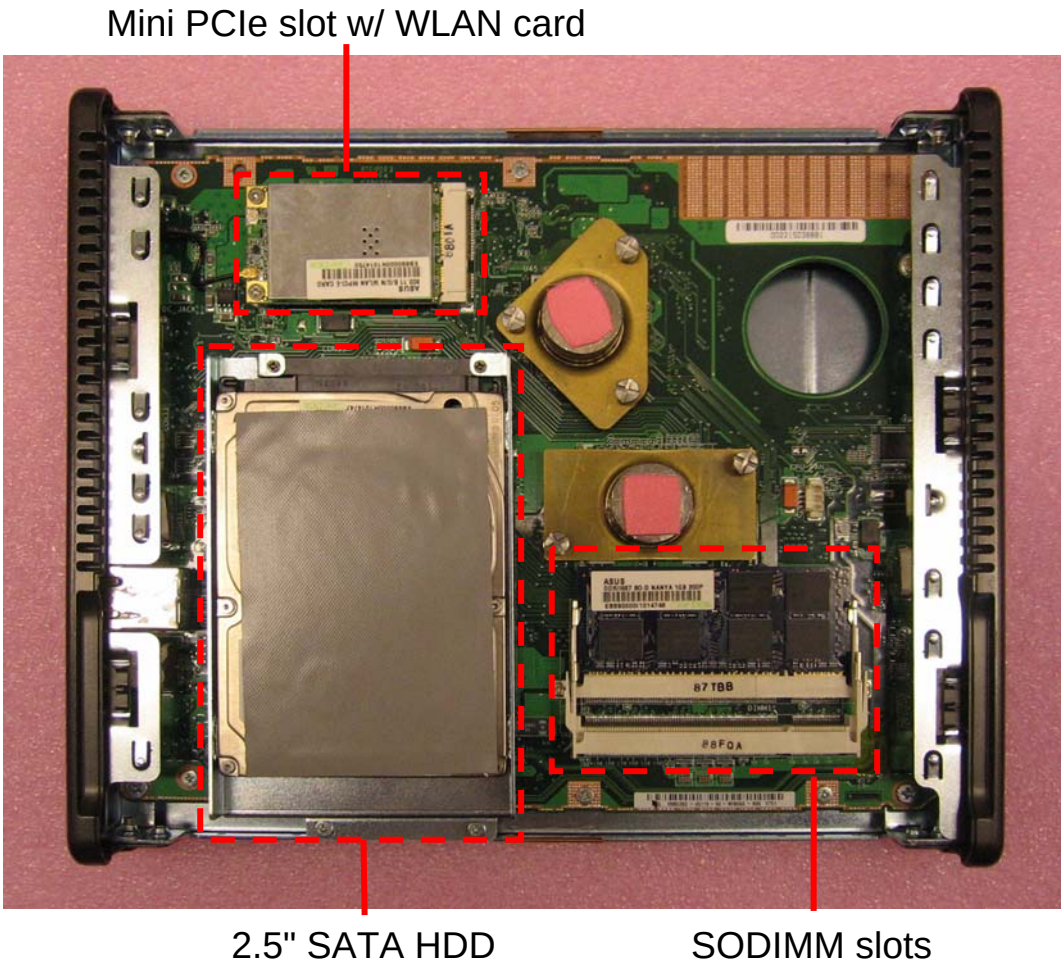


Replacing the Cover

To replace the chassis cover, reverse the steps described above and tighten the four (4) screws securing the cover to the chassis.

2.2 Internal Layout

The locations of the hard drive, SODIMM memory sockets, and Mini PCIe socket with WLAN card installed are shown below



2.3 System Memory

Overview

The ELF-500 comes with two (2) stacked 200-pin DDR2 SODIMM sockets. A 1GB module is pre-installed in the lower socket.

DDR2 modules have the same physical dimensions as a DDR DIMM but have a 200-pin footprint compared to the 184-pin DDR DIMM. DDR2 DIMMs are notched differently to prevent installation on a DDR DIMM socket. See *Internal Layout* above for the location of the sockets.

Memory Configurations

You may install 64 MB, 128 MB, 256 MB, 512 MB and 1 GB unbuffered ECC or non-ECC DDR SODIMMs into the SODIMM sockets. The maximum capacity is 2GB with 2 SODIMM modules installed

Installing a Memory Module

Make sure to unplug the power supply before adding or removing memory modules or other system components. Failure to do so may cause severe damage to both the system and its components.

1. Unlock a SODIMM socket by pressing the retaining clips outward
2. Align a SODIMM on the socket such that the notch on the SODIMM matches the break on the socket.
3. Firmly insert the SODIMM into the socket until the retaining clips snap back in place and the SODIMM is properly seated.

- A DDR2 SODIMM is keyed with a notch so that it fits in only one direction. DO NOT force a SODIMM into a socket to avoid damaging the SODIMM.
- The DDR2 SODIMM sockets do not support DDR SODIMMs. DO NOT install DDR SODIMMs to the DDR2 SODIMM socket.

Removing a Memory Module

1. Simultaneously press the retaining clips outward to unlock the SODIMM.

Support the SODIMM lightly with your fingers when pressing the retaining clips. The SODIMM may be damaged by the "spring release" effect when the clips are released.

2. Remove the SODIMM from the socket.

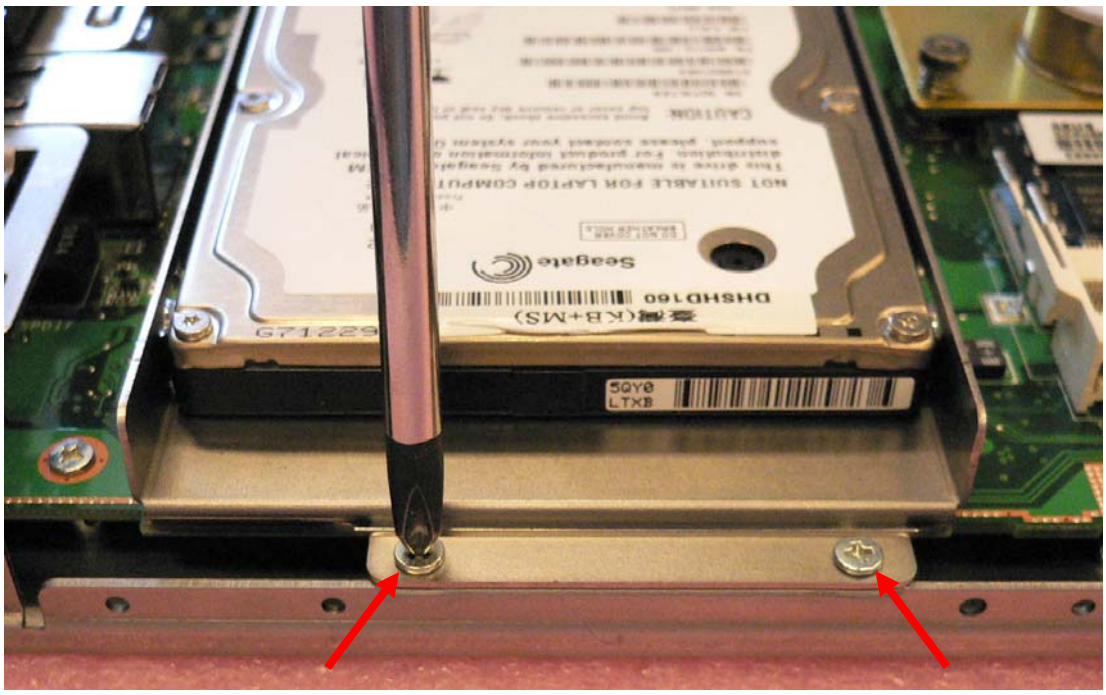
2.4 Hard Disk Drive

Overview

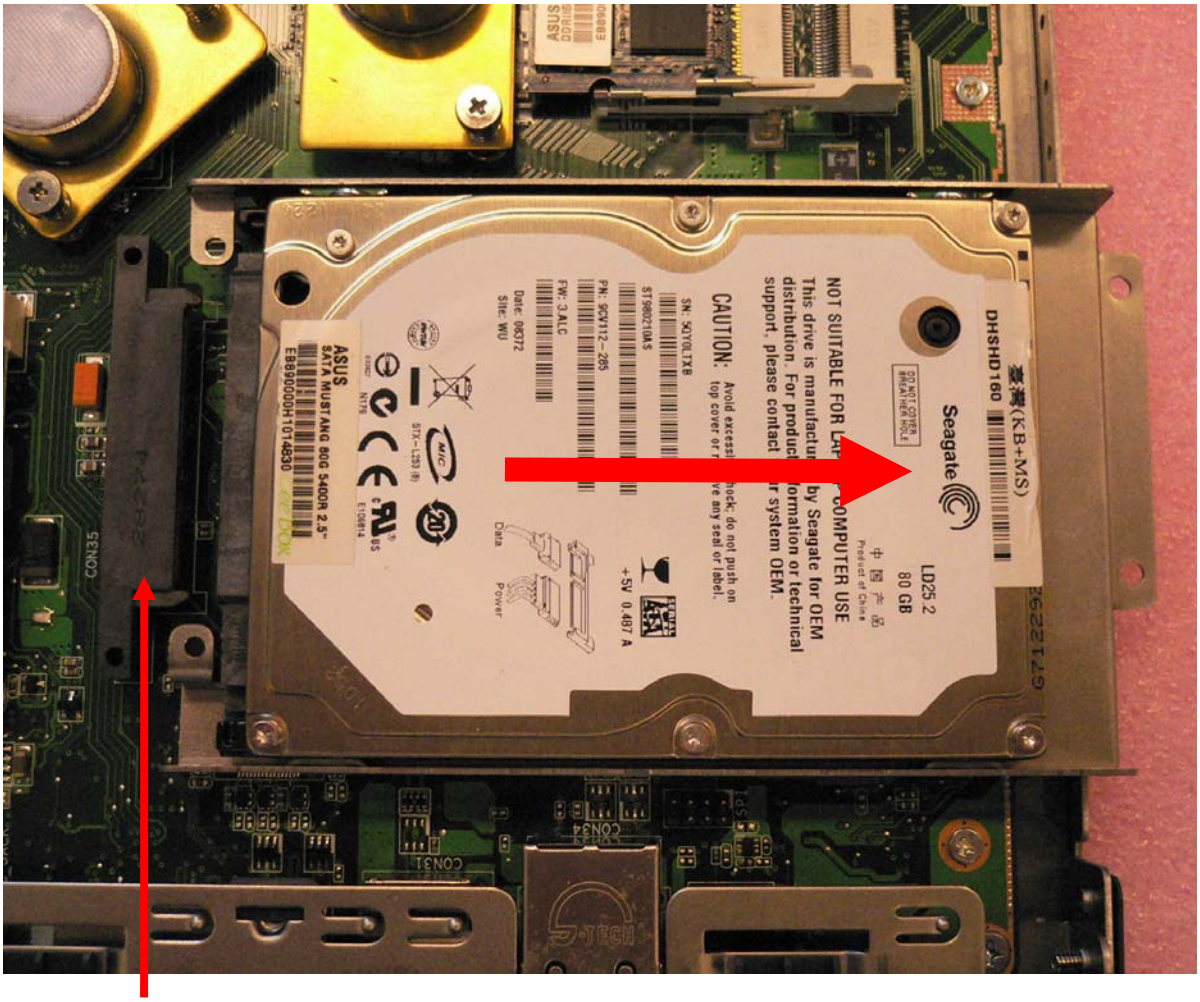
The ELF-500 comes with an 80GB 2.5" SATA hard disk drive pre-installed.

