EP-7KXA+

An AMD Athlon Slot A Processor based mainboard (133/100MHz) Supports PC-133 SDRAM Modules

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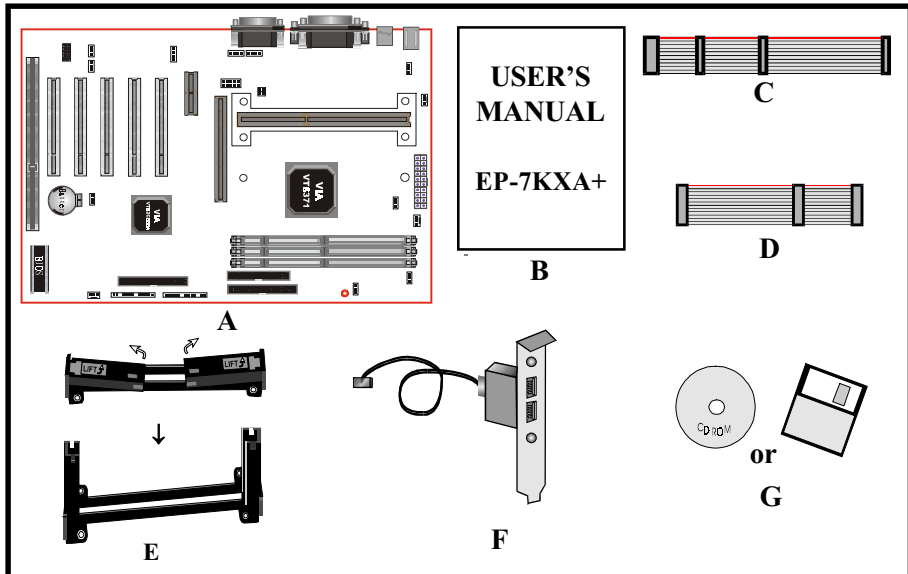
Appendix D

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Section 1
INTRODUCTION

Components Checklist

✓   A.   (1)   EP-7KXA+ mainboard

✓   B.   (1)   EP-7KXA+ user's manual

✓   C.   (1)   Floppy ribbon cable

✓   D.   (1)   ATA-66 Hard drive ribbon cable

✓   E.   (1)   Foldable Retention Module

    F.   (1)   USB Cable (Optional)

✓   G.   (1)   Driver and utility

Overview

AMD Athlon™ Processor

The AMD Athlon™ processor is the newest microprocessor in the AMD K86™ family of microprocessors. The AMD Athlon processor brings superscalar RISC performance to desktop systems running industry-standard x86 software. This processor implements advanced design techniques such as:

- Three out-of-order, superscalar, pipelined Multimedia Units
- Three out-of-order, superscalar, pipelined Integer Units
- Three x86 instruction decoders
- Fixed-sized internal instruction formats (MacroOPs)
- 72-entry Instruction Control Unit
- AMD 3DNOW!™ technology
- Large L1 and L2 caches and translation lookaside (TLB) structures
- Register renaming and data-forwarding
- Dynamic branch prediction
- S2K Interface Technology

The AMD Athlon processor is the first x86 processor ever to incorporate the S2K interface technology to deliver unprecedented system performance. The S2K interface technology is based on the EV6 bus technology from Digital/Compaq and provides 1.6 Gbytes per second bandwidth to the system.

The AMD Athlon Processor utilizes Single Edge Contact (S.E.C.) (Figure 1) cartridge packaging technology. The S.E.C. cartridge utilizes surface mounted core components and a printed circuit board with an edge finger connection. The S.E.C. cartridge package introduced on the AMD Athlon Processor will also be used in future Slot A processors.

The S.E.C. cartridge has the following features: a thermal plate, a cover and a PCB with an edge finger connection. The thermal plate allows standardized heatsink attachment or customized thermal solutions. The thermal plate enables a reusable

heatsink to minimize fit issues for serviceability, upgradeability and replacement. The full enclosure also protects the surface mount components. The edge finger connection maintains socketabilty for system configuration. The edge finger connector is denoted as 'Slot A connector' in this and other documentation.

S.E.C. Cartridge Terminology

- Processor card
  The green PCB (with or without components on it)

- Processor core
  The CPU silicon chip on the processor card.

- Cover
  The plastic cover on the opposite side from the thermal plate.

- Slot A
  The slot that the S.E.C. cartridge plugs into.

- Retention mechanism
  Formerly 'retention module' the dual posts, etc. that holds the cartridge in place.

- Thermal plate
  The heatsink attachment plate.

- Heat sink supports
  The support pieces that are mounted on the mainboard to provide added support for heatsinks.
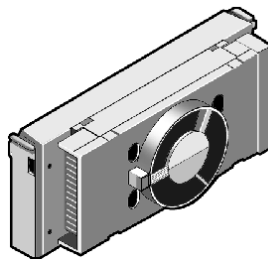
Figure 1: AMD Athlon Processor with S.E.C.C.

Accelerated Graphics Port
(AGP or A.G.P.)

Typically, 3D graphics rendering requires a tremendous amount of memory, and demands ever increasing throughput speed as well. As 3D products for the personal computer become more and more popular, these demands will only increase. This will cause a rise in costs for both end users and manufacturers. Lowering these costs as well as improving performance is the primary motivation behind AGP. By providing a massive increase in the bandwidth available between the video card and the processor, it will assist in relieving some of these pressures for quite sometime.

Hardware Monitoring

Hardware monitoring allows you to monitor various aspects of your systems operations and status. The features include CPU temperature, voltage and RPM of fan.

EP-7KXA+ Form-Factor

The EP-7KXA+ is designed with ATX form factor - the new industry standard of chassis. ATX form factor is essentially a Baby-AT baseboard rotated 90 degrees within the chassis enclosure and a new mounting configuration for the power supply. With these changes the processor is relocated away from the expansion slots, allowing them all to hold full length add-in cards. ATX defines a double height aperture to the rear of the chassis which can be used to host a wide range of onboard I/O. Only the size and position of this aperture is defined, allowing PC manufacturers to add new I/O features (e.g.; TV input, TV output, joystick, modem, LAN, etc.) to systems. This will help systems integrators differentiate their products in the marketplace, and better meet your needs.

- Smaller size promotes a smaller system size.

- I/O shield does not need to be retooled in an ATX 2.01 or later. The mainboard should be used in an ATX 2.01 (or later) compliant case.