Removing the Hard Disk Drive

1. Carefully remove the thermal pad affixed to the hard disk drive and set aside.
2. Remove the hard disk drive, loosen the four (4) screws securing the hard drive bracket to the system board as shown below.

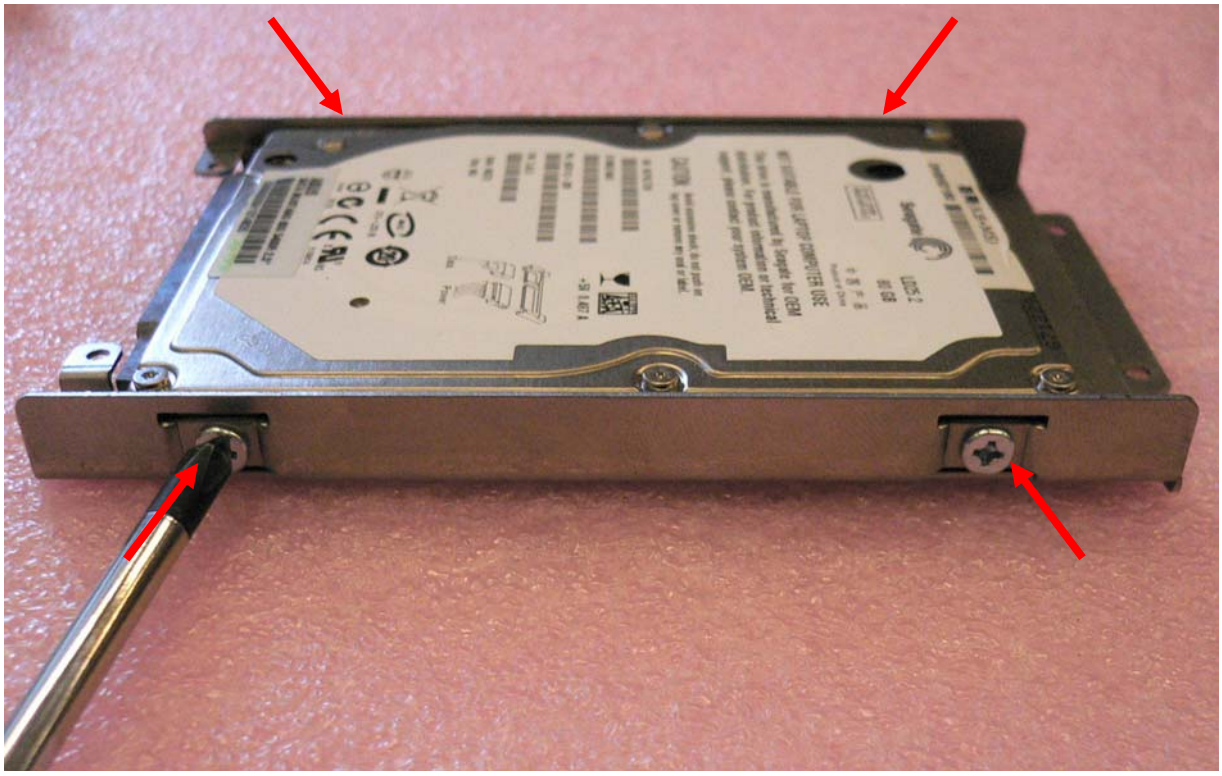


3. Slide the hard drive/bracket assembly towards the edge of the chassis as indicated by the large red arrow below to disconnect it from the connector on the system board. The hard drive/bracket assembly can now be removed from the box computer.



onboard HDD connector

4. Remove the hard disk drive from the bracket by removing the four (4) screws as shown.



Installing the Hard Disk Drive

To install a hard disk drive, reverse the steps for *Removing the Hard Disk Drive* described above.

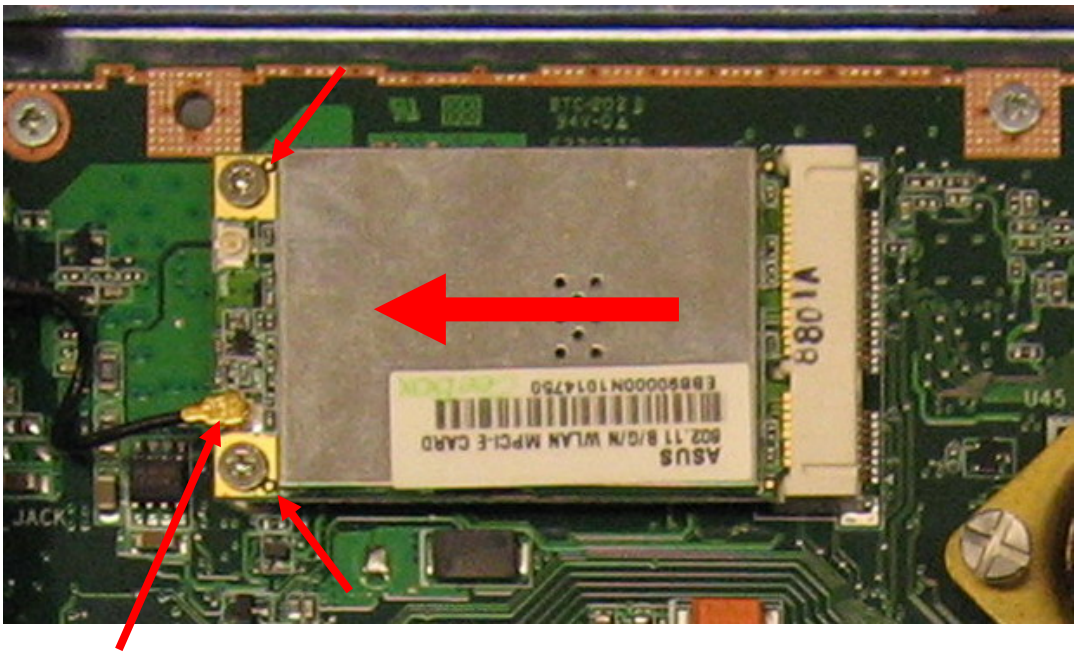
Be sure to replace the thermal pad removed in Step 1 before reinstalling the chassis cover to prevent overheating of the hard disk drive.

2.5 Mini PCIe Card Slot

Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage system components.

Removing the Mini PCIe WLAN Card

1. Disconnect the antenna cable from the WLAN card as indicated below.
2. Remove the two (2) screws securing the card to the system board as indicated.



antenna cable

3. Slide the card in the direction indicated by the large red arrow above to remove it from the Mini PCIe slot.

Installing the Mini PCIe WLAN Card

To install a Mini PCIe WLAN card, reverse the steps described above.

2.6 Installing the Antenna

The ELF-500 comes with a WIFI antenna. To install the antenna, locate the antenna socket on the Rear Panel of the chassis (see *1.5 External I/O*). Screw the antenna into the socket until it is securely attached as shown below.

2.7 Installing the VESA Mount Bracket

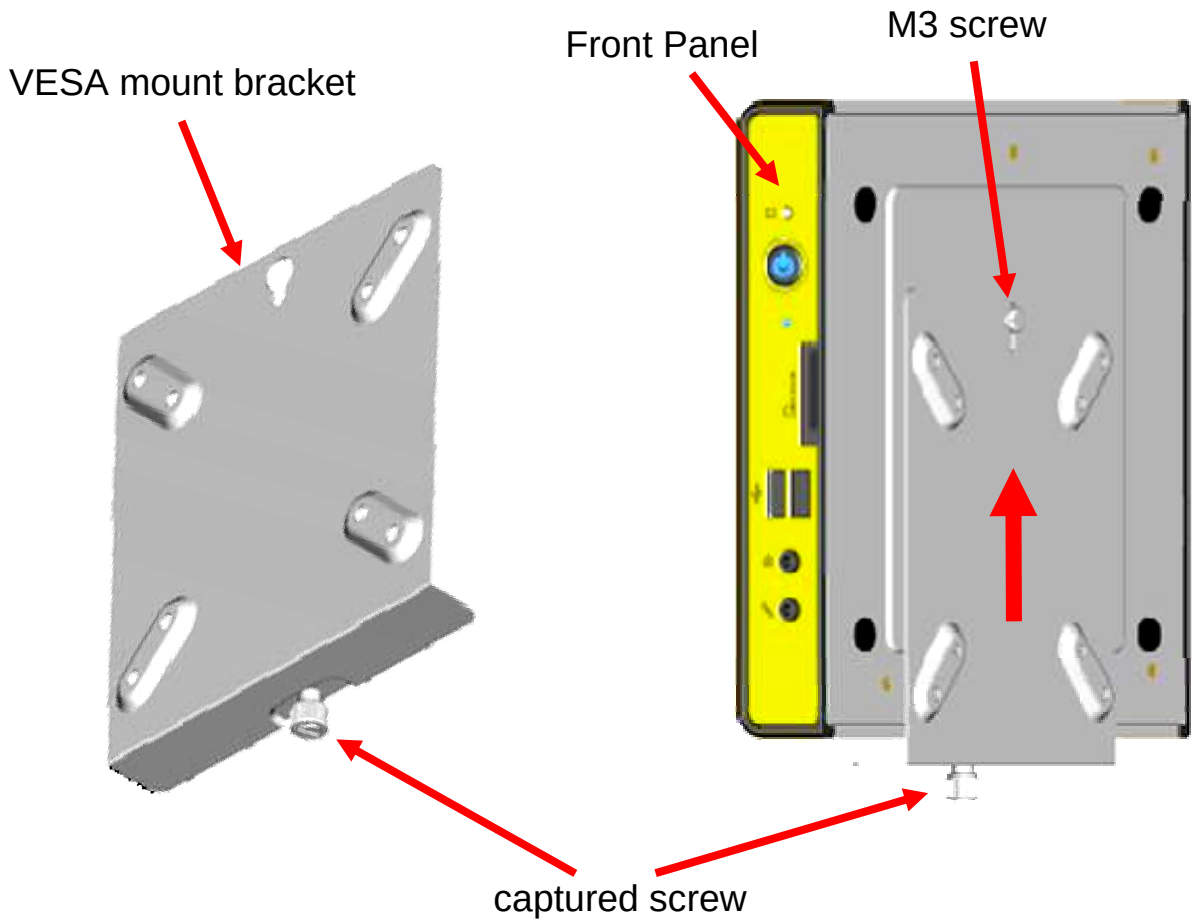
The ELF-500 comes with a VESA mount bracket and a screw bag containing:

- one (1) M3 x 4.3mm screw
- four (4) M4 x 6mm screws

The shorter M3 screw is used to secure the VESA mount bracket to the bottom of the ELF-500 chassis. The four M4 screws are used to secure the box computer using the VESA mount bracket to the desired location.

To attach the VESA mount bracket to the chassis, follow the procedure below.

1. Place the VESA mount bracket against the bottom of the chassis as shown below.
2. Loosely attach the M3 screw to through the keyhole in the bracket to the bottom of the chassis.
3. Secure the captured screw to the side panel of the chassis, and then tighten the M3 screw to complete the bracket installation



This chapter describes how to
begin using your box computer.

3 Getting Started

3 Getting Started

Before you install the ELF-500, check the installation environment to ensure that the box computer can be suitably and safely installed.

Make sure to unplug the power cord before installing or moving the box computer. Failure to do so can cause you physical injury and damage system components.

3.1 Power Connection

The ELF-500 comes with an AC power adapter (110~240 VAC input, 12 VDC output) and a power cord suitable for your region. Connect the DC output of the power adapter to the DC power input socket on the Rear Panel of the box computer. To power on the system, press the power button on the Front Panel of the box computer.

Make sure to use the power cord suitable for your region. Do not remove or alter the grounding prong on the power cord. In situations where a two-slot receptacle is present, have it replaced with a properly grounded three-prong grounding type receptacle.