- A smaller power supply can be used. High integration on mainboard reduces the system costs.
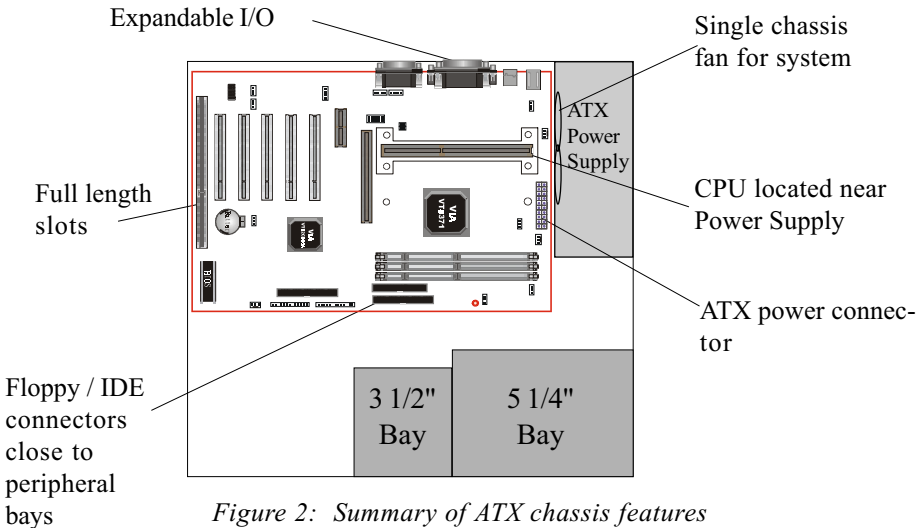
Figure 2: Summary of ATX chassis features

I/O Shield Connector

The EP-7KXA+ is equipped with an I/O back panel. Please use the appropriate I/O shield (figure 3).
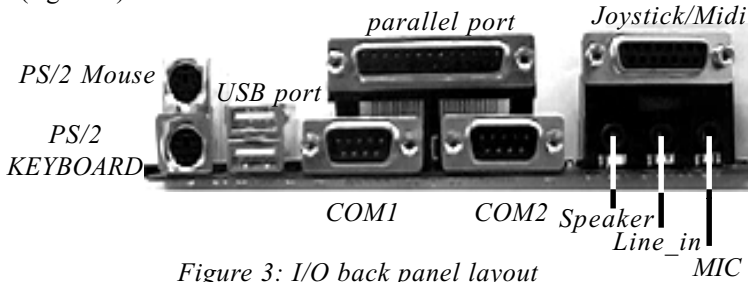
Figure 3: I/O back panel layout

Power-On/Off (Remote)

The EP-7KXA+ has a single 20-pin connector for ATX power supplies. For ATX power supplies that support the **Remote On/Off** feature, this should be connected to the systems front panel for system Power On/Off button. The systems power On/Off button should be a momentary button that is normally open.

The EP-7KXA+ has been designed with "Soft Off" functions. You can turn Off the system from one of two sources: The first is the front panel Power On/Off button, and the other is the "Soft Off" function (coming from the EP-7KXA+'s onboard circuit controller) that can be controlled by the operating system. Windows 95/98 will control this when the user clicks that they are ready to Shutdown the system.
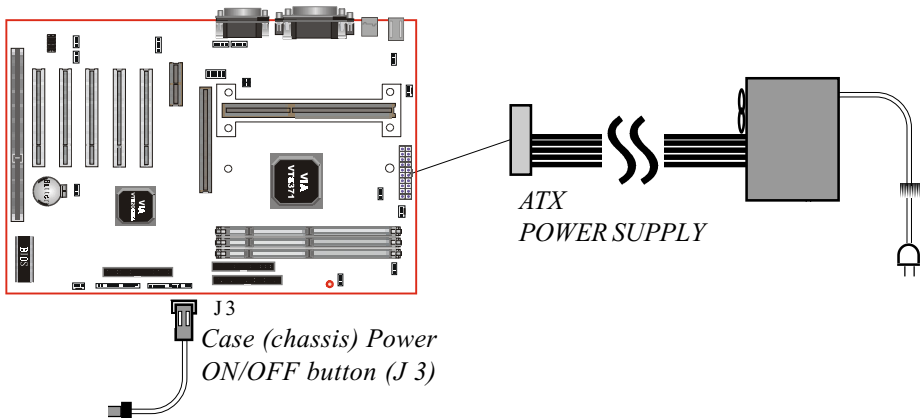
Figure 4: Simple ATX Power ON/OFF Controller

System Block Diagram

AMD Athlon Processor

133/100MHz

4X

66MHz
AGP Bus

AGP Slot

PAC
PCI Bridge
and memory
controller
VT8371

MA [0:13]
MD [0:63]
MPE [0:7]

133/100MHz

AMR Slot

AC
97

CD-Rom

Graphic
Video

PCI Slots

VT82C686A
I/O Bridge

HDD

USB 0,1 USB 2,3

ISA Slots

Serial Port 1
Serial Port 2
LPT Port
PS/2 Mouse
PS/2 Keyboard

BIOS
Flash Memory
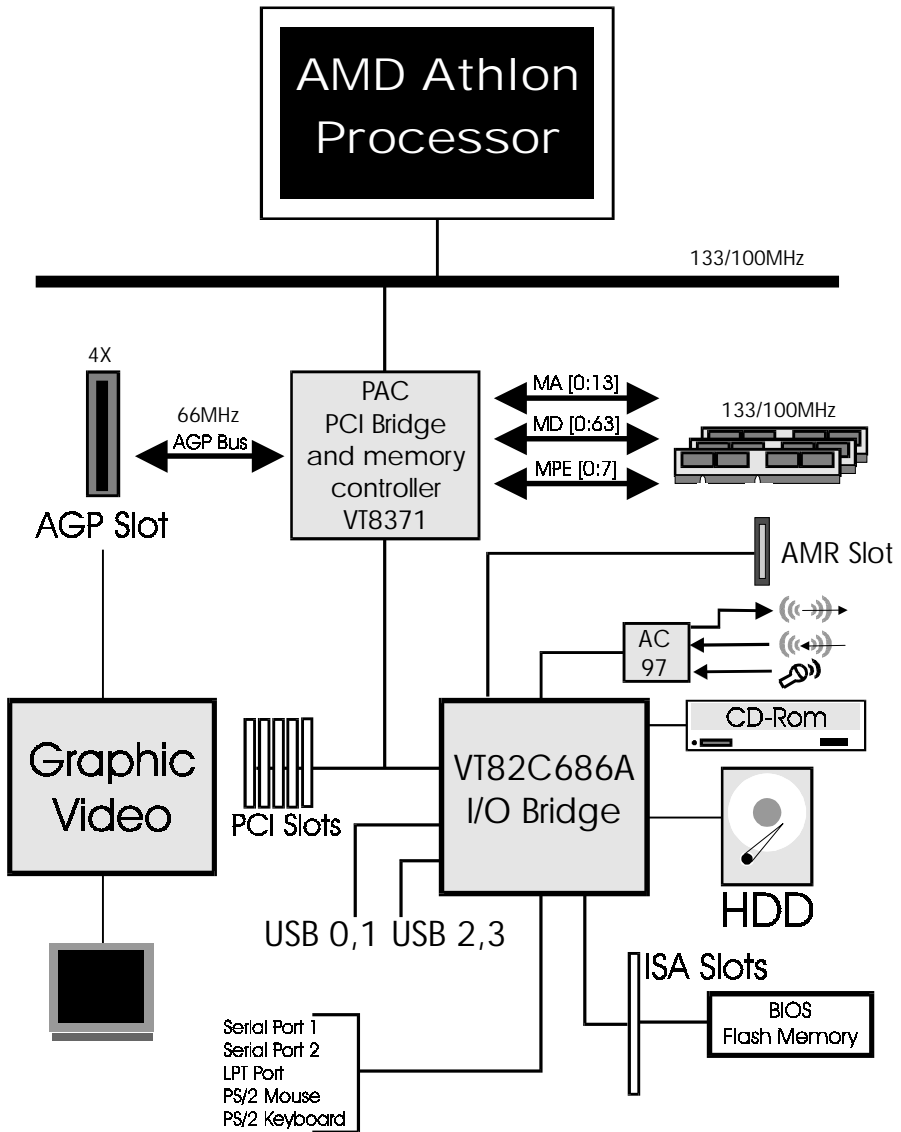
Figure 5: System Block Diagram