3.2 Operating System and Drivers

The ELF-500 does not come with an operating system pre-installed. You will need to install an operating system and the necessary drivers to operate it. After you have finished assembling your system and connected the power supply provided, power it up using the power switch and install the desired operating system.

The ELF-500 has been qualified to run the Windows XP Embedded operating system. If you have purchased a license, the Windows XP Embedded operating system will be pre-installed on the ELF-500 at the factory.

This chapter describes use the BIOS Setup Utility. Detailed descriptions of the BIOS parameters are also provided.

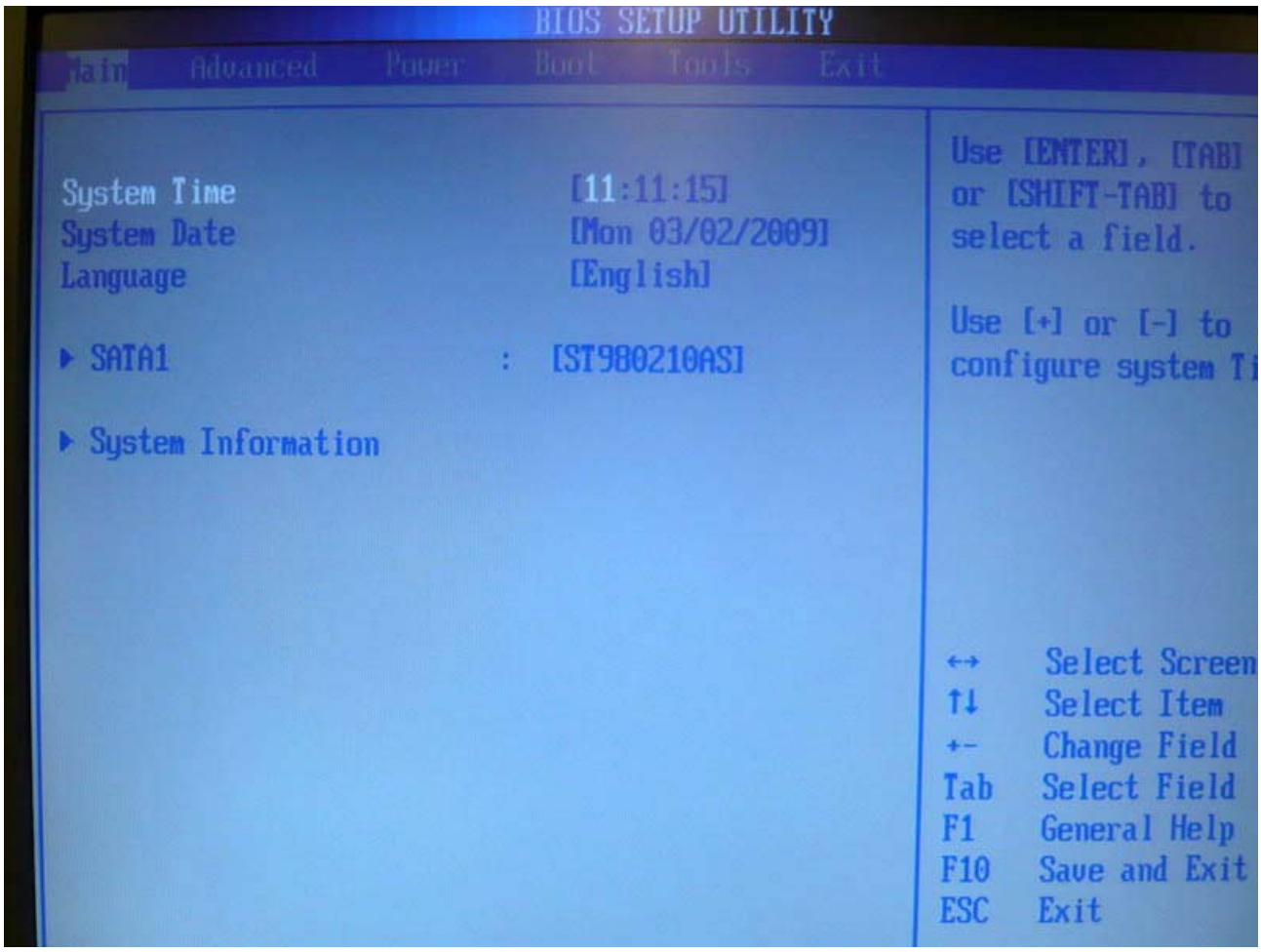
4 BIOS Setup

4 BIOS Setup

The following chapter describes basic navigation for the BIOS Setup Utility.

4.1 Entering BIOS Setup Utility

To enter the BIOS Setup Utility, power on the system and press the <DEL> key when boot-up screen appears. The Main BIOS Setup Menu will then display as below.



The Main BIOS Setup Menu screen has two main frames. The left frame displays all the options that can be configured. “Grayed” options cannot be configured, “Blue” options can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. A text message will often accompany it.

Navigation

The BIOS Setup Utility is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the Advansus website to download the latest BIOS file for this motherboard.

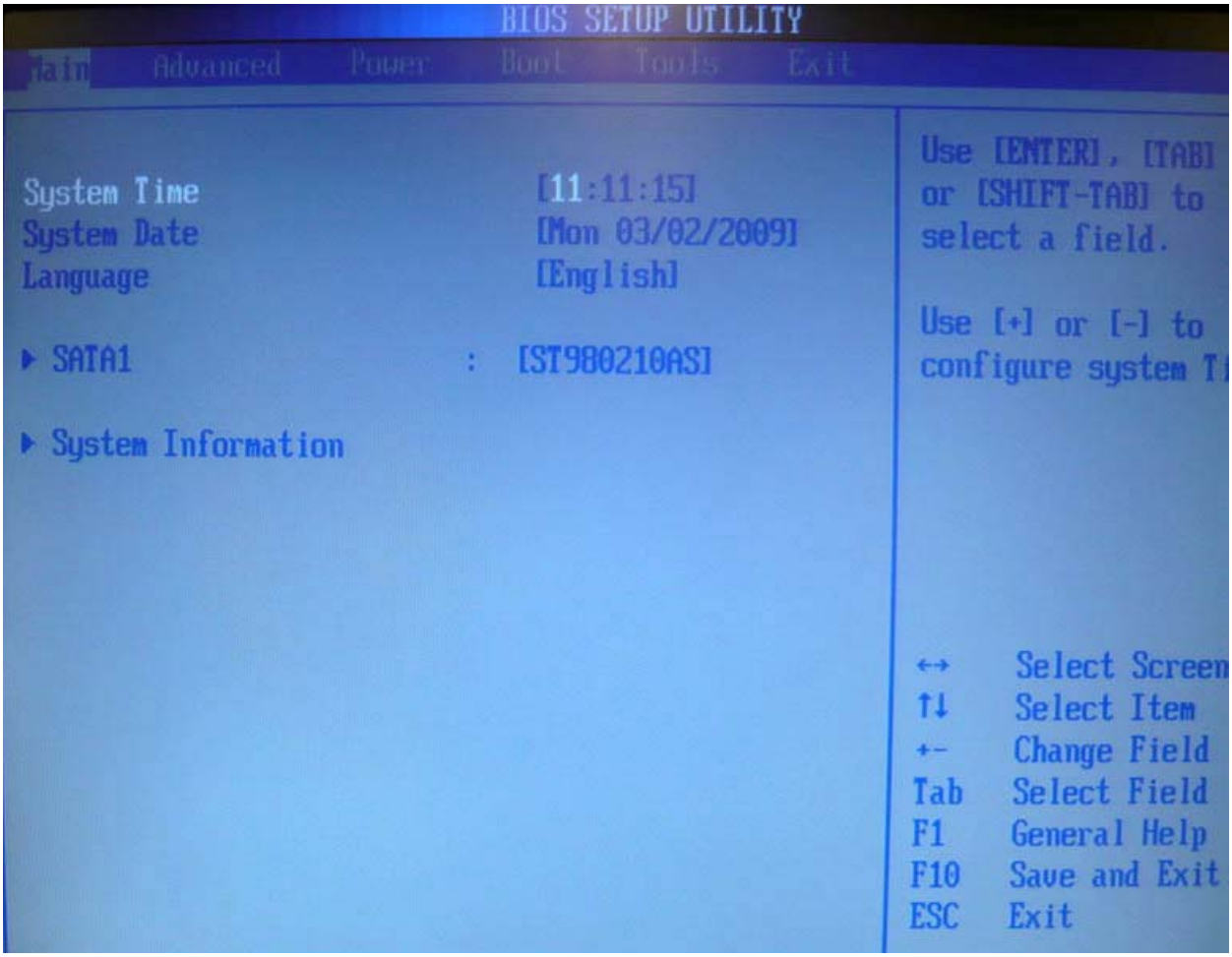
Hotkey Legend

The BIOS Setup Utility uses a hotkey-based navigation system. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

Key(s)	Function Description
→ ←	Left/Right. The *Left* and *Right* < Arrow > keys allow you to select a setup screen.
↑ ↓	Up/Down. The *Up* and *Down* < Arrow > keys allow you to select a setup item or sub-screen.
+ -	Plus/Minus The *Plus* and *Minus* < Arrow > keys allow you to change the field value of a particular setup item.
Tab	The < Tab > key allows you to select setup fields.
F8	The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.
F1	The < F1 > key allows you to display the *General Help screen*.
F10	The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes.
ESC	The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes.
Enter	The < Enter > key allows you to display or change the setup option listed for a particular setup item. The < Enter > key can also allow you to display the setup sub-screens.

4.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

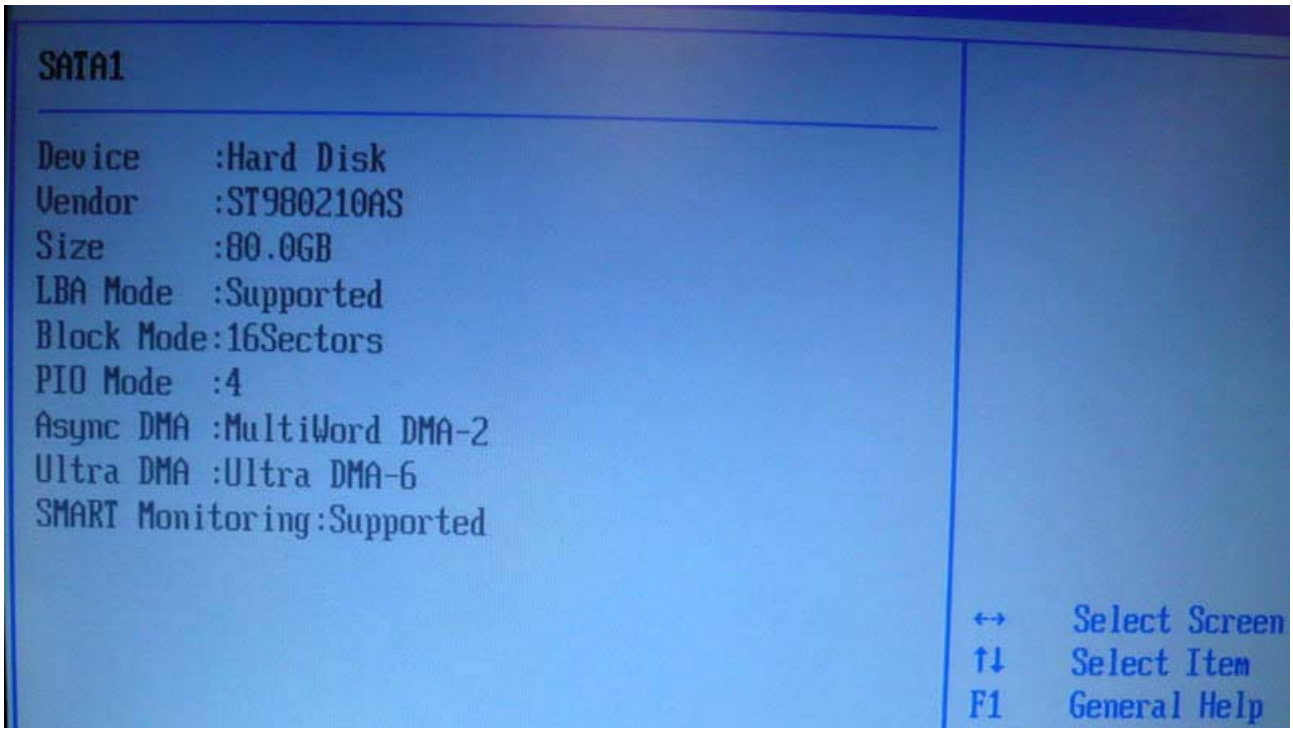


System Time/Date

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the < `Arrow` > keys. Enter new values using the keyboard. Press the < `Tab` > key or the < `Arrow` > keys to move between fields. The time is entered in HH:MM:SS format (24-hour format). The date must be entered in MM/DD/YY format.