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Section 2
FEATURES

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EP-7KXA+ Features:

- EP-7KXA+ is based on the AMD Athlon Processor operating at 500 ~ 800MHz on SlotA.

- Designed with VIA KX133 AGPset.

- Supports up to 768MB of DRAM (minimum of 8 MB) on board (please see Section 3-2).

- EP-7KXA+ will support Error Checking and Correcting (ECC) when using parity SDRAM memory modules. This will detect multiple bit errors and correct 1-bit memory errors.

- Supports (1) 16 bit ISA slots, (5) 32 bit PCI slots, (1) 4X AGP slot, (1) AMR slot and provides (2) independent high performance PCI IDE interfaces capable of supporting PIO Mode 3/4 and Ultra DMA 33/66 devices. The EP-7KXA+ supports (5) PCI Bus Master slots and a jumperless PCI INT# control scheme which reduces configuration confusion when plugging in PCI card(s).

- Supports ATAPI (e.g. CD-ROM) devices on both Primary and Secondary IDE interfaces.

- Designed with on chip Multi I/O: (1) floppy port, (1) parallel port (EPP, ECP), and (2) serial ports (16550 Fast UART).
  Note: Japanese "Floppy 3 mode" is also supported

- Features Award Plug & Play BIOS. With Flash Memory you can always upgrade to the current BIOS as they are released.

- EP-7KXA+ utilizes a Lithium battery which provides environmental protection and longer battery life.

- 4 USB ports are provided, 2 ports are onboard and another 2 USB ports, as option, need USB a cable on USB2 position. The onboard VT82C686A chip provides the means for connecting PC peripherals such as; keyboards, joysticks, telephones, and modems.

- Built-in ATX 20-pin power supply connector.

- Software power-down when using Windows® 95/98.

- Supports ring-in feature (remote power-on through external modem, allows system to be turned on remotely).

- Resume by Alarm - Allows your system to turn on at a preselected time.

- Power Loss Recovery - In the event of a power outtage your system will automatically turn itself back on without user intervention.

- Supports CPU Hardware sleep and SMM (System Management Mode).

- Supports Keyboard power ON function (KBPO).

- Built-in WOL (Wake-up On Lan) Connector.

- Built-in WOM (Wake-up On Modem) Connector.

- Built-in AC97 PCI Audio.

- Supports STR (Suspend to RAM) function.

Section 3
INSTALLATION
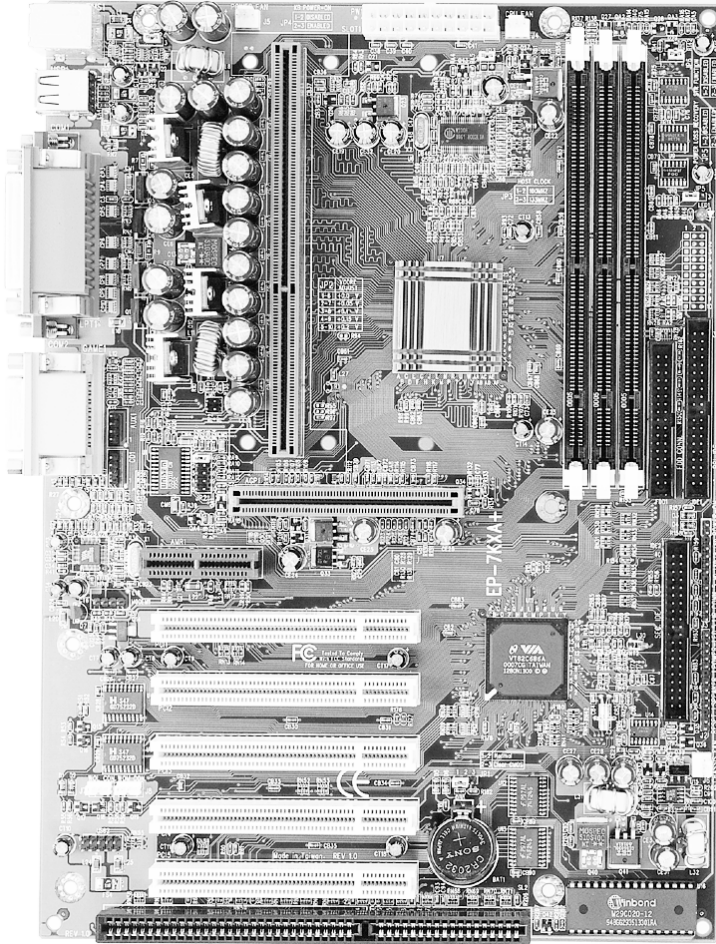
EP-7KXA+ Detailed Layout
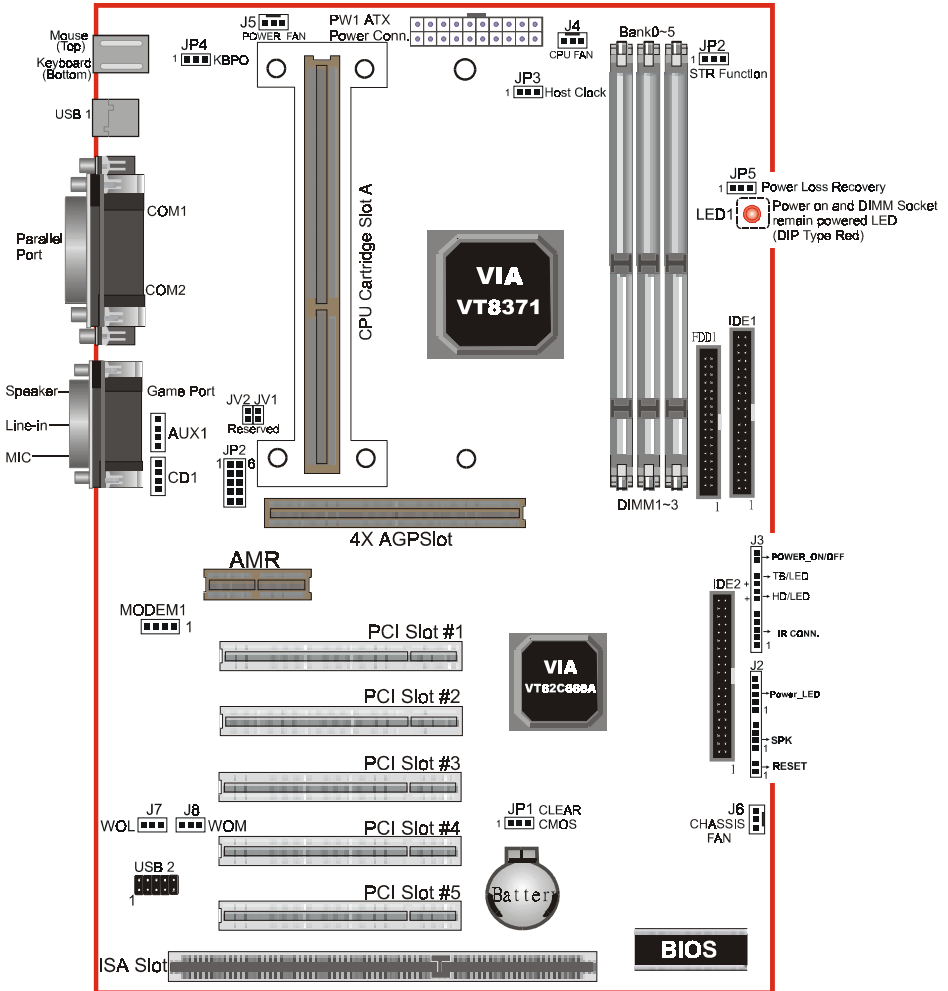
Figure 1

Easy Installation Procedure

Easy Installation Procedure

The following must be completed before powering on your new system:

- **3-1. Jumper Settings**
- **3-2. System memory Configuration**
- **3-3. Install Processor**
- **3-4. Device Connectors**
- **3-5. External Modem Ring-in Power ON and Keyboard Power ON Functions (KBPO)**
- **3-6. STR (Suspend To RAM) Function**

Section 3-1
Jumper Settings

The EP-7KXA+ motherboard was designed with very few jumpers to make your installation faster and easier.

JP2: CPU Vcore Adjust
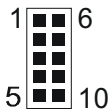
JP2	Vcore Adjust
1-6	+0.0 V
2-7	+0.05 V
3-8	+0.1 V
4-9	+0.15 V
5-10	+0.2 V

JP3: CPU Host Clock Selection

JP3	CPU CLOCK	
1-2	100MHz	
2-3	*133MHz	* Reserved

JP1   [▪▪▪▪]   CMOS Clear
         1   JP1 = 1-2 Normal (Default)
                            = 2-3 Clear CMOS

JP2   [▪▪▪▪]   STR Function
         1   JP2 = 1-2 Disabled
                            = 2-3 Enabled

JP4   [▪▪▪▪]   Keyboard Power-ON Function
         1   JP4 = 1-2 Disabled (Default)
                            = 2-3 Enabled

JP5   [▪▪▪▪]   Power Loss Recovery
         1   JP5 = 1-2 Disabled
                            = 2-3 Enabled

Section 3-2
System Memory Configuration

Memory Layout

The EP-7KXA+ supports (3) PC133 168-pin DIMMs (Dual In-line Memory Module). The DIMMs can be either SDRAM (Synchronized DRAM) or VC SDRAM (Virtual Channel SDRAM).

- DIMM SDRAM may be 83MHz (12ns), 100MHz (10ns) or 125MHz (8ns) bus speed.

- When using Synchronous DRAM we recommend using the 4 clock variety over the 2 clock.

Figure 2 and Table 1 show several possible memory configurations.

DIMM 1	Bank 0/1
DIMM 2	Bank 2/3
DIMM 3	Bank 4/5
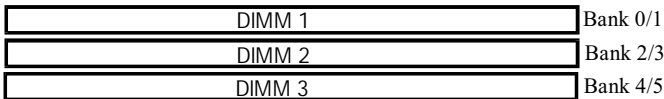
Figure 2

Total Memory	DIMM 1 (Bank 0/1)	DIMM 2 (Bank 2/3)	DIMM 3 (Bank 4/5)
= 256MB Maximum	SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None	None
= 512MB Maximum	SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	None
= 768MB Maximum	SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1	SDRAM* 8MB, 16MB, 32MB, 64MB, 128MB, 256MB X 1

Table 1

* SDRAM only supports 8, 16, 32, 64, 128, 256MB DIMM modules.

* We recommend to use PC100 Memory Module for bus speed 100MHz and PC133 Memory for bus speed over 100MHz.

* Using non-compliant memory with higher bus speed (over clocking) may severely compromise the integrity of the system.

DIMM Module Installation

Figure 3 displays the notch marks and what they should look like on your DIMM memory module.

DIMMs have 168-pins and two notches that will match with the onboard DIMM socket. DIMM modules are installed by placing the chip firmly into the socket at a 90 degree angle and pressing straight down (figure 4) until it fits tightly into the DIMM socket (figure 5).

LEFT KEY ZONE
(UNBUFFERED)

CENTER KEY ZONE
(3.3 V DRAM)