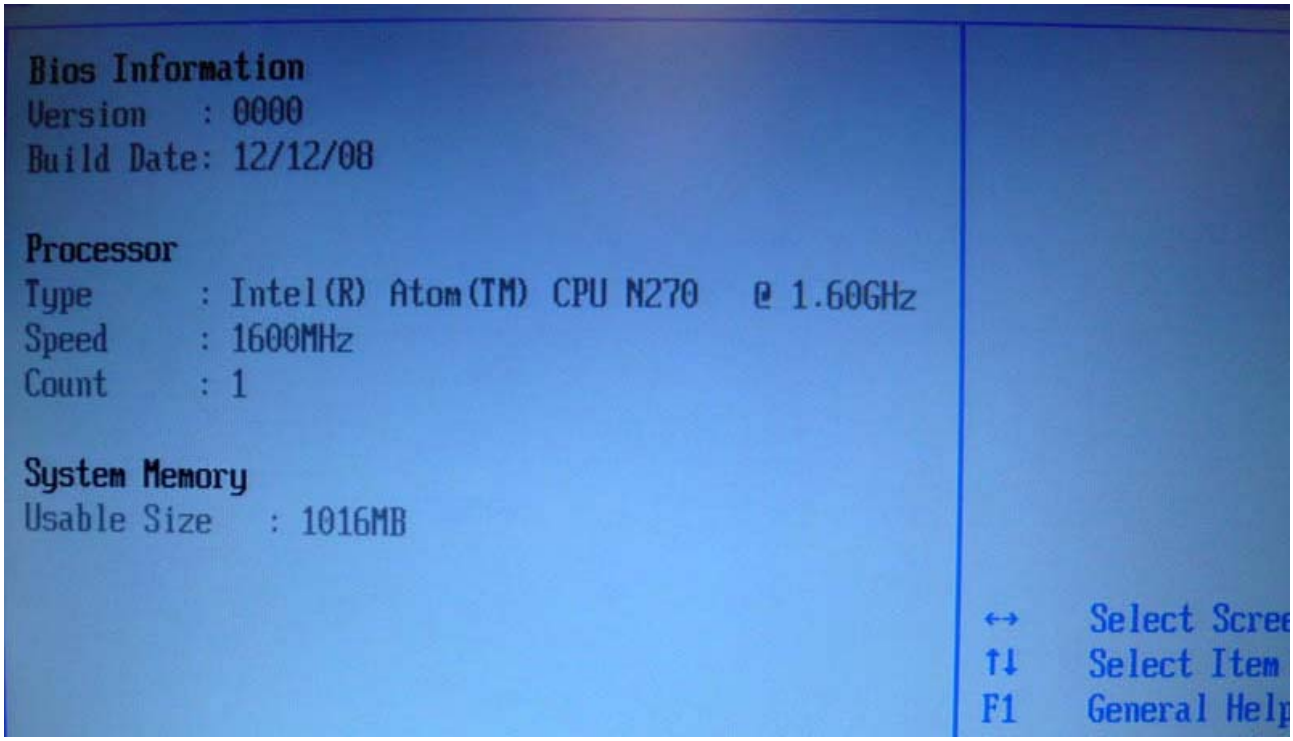
SATA1

Use this submenu to view the details of the onboard SATA hard disk drive.



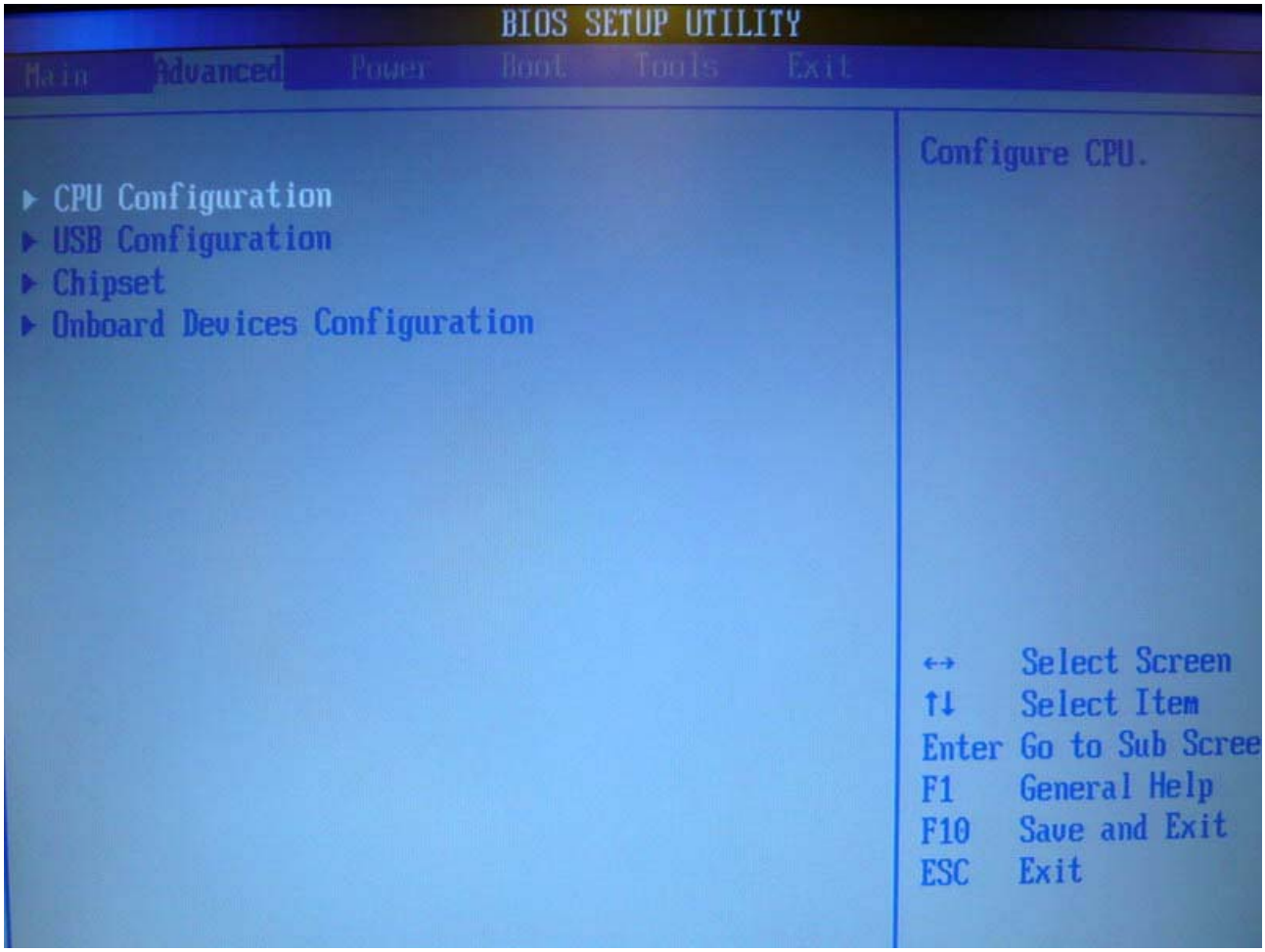
System Information

Use this submenu to view information on the BIOS version, CPU and .memory.



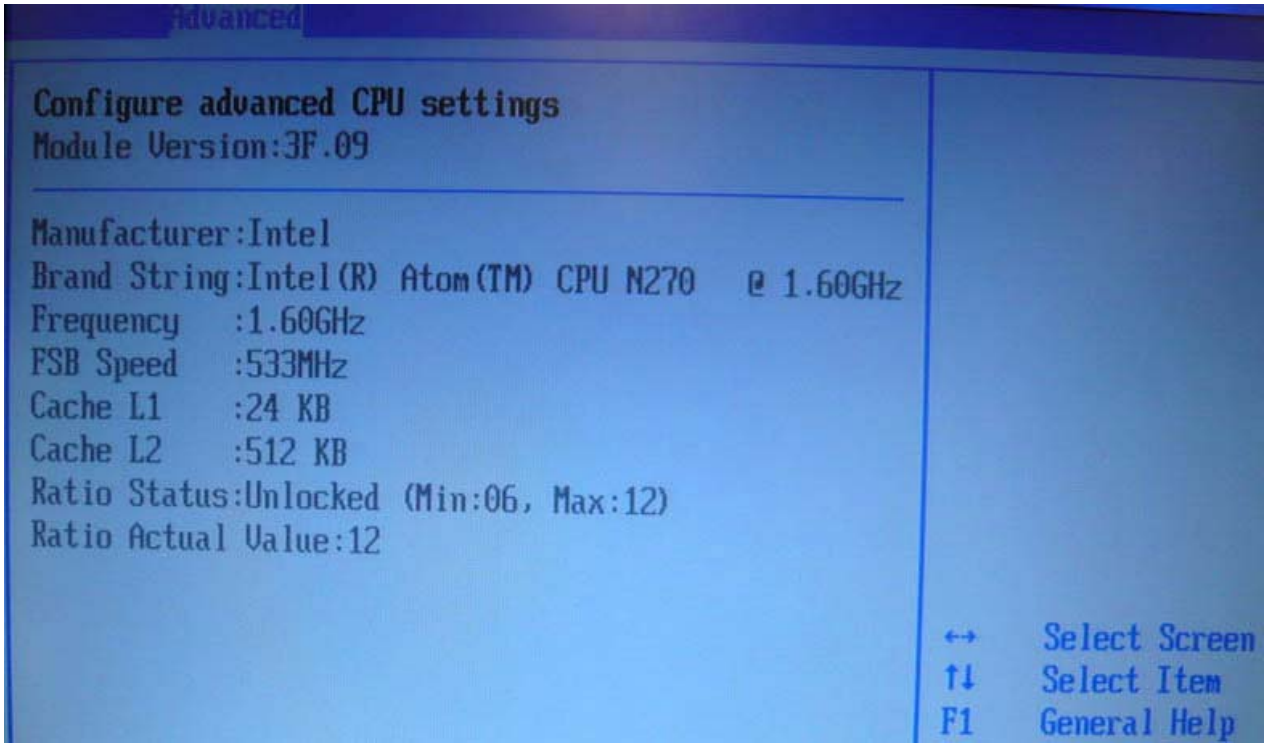
4.3 Advanced BIOS Setup

Select the *Advanced* tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < `Arrow` > keys. The Advanced BIOS Setup screen is shown below.



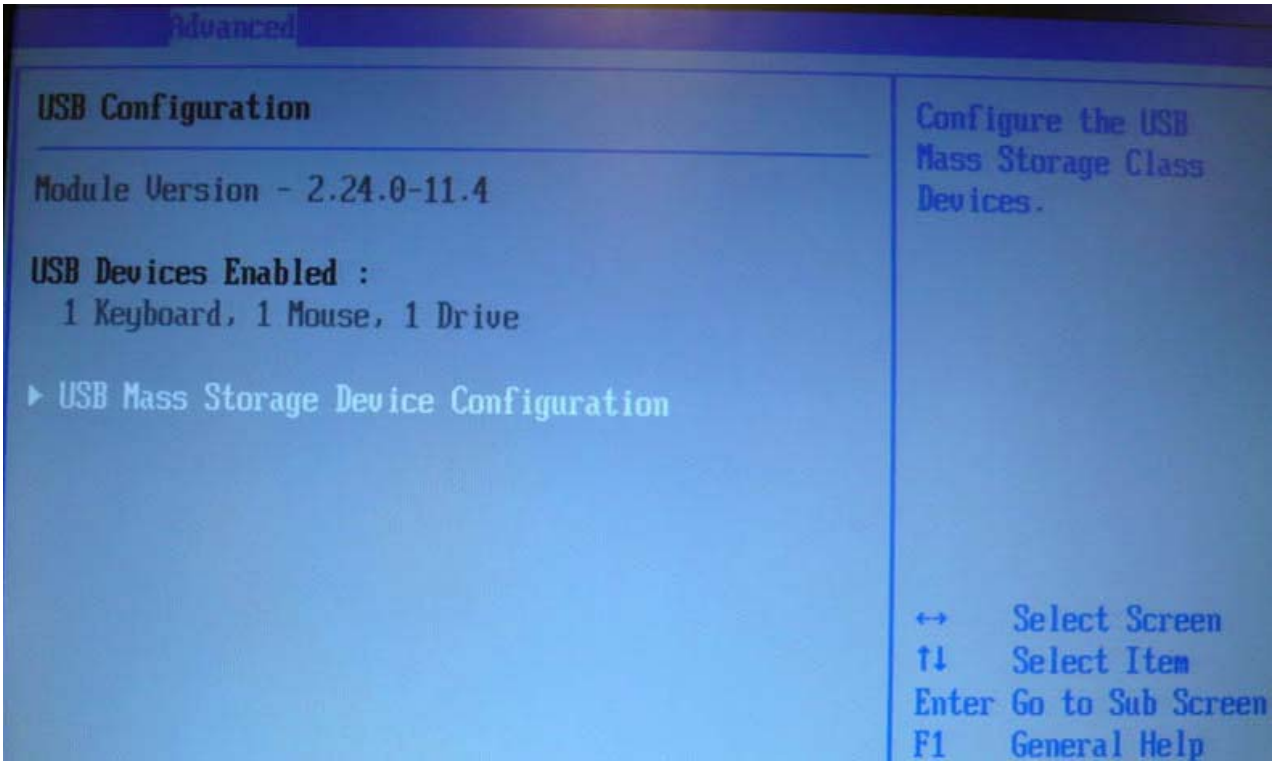
CPU Configuration

Use this submenu to view the details of the CPU settings.



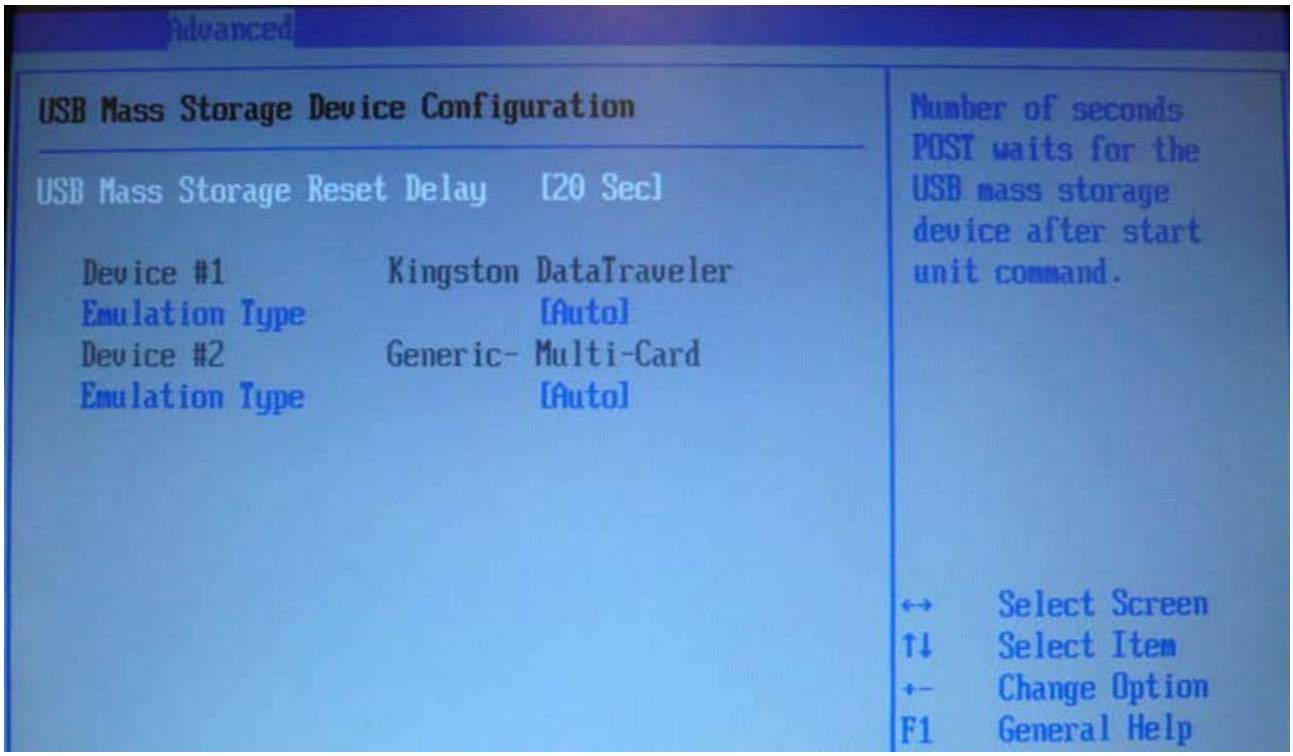
USB Configuration

Use this submenu to view the enabled USB devices, and configure the USB Mass Storage Class Devices.



USB Mass Storage Device Configuration

Use this submenu to configure the USB Mass Storage Class Devices



USB Mass Storage Reset Delay

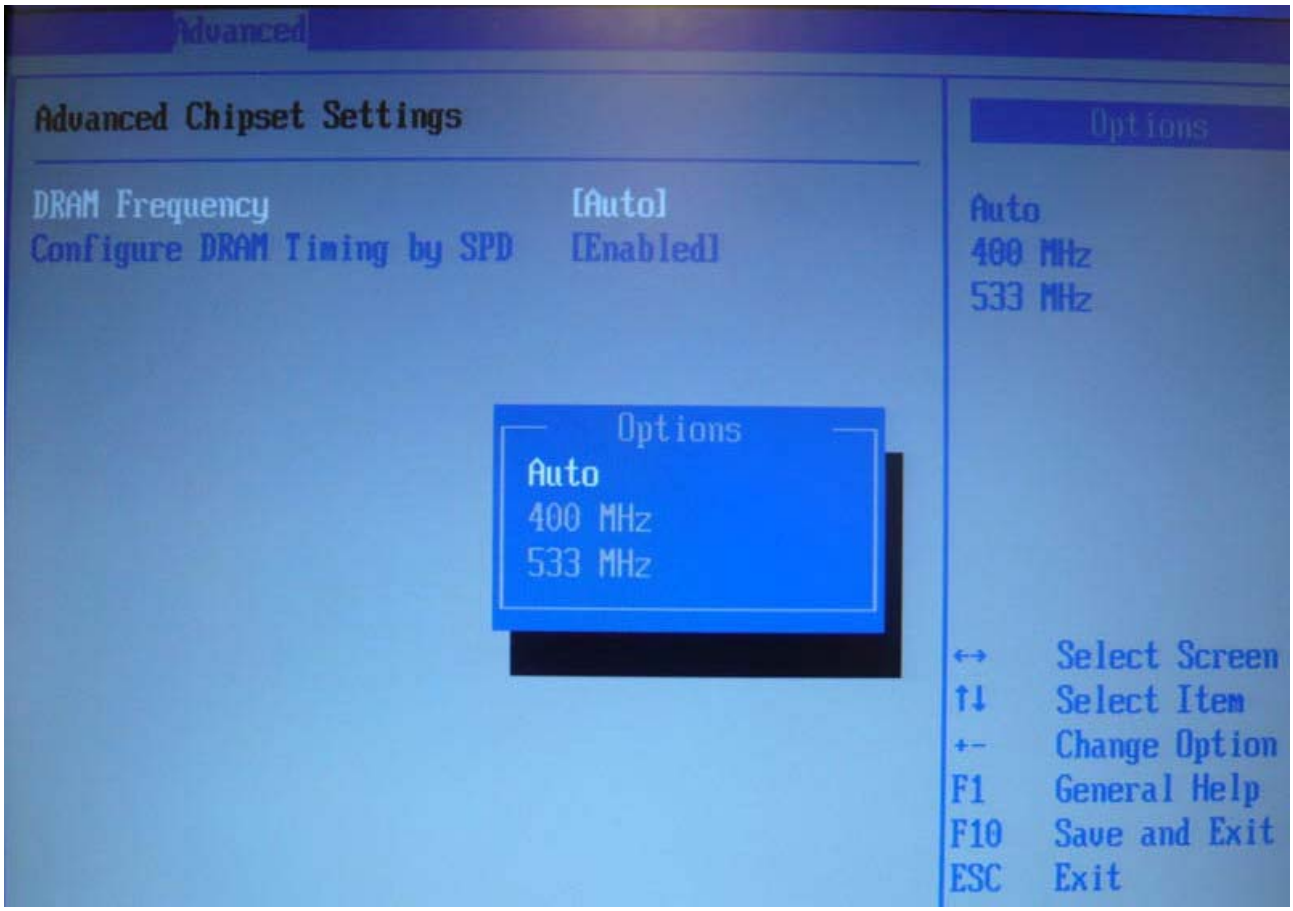
This option specifies amount of time the USB code should wait after issuing a reset to the USB mass storage devices.

Emulation Type

Emulation Type can be set according to the type of attached USB mass storage device(s). If set to Auto, USB devices less than 530MB will be emulated as Floppy and those greater than 530MB will remain as hard drive. The Forced FDD option can be used to force a hard disk type drive (such as a Zip drive) to boot as FDD.

Advanced Chipset Settings

Use this submenu to configure Advanced Chipset Settings.