Figure 3

Figure 4

DIMM Module clip before installation

Figure 5

DIMM Module clip after installation
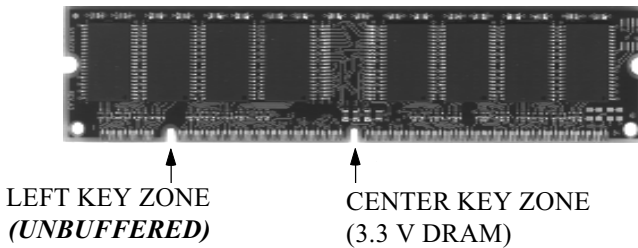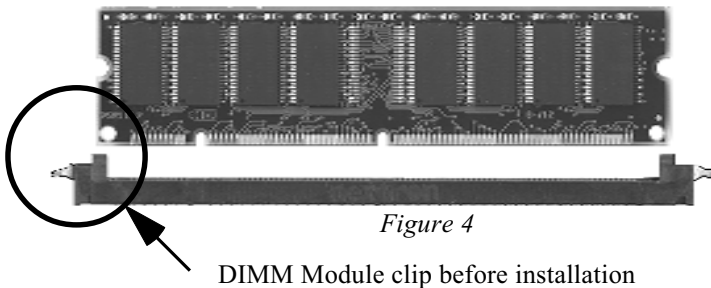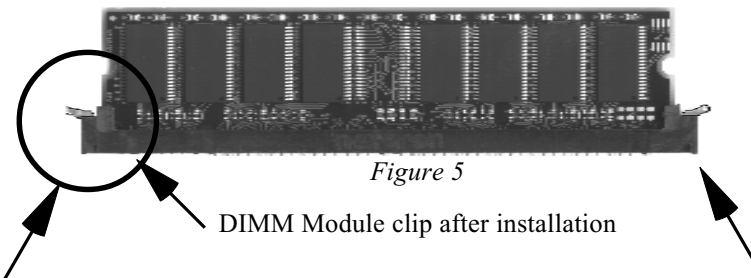
To remove the DIMM module simply press down both of the white clips on either side and the module will be released from the socket.

Section 3-3
Installing Processor

The EP-7KXA+ uses the Single Edge Contact (SEC) slot for a AMD Athlon processor packaged in an SEC cartridge.

Please have ready the following list of components so that we may install the processor onto the motherboard.

1.   AMD Athlon processor heat sink
2.   AMD Athlon Processor

OK, now that you have all of your components ready, we can start.

❶ First, please refer to figure 6 below, and follow the direction to lift up the foldable AMD Athlon Retention Mechanism. This pre-installed device is designed for you to install AMD Athlon CPU more easier and to avoide any damage on the board due to overtightening the four screws.

❷ One thing must be kept in your mind that please make sure to lift upright the foldable parts of the Retention module to fit and install CPU properly.

Figure 6

Now we are going to install the heatsink support base piece onto the motherboard. There is both a large and small hole so that the base will only fit in one direction. This piece needs to be pushed into the holes firmly until it is seated.

Now we are ready to install the SEC Cartridge (AMD Athlon Processor) into the Retention Module. The SEC Cartridge is mounted by sliding the SEC Cartridge into the Retention Module and letting it slide all the way down. Once it reaches the bottom make sure you press firmly on SEC cartridge to firmly secure into the Slot A Socket.

Section 3-4
Device Connectors

Now that your motherboard is installed you are ready to connect all your connections (figure 7).

PS/2 Mouse   *USB port*   *parallel port*   *Joystic/Midi*

PS/2 KEYBOARD

COM1   *COM2*   *Speaker*   *Line_in*   *MIC*
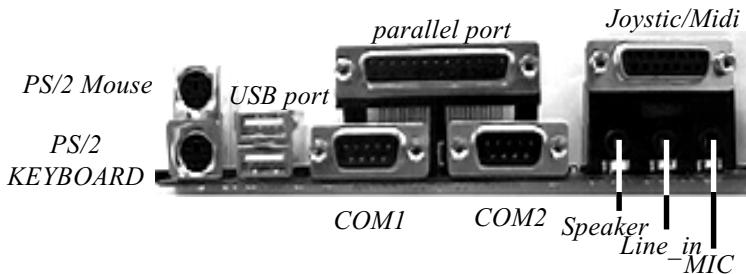
Figure 7

J2,J3:   Chassis Panel Connector
   • Power_LED, Speaker, Reset, Sleep, Turbo LED and HDD LED

J4:   CPU Fan Power
   • A plug-in for the CPU Fan Power

J5:   Power Supply Fan Monitoring
   • A plug-in for the Power Supply Fan Power

J6:   Chassis Fan Power
   • A plug-in for the chassis Fan Power

J7:   WOL (Wake On Lan) Connector

J8:   WOM (Wake On Modem) Connector

JV1:   Reserved

JV2:   Reserved

IDE1:   Primary IDE Connector

IDE2:   Secondary IDE Connector

FDD1:   Floppy Controller Connector

PW1: ATX Power Connector
- 20-pin power connector

CD1: CD Audio Connector

AUX1: AUX Audio Connector

MODEM1: Telephony Connector
- Pin1(Audio_in), Pin2/Pin3(GND), Pin4(Mic-out to Modem)

USB2: USB port header pins for adding two additional USB ports.
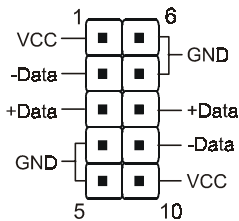
USB port header pin descriptions.

PIN#	Wire color	Signal Name	Comment
1	Red	Vcc	Cable Power
2	White	-Data	Data
3	Green	+Data	Data
4	Black	Ground	Cable Ground
5	Black	Ground	Case Ground
6	Black	Ground	Case Ground
7	Black	Ground	Cable Ground
8	Green	+Data	Data
9	White	-Data	Data
10	Red	Vcc	Cable Power

Device Connectors (continued)

(This is connected to the power button on the case. Using the Soft-Off by Pwr-BTTN feature, you can choose either Instant Off (turns system off immediatly), or 4 sec delay (you need to hold the button down for 4 seconds before the system turns off). When the system is in 4 sec delay mode, there is a special feature to make the system to go into suspend mode when the button is pressed momentarily).
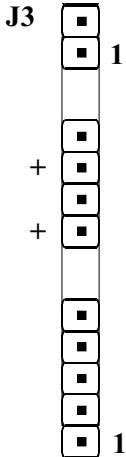
J3   **Power On/Off**

Turbo LED indicator - LED ON when higher speed is selected

IDE LED indicator - LED ON when Onboard PCI IDE Hard disks is activate

IR Connector
  1. VCC   4. GND
  2. NC   5. IRTX
  3. IRRX
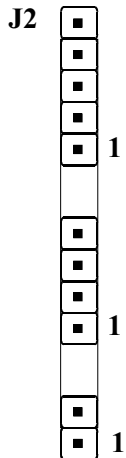
J2   **Power LED** - Power LED connector
  1. Power LED(+)   4. NC
  2. N/C   5. GND
  3. GND

Speaker - Connect to the system's speaker for beeping
  1. Speaker   3. GND
  2. N/C   4. GND

Reset - Closed to restart system.

Section 3-5
External Modem Ring-in Power
ON and Keyboard Power ON
Functions (KBPO)

On the basis of bounded functions in I/O chipset, the two serial ports are able to support the External Modem Ring-in Power ON function. Once users connect the external modem to COM1 or COM2, the EP-7KXA+ mainboard allows users to turn on their system through the remote and host's dial-up control.

Exclusive Keyboard Power ON Function

To innovate a unique feature to benefit users, we devoted the easiest and most convenient way to turn on your system based on the the ATX power supply.

How to work with it

Step 1: Please check JP4 at the position 2-3 after you finished the system installation.

JP4 *Keyboard Power-ON Function Selection*
1-2 : Disabled (default)
2-3 : Enabled

Step 2: You can enjoy the Keyboard Power ON function (KBPO) by *pressing any key and BUTTON only to turn on your system.* Your system will be turned on automatically, after releasing the keys. To power off you system, you can use the Soft-OFF function under Windows 95/98.

Notes: ATX version 2.0 specification has recommended you use the power supply with 0.72A(720mA) in 5.0VSB. With our EP-7KXA+ mainboard, *the 5.0VSB standby power only has to be > = 0.72A (720mA)* then you can enjoy this unique benefit. However, the ATX power supply which is < 0.72A (720mA) is still applicable to your system by placed JP4 at the position 1-2 to disable this feature.

3-6 STR (Suspend To RAM) Function

The EP-7KXA+ supports the STR power management state by maintaining the appropriate states on the SDRAM interface signals. The power source must be kept alive to the SDRAM during STR (ACPI S3). Advanced Configuration Power Interface (ACPI) provides more Energy Saving Features for operating systems that support OS such as Instant ON and QuickStart™ function.

1. To enable the ACPI function and use the STR functionally to save your system energy, you are recommended to confirm the following requirements:

   a. In BIOS, please select " ACPI function: Enable" and "ACPI Suspend Type: S3(STR)" in the Power Management Setup menu.

   b. Then, please type the following before installing the Windows® 98:

      {Driver}:> Setup /p j

      If the Windows® 98 installed in your system without the parameters above, please do refer your manual or contact Microsoft for more detail and then upgrade the system to support ACPI function.

   c. Restart your system.

   d. Getting in to the "Advanced" of the Power Management icon of Control Panel, and selecting the "Stand By" in the Power Buttons.

2. Getting start with STR function, please click the START button and choose Shut Down icon. Then, select the Stand By option in the Shut Down Windows box to let system go to STR mode.

   Here are the differences between STR power saving mode and Green (or Suspend) mode:

   a. It is the most advanced Power Management mode

   b. It cuts all the power supplied to peripherals except to Memory - max. power saving

c. It saves and keeps all on-screen data including any executed applications to SDRAM.

d. You must push the Power button connected with onboard J3 pin to wake up you system (not to click to mouse or press keyboard to wake up the system.)

Just pushing Power button, your system will quickly back to the last screen for you.

The "LED Indicator for ACPI Status" table shown below will guide you and give you a reference for ACPI status on this mainboard.

ACPI Onboard's LED Status Indicator Table					
Onboard's LED Location	Status				
	Plug in the ATX Power Core	Power ON J3(PW-ON)	Green Mode (S1)	STR (S3)	Shutdown (Soft-OFF) (S5)
LED1 (Red LED)	OFF	ON	ON	ON	OFF
J2 PW_LED	OFF	ON	Blinking	OFF	OFF

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Section 4
AWARD BIOS SETUP

Main Menu

Award's ROM BIOS provides a built-in Setup program which allows user to modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS, so that data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM will stay unchanged unless there is a configuration change in the system, such as hard drive replacement or a device is added.

It is possible for the CMOS battery to fail, this will cause data loss in the CMOS only. If this does happen you will need to reconfigure your BIOS settings.

To enter the Setup Program :

Power on the computer and press the <Del> key immediately, this will bring you into the BIOS CMOS SETUP UTILITY.
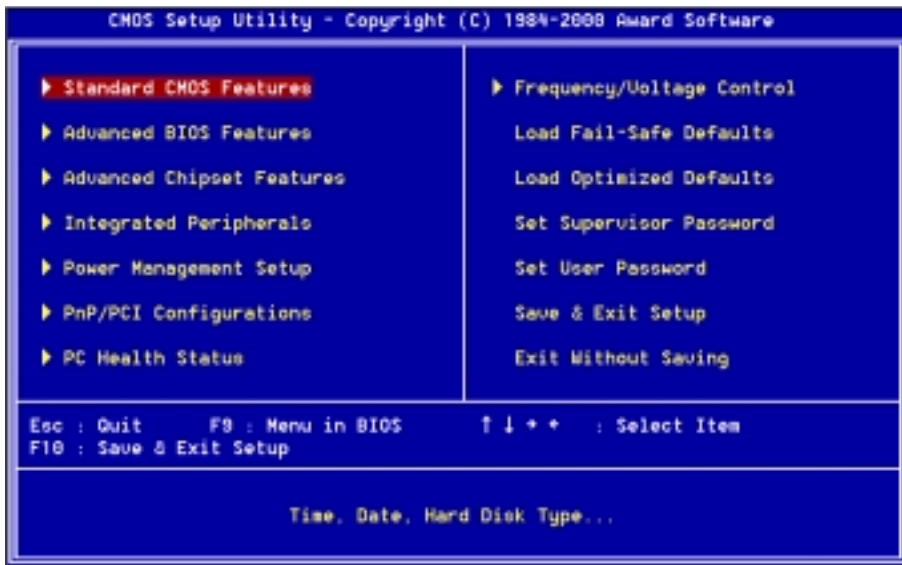
Figure 1: CMOS Setup Utility

The menu displays all the major selection items. Select the item you need to reconfigure. The selection is made by moving the cursor (press any direction key) to the item and pressing the 'Enter' key. An on-line help message is displayed at the bottom of the screen as the cursor is moved to various items which provides a better understanding of each function. When a selection is made, the menu of the selected item will appear so that the user can modify associated configuration parameters.

4-1 Standard CMOS Setup

Choose "Standard CMOS Setup" in the CMOS SETUP UTILITY Menu (Figure 2). The Standard CMOS Setup allows the user to configure system settings such as the current date and time, type of hard disk drive installed, floppy drive type, and display type. Memory size is auto-detected by the BIOS and displayed for your reference. When a field is highlighted (use direction keys to move the cursor and the <Enter> key to select), the entries in the field can be changed by pressing the <PgDn> or the <PgUp> key.
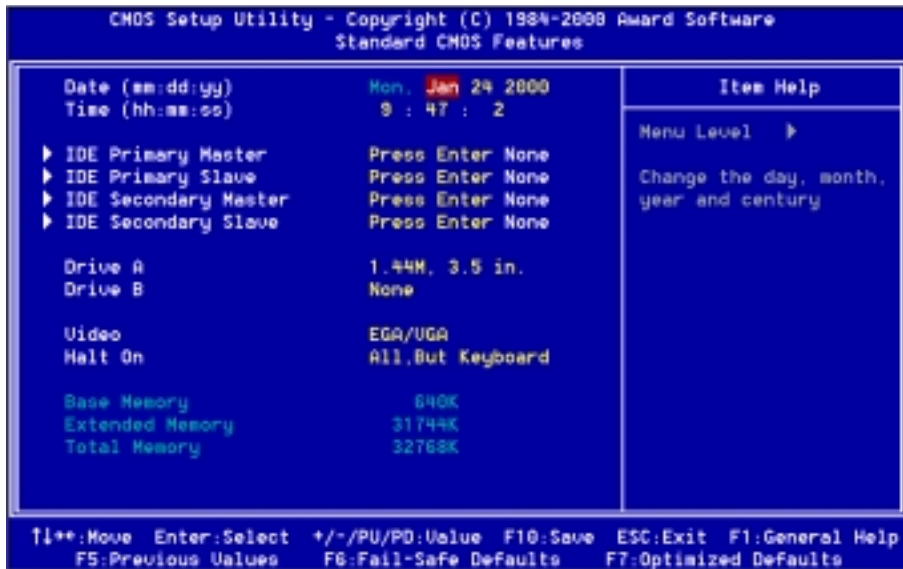
Figure 2: Standard CMOS Setup