DRAM Frequency

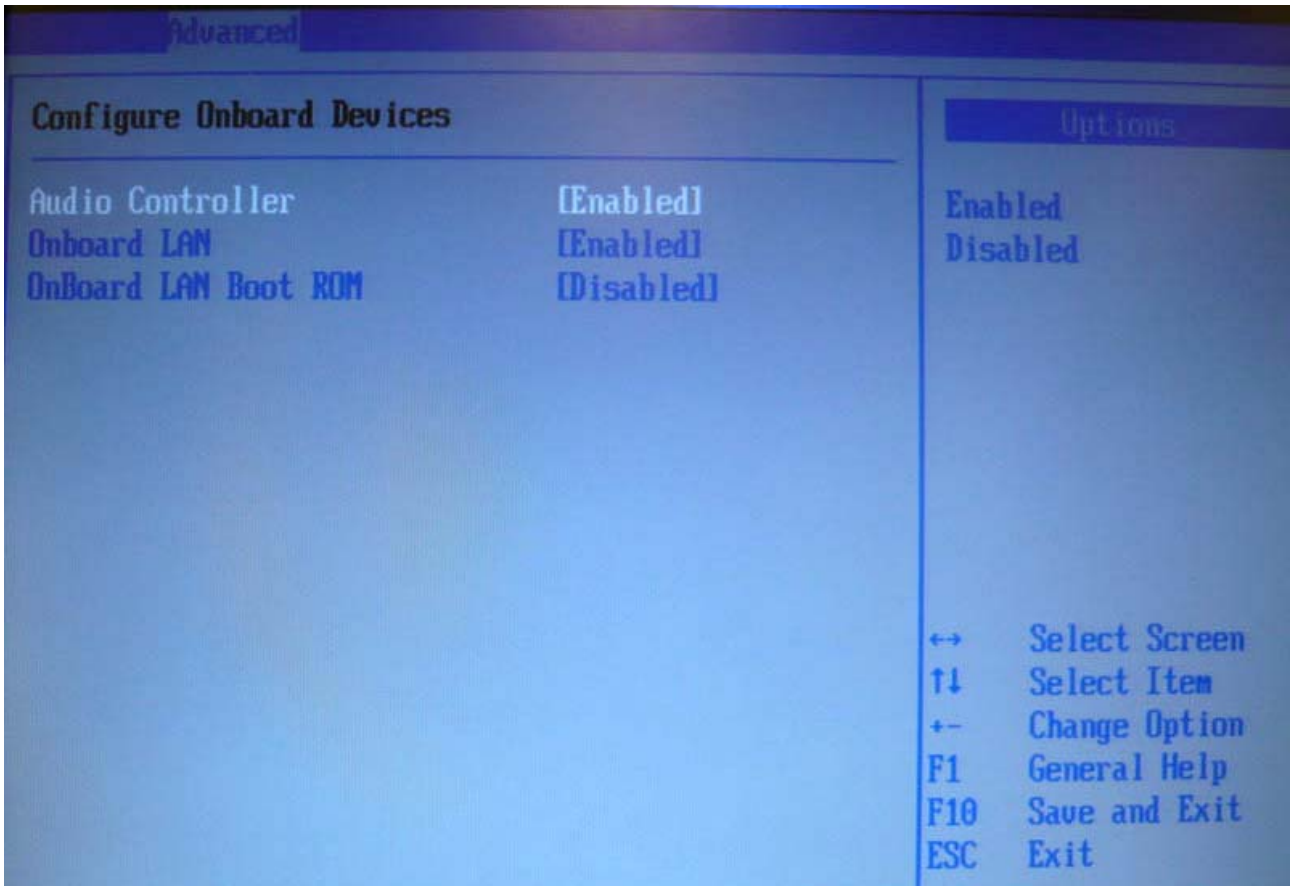
Set DRAM frequency. You can let frequency be set by BIOS automatically or configure it manually.

Configure DRAM Timing by SPD

This option enables/disables configuring of DRAM Timing by SPD.

Onboard Devices Configuration

Use this submenu to configure Onboard Devices.



Audio Controller

This option enables/disables the Audio Controller.

Onboard LAN

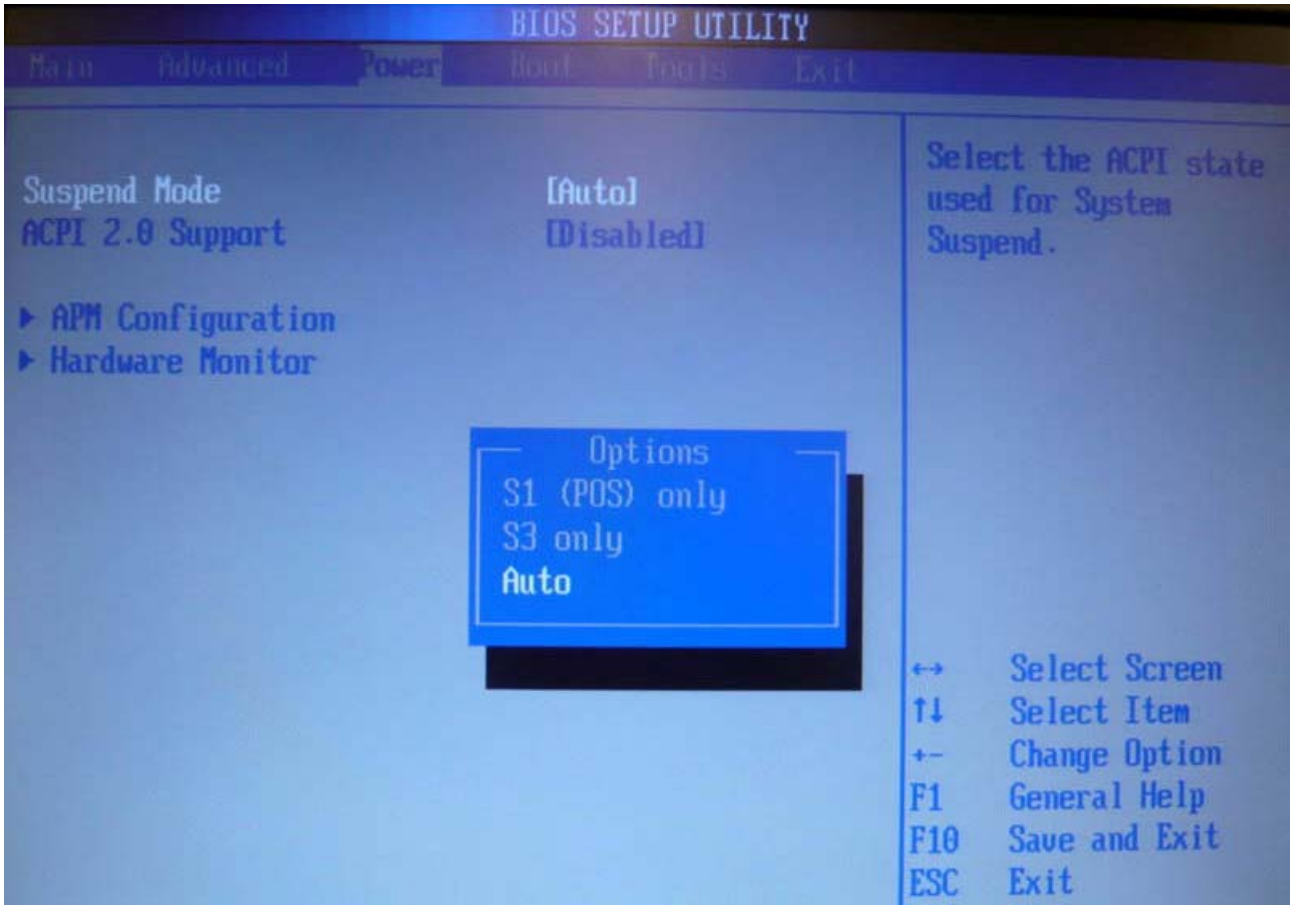
This option enables/disables the Onboard LAN.

Onboard LAN Boot ROM

Set this value to enable/disable the onboard LAN's PXE ROM to enable boot from LAN. Setting to Disabled can shorten the POST time without initializing LAN PXE ROM if boot from LAN is not needed.

4.4 Power Setup

Select the Power tab from the setup screen to enter the power management BIOS Setup screen. You can select any of the items in the left frame of the screen to go to the sub menu for that item. The power management BIOS Setup screen is shown below.



Suspend Mode

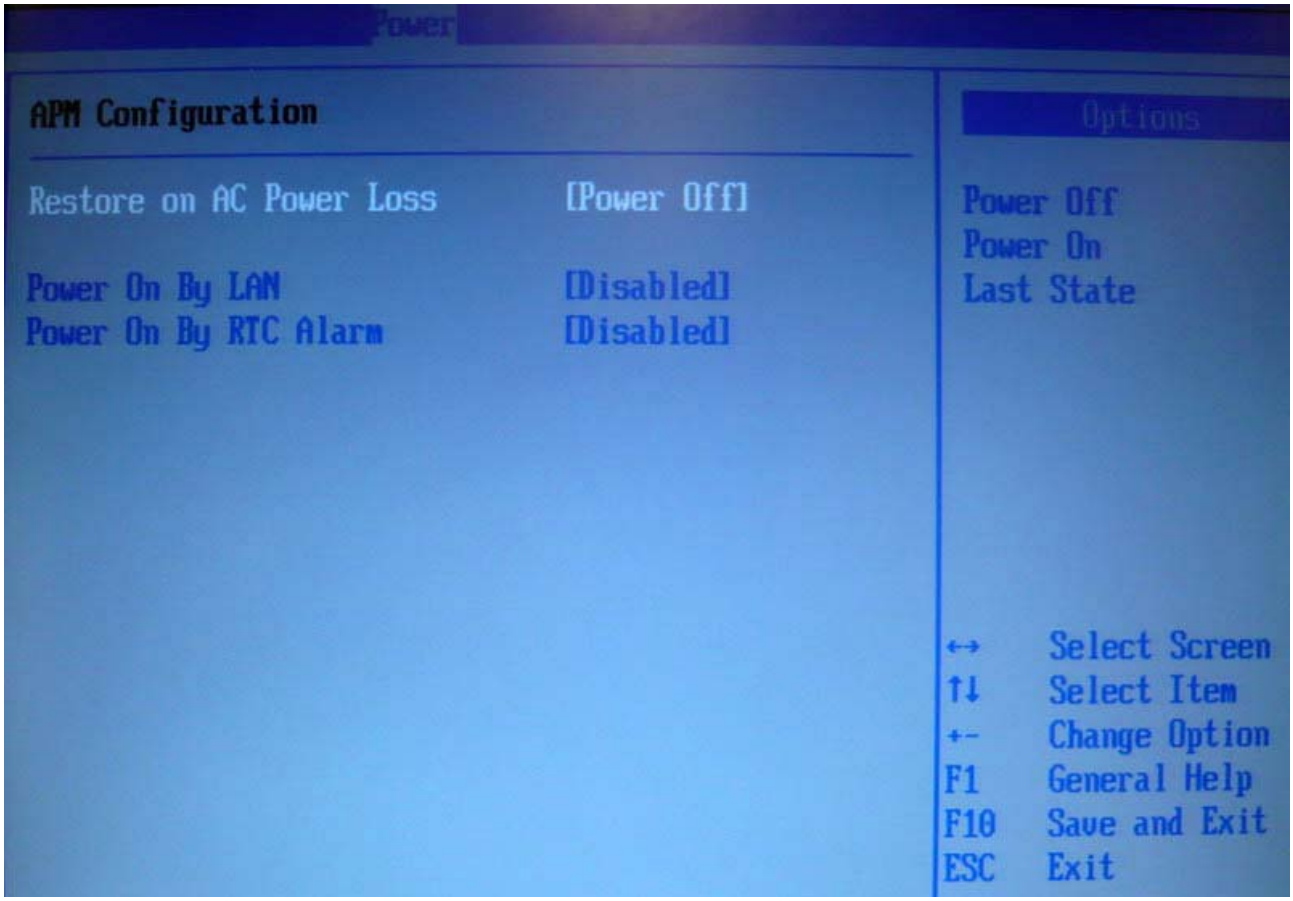
This option selects either **S1 (POS)** or **S3 (STR)** system suspend mode.

S1 (POS)	● Power On Suspend - Under this setting the CPU is not executing instructions, all power resources that supply system level reference of S0 are off, system memory context is maintained, devices that reference power resources that are on are on, and devices that can wake-up the system can cause the CPU to continue to execute from where it left off.
S3 (STR)	● Suspend to RAM - Under this setting the system enters a low power state instead of being completely shut off. This allows the computer system to boot up in a few seconds.

ACPI 2.0 Support

This option enables/disables ACPI 2.0 support.

APM Configuration



Restore on AC Power Loss

This option determines which state the computer enters when AC power is restored after a power loss. The options for this value are **Last State**, **Power On** and **Power Off**.

Power Off	● Set this value to always power off the system while AC power is restored.
Power On	● Set this value to always power on the system while AC power is restored.
Last State	● Set this value to power off/on the system depending on the last system power state while AC power is restored.

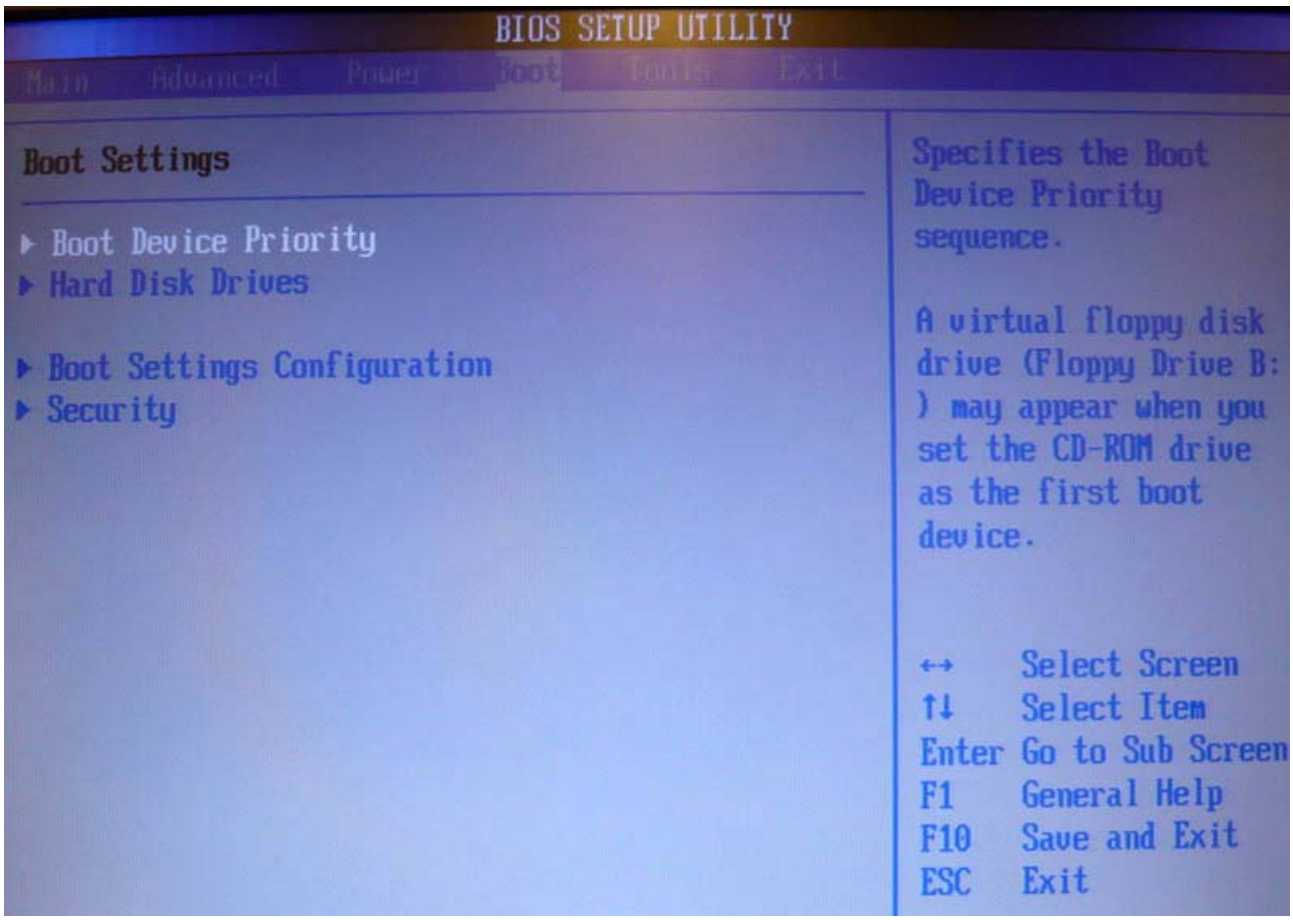
Power On By LAN

This option enables/disables the LAN GPI to generate a wake event.

Power On By RTC Alarm

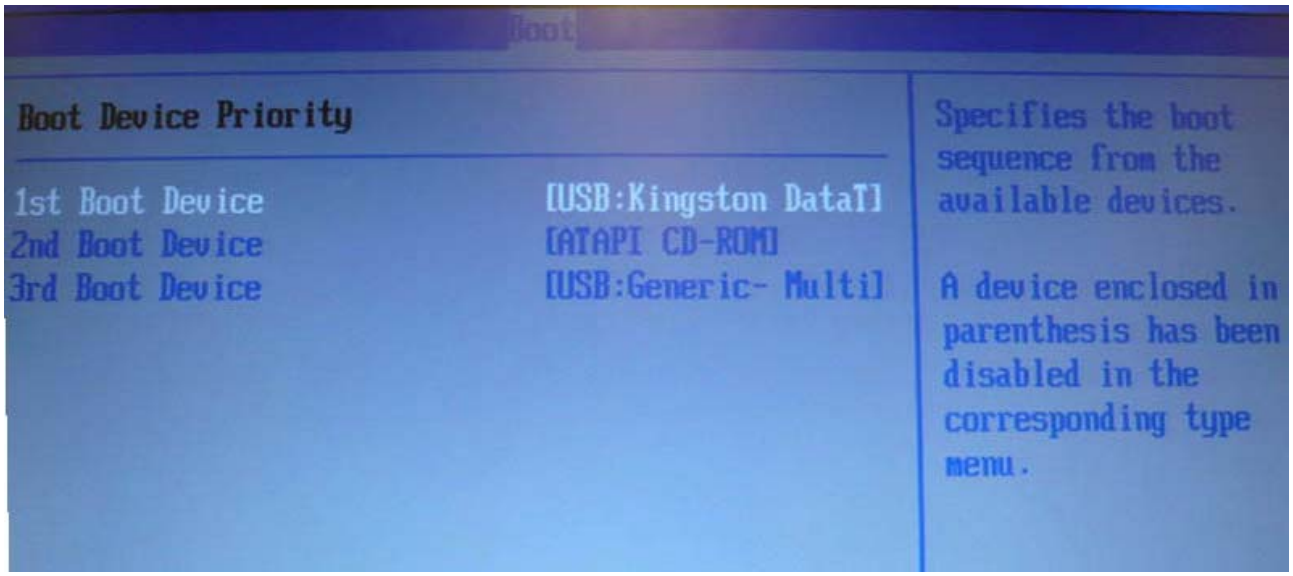
This option enables/disables the Real Time Clock's ability to generate a wake event.

4.5 Boot Settings



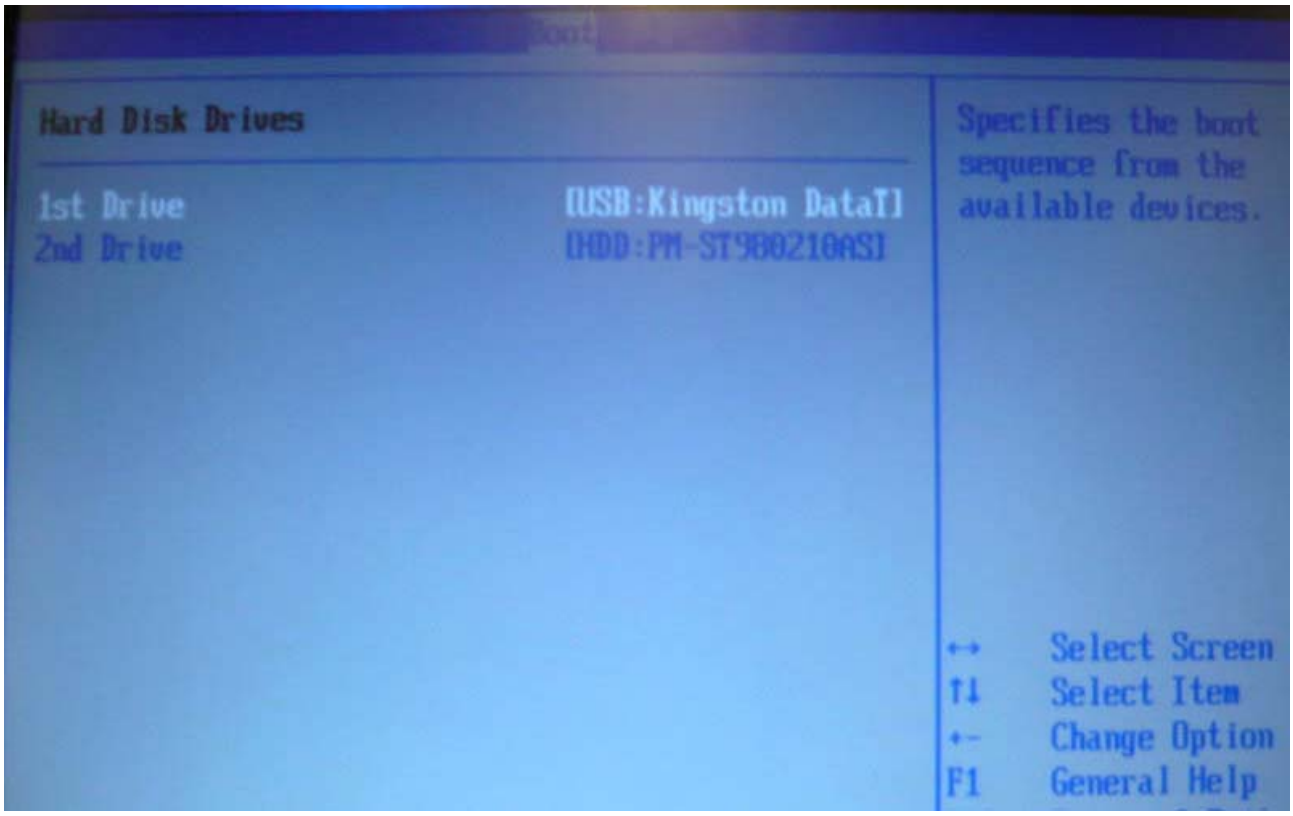
Boot Device Priority

This option determines the sequence in which the computer checks which device to boot from.