NOTE: If the hard disk Primary Master/Slave and Secondary Master/ Slave are set to Auto, then the hard disk size and model will be auto-detected.

NOTE: The "Halt On:" field is used to determine when to halt the system by the BIOS if an error occurs.

NOTE: Floppy 3 Mode support is a mode used to support a special 3.5" drive used in Japan. This is a 3.5" disk that stores only 1.2 MB, the default setting for this is disabled.

4-2 Advanced BIOS Features

Selecting the "BIOS FEATURES SETUP" option in the CMOS SETUP UTILITY menu allows users to change system related parameters in the displayed menu. This menu shows all of the manufacturer's default values for the EP-7KXA+.

Pressing the [F1] key will display a help message for the selected item.
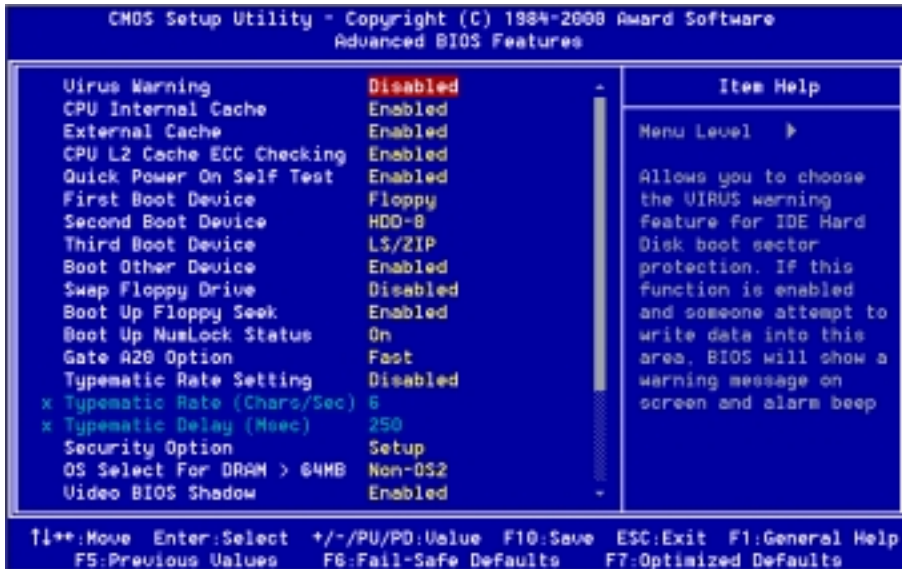
Figure 3: BIOS Features Setup

Virus Warning: During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system and an error message will appear.

You should then run an anti-virus program to locate the virus. Keep in mind that this feature protects only the boot sector, not the entire hard drive.
The default value is Disabled.

Enabled: Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector.
Disabled: No warning message will appear when anything attempts to access the boot sector.

Note: Many disk diagnostic programs that access the boot sector table can trigger the virus warning message. If you plan to run such a program, we recommend that you first disable the virus warning.

CPU Internal Cache: This controls the status of the processor's internal cache area. The default is Enabled.
Enabled: This activates the processor's internal cache thereby increasing performance.
Disabled: This deactivates the processor's internal cache thereby lowering performance.

External (L2) Cache: This controls the status of the external (L2) cache area. The default is Enabled.
Enabled: This activates the motherboard's L2 cache thereby increasing performance.
Disabled: This deactivates the motherboard's L2 cache thereby lowering performance.

CPU L2 Cache ECC Checking: This control if the CPU's L2 Cache will support Error Checking and Correcting (ECC). The default is Disabled.
Enabled: Enables ECC support for the CPU's L2 cache. Performance will decrease 2% ~ 4%.
Disabled: Disables ECC support for the CPU's L2 cache.

Quick Power On Self Test: This category speeds up the Power On Self Test (POST). The default is Enabled.
Enabled: This setting will shorten or skip of the items checked during POST.
Disabled: Normal POST.

First /Second/Third/Other Boot Device: The BIOS attempts to load the operating system from the devices in the sequence selected in these items.
The choice: Floppy, LS/ZIP, HDD, SCSI, CDROM, Disabled.

Swap Floppy Drive: This will swap your physical drive letters A & B if you are using two floppy disks. The default is Disabled.
Enabled: Floppy A & B will be swapped under the O/S.
Disabled: Floppy A & B will be not swapped.

Boot Up Floppy Seek: During Power-On-Self-Test (POST), BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. Only 360K type is 40 tracks while 760K, 1.2MB and 1.44MB are all 80 tracks. The default is Enabled.
Enabled: The BIOS will search the floppy disk drive to determine if it is 40 or 80 tracks.
Disabled: The BIOS will not search for the type of floppy disk drive by track number.

> *Note: BIOS can not tell the difference between 720K, 1.2MB and 1.44MB drive types as they are all 80 tracks.*

Boot Up NumLock Status: This controls the state of the NumLock key when the system boots. The default is On.
On: The keypad acts as a 10-key pad.
Off: The keypad acts like the cursor keys.

Gate A20 Option: This refers to the way the system addresses memory above 1MB (extended memory). The default is Fast.
Normal: The A20 signal is controlled by the keyboard controller or chipset hardware.
Fast: The A20 signal is controlled by Port 92 or chipset specific method.

Typematic Rate Setting: This determines the keystrokes repeat rate.
The default is Disabled.
Enabled: Allows typematic rate and typematic delay programming.
Disabled: The typematic rate and typematic delay will be controlled by the keyboard controller in your system.

Typematic Rate (Chars/Sec): This is the number of characters that will be repeated by a keyboard press. The default is 6.

6: *6 characters per second.*   *8*: *8 characters per second.*
10: *10 characters per second.*   *12*: *12 characters per second.*
15: *15 characters per second.*   *20*: *20 characters per second.*
24: *24 characters per second.*   *30*: *30 characters per second.*

Typematic Delay (msec): This setting controls the time between the first and the second character displayed by typematic auto-repeat. The default is 250.

250: *250 msec.*
500: *500 msec.*
750: *750 msec.*
1000: *1000 msec.*

Security Option: This category allows you to limit access to the System and Setup, or just to Setup. The default is Setup.

System: The system will not boot and the access to Setup will be denied if the correct password is not entered at the prompt.

Setup: The system will boot; but the access to Setup will be denied if the incorrect password is not entered at the prompt.

OS Select For DRAM > 64MB: Some operating systems require special handling. Use this option only if your system has greater than 64MB of memory. The default is Non-OS2.

OS2:   Select this if you are running the OS/2 operating system with greater than 64MB of RAM.

Non-OS2: Select this for all other operating systems and configurations.

Video BIOS Shadow: This option allows video BIOS to be copied into RAM. Video Shadowing will increase the video performance of your system.
The default is Enabled.

Enabled: Video shadow is enabled.

Disabled: Video shadow is disabled.

C8000 - CBFFF Shadow:
CC000 - CFFFF Shadow:
D0000 - D3FFF Shadow:
D4000 - D7FFF Shadow:

D8000 - DBFFF Shadow:

DC000 - DFFFF Shadow:

These categories determine whether ROMs from option cards will be copied into RAM. This will be in 16K byte or 32K byte units, and the size will depend on chipset of the option card.

Enabled: Optional shadow is enabled.
Disabled: Optional shadow is disabled.

4-3 Advanced Chipset Features

Choose the "CHIPSET FEATURES SETUP" in the CMOS SETUP UTILITY menu to display following menu.
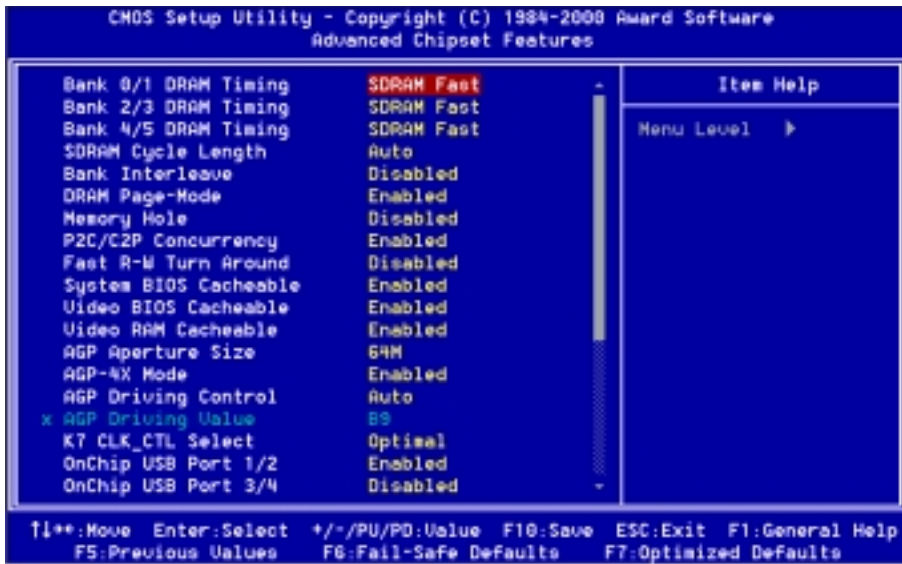
Figure 4:   Chipset Features Setup

Bank 0/1, 2/3, 4/5 DRAM Timing: This value in this field is set by the system board manufacturer, depending on whether the board has paged DRAMs or EDO (extended data output) DRAMs.
The Choice: Bank 0/1, 2/3, 4/5.

SDRAM Cycle length: This setting defines the CAS timing parameter of the SDRAM in terms of clocks. The default is 3.
2: Provides faster memory performance.
3: Provides better memory compatibility.

Bank Interleave: The item allows you to set how many banks of SDRAM support in your mainboard.
The Choice: 2 Bank, 4 Bank, Disabled.

DRAM Page-Mode: The item will active or inactive chipset page registers.
Enabled: Page-Mode Enabled.
Disabled: No page registers update and non Page-Mode operation.

Memory Hole : You can reserve this memory area for the use of ISA adaptor
ROMs. The default is Disabled.
Enabled: This field enables the main memory (15~16MB) to remap to ISA BUS.
Disabled: Normal Setting.
   Note: If this feature is enabled you will not be able to cache this memory segment.

System BIOS Cacheable: This allows you to copy your BIOS code from slow
ROM to fast RAM. The default is Disabled.
Enabled: The option will improve system performance. However, if any program
              writes to this memory area, a system error may result.
Disabled: System BIOS non-cacheable.

Video BIOS Cacheable: This option copies the video ROM BIOS to fast RAM
(C0000h to C7FFFh). The default is Enabled.
Enabled: Enables the Video BIOS Cacheable to speed up the VGA Performance.
Disabled: Will not use the Video BIOS Cacheable function.

Video RAM Cacheable: This option allows the CPU to cache read/writes of the
video RAM. The default is Enabled.
Enabled: This option allows for faster video access.
Disabled: Reduced video performance.

AGP Aperture Size: The amount of system memory that the AGP card is
allowed to share. The default is 64.

   4: 4MB of systems memory accessable by the AGP card.

   8: 8MB of systems memory accessable by the AGP card.

   16: 16MB of systems memory accessable by the AGP card.

   32: 32MB of systems memory accessable by the AGP card.

   64: 64MB of systems memory accessable by the AGP card.

   128: 128MB of systems memory accessable by the AGP card.

   256: 256MB of systems memory accessable by the AGP card.

AGP-4X Mode: Chipset AGP Mode support.
Options: x1 , x2 and x4.

USB Keyboard Support: This controls the activation status of an optional USB keyboard that may be attached. The default is disabled.
Enabled: Enable USB keyboard support.
Disabled: Disable USB keyboard support.

OnChip Sound: Turn on/off onchip sound device.

OnChip Modem: Turn on/off onchip software modem device.

CPU to PCI Write Buffer: When enabled, up to four D words of data can be written to the PCI bus without interruting the CPU. When disabled, a write buffer is not used and the CPU read cycle will not be completed until the PCI bus signals that it is ready to receive the data.
The Choice: Enabled, Disabled.

PCI Dynamic Bursting: When Enabled, data transfers on the PCI bus, where possible, make use of the high-performance PCI bust protocol, in which graeater amounts of data are transferred at a single command.
The Choice: Enabled, Disabled.

PCI Master 0 WS Write: When Enabled, writes to the PCI bus