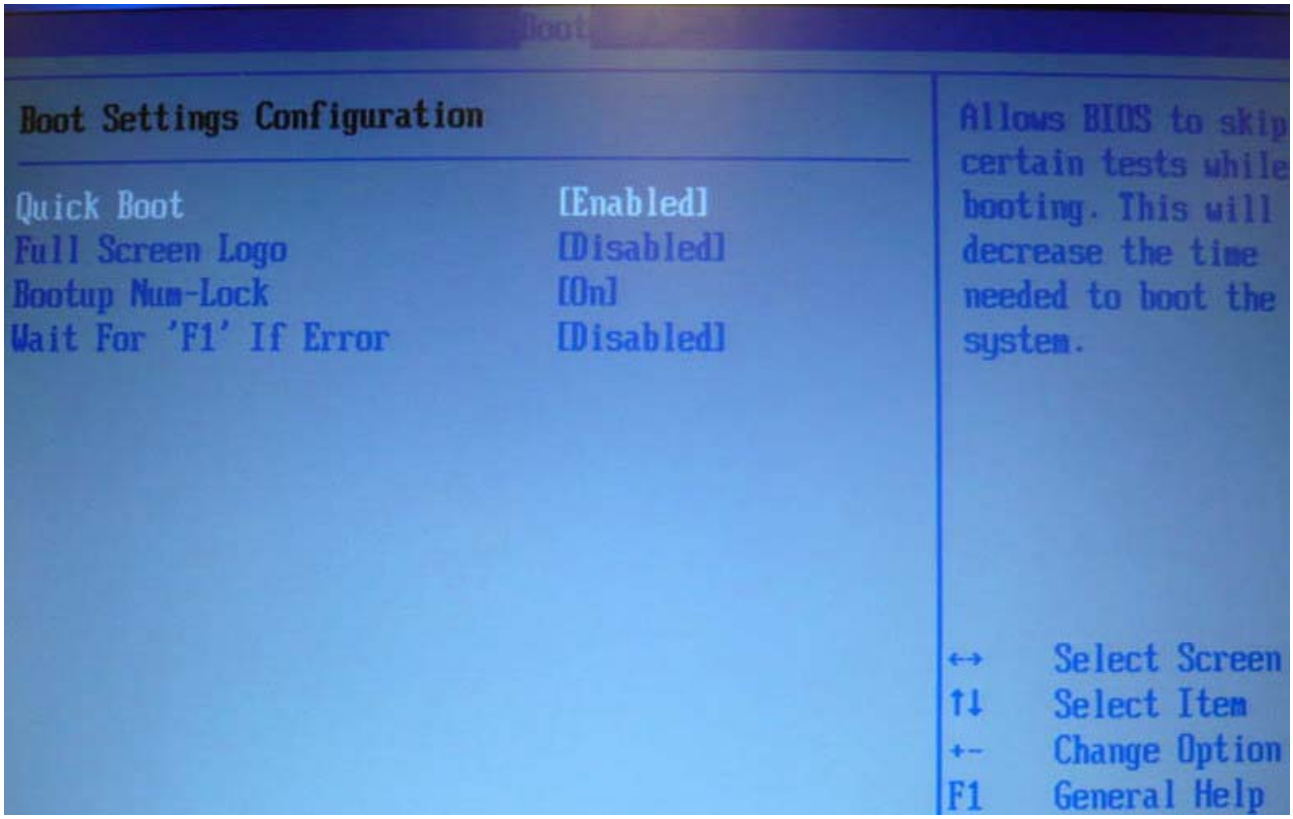


Hard Disk Drives

This option specifies the boot sequence from the available disk drives.



Boot Settings Configuration



Quick Boot

Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

Disabled	● Set this value to allow the BIOS to perform all POST tests.
Enabled	● Set this value to allow the BIOS to skip certain POST tests to boot faster.

Full Screen Logo

This option enables/disables display of the Full Screen Logo during bootup.

Boot Num-Lock

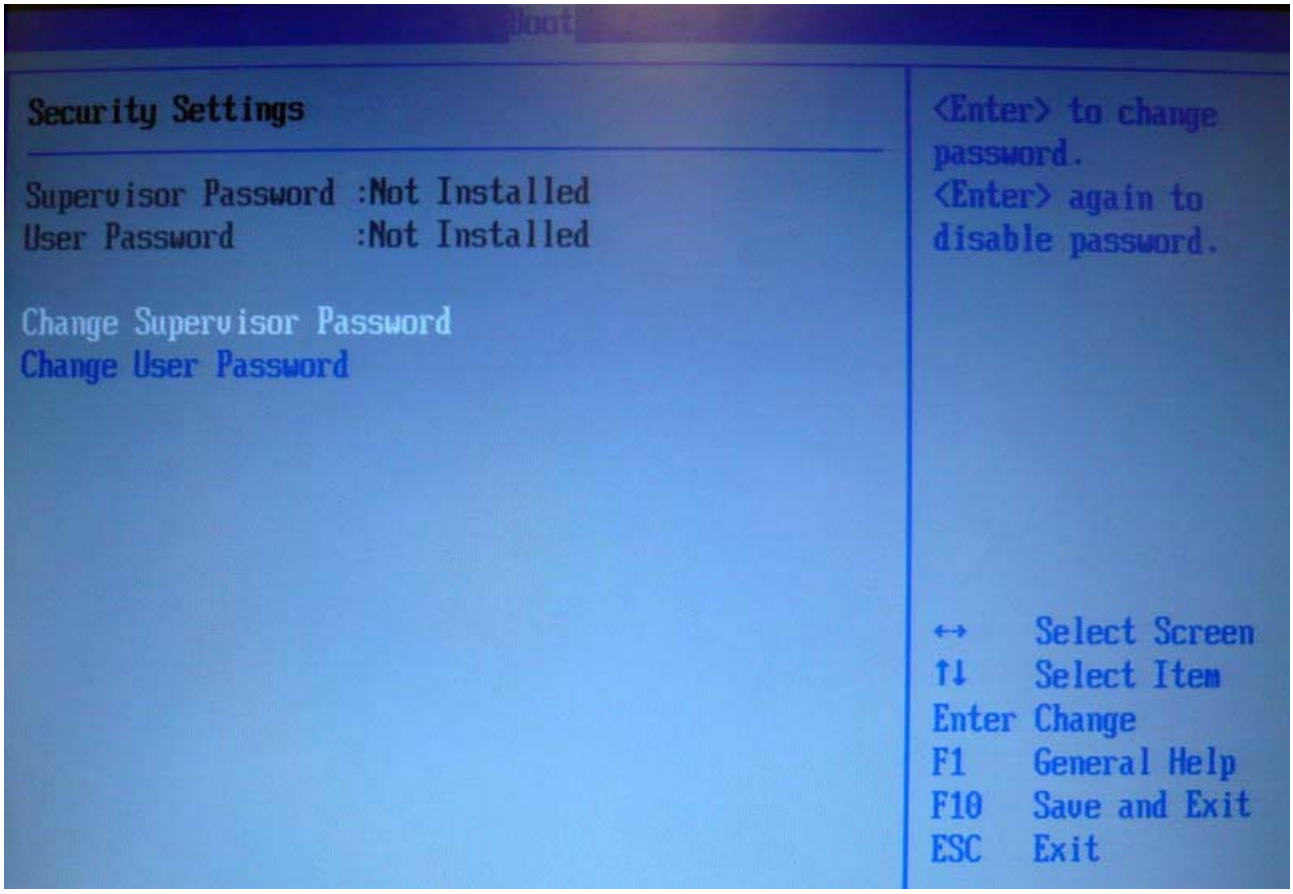
Set this value to allow the Number Lock setting to be modified during boot up.

Off	● This option does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard will light up when the Number Lock is engaged.
On	● Set this value to allow the Number Lock on the keyboard to be enabled automatically when the computer system is boot up. This allows the immediate use of 10-keys numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard will be lit.

Wait For F1 If Error

BIOS POST error messages are followed by: Press <F1> to continue. If this option is set to Disabled, BIOS does not wait for you to press the <F1> key after an error message. The settings are Disabled or Enabled.

Security Settings



Two Levels of Password Protection

BIOS provides both a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

The system can be configured so that all users must enter a password every time the system boots or when Setup is executed, using either or either the Supervisor password or User password.

The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain NVRAM and re-configure.

Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM.

To access the sub menu for the following items, select the item and press < `Enter` >:

- Change Supervisor Password
- Change User Password
- Clear User Password

Supervisor Password

Indicates whether a supervisor password has been set.

User Password

Indicates whether a user password has been set.

Change Supervisor Password

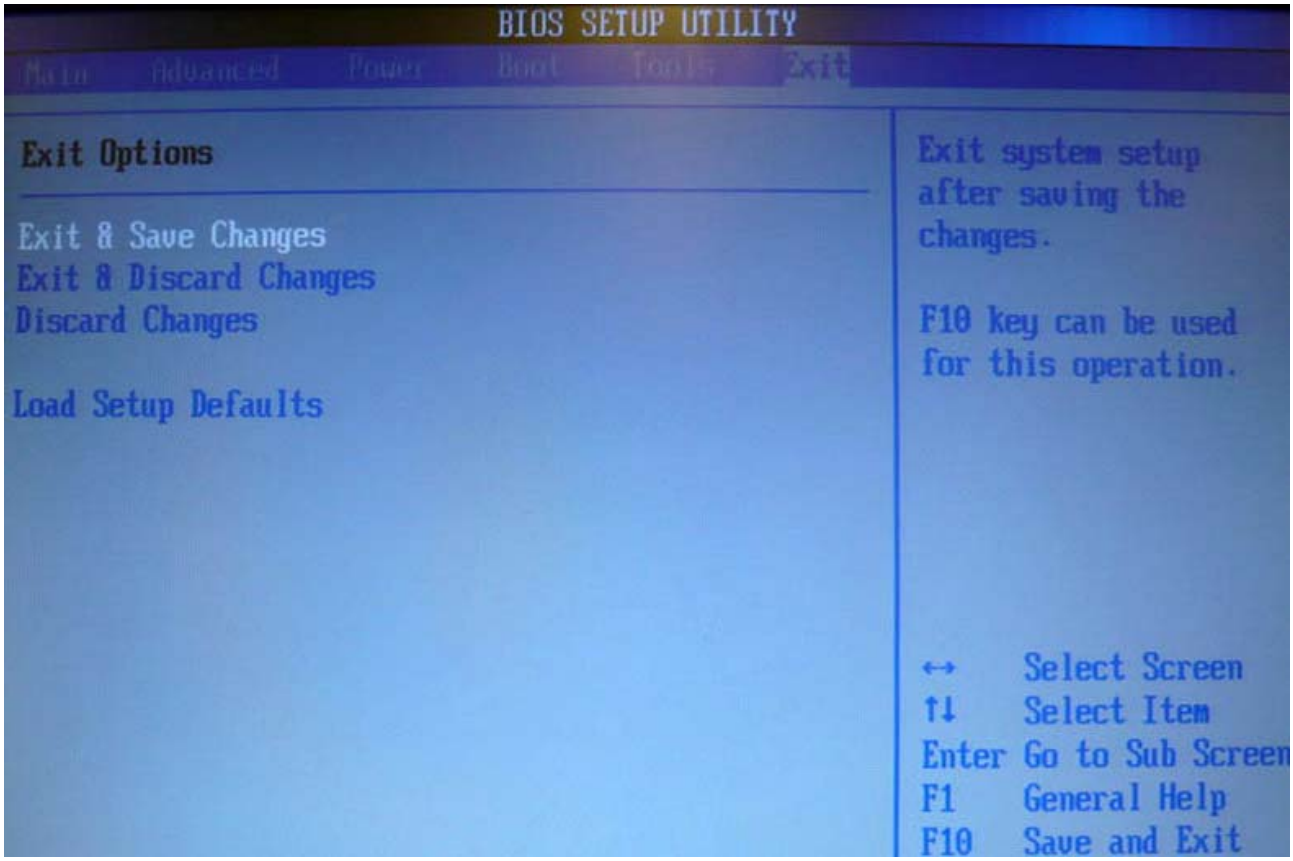
Select this option and press < `Enter` > to access the sub menu. You can use the sub menu to change the supervisor password.

Change User Password

Select this option and press < `Enter` > to access the sub menu. You can use the sub menu to change the user password.

4.6 Exit Options

Select the *Exit* tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the < `Arrow` > keys. The Exit BIOS Setup screen is shown below.



Exit & Save Changes

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect.

Exit & Discard Changes

Select this option to quit Setup without making any permanent changes to the system configuration.

Discard Changes

Select this option to discard changes to the system configuration.

Load Setup Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option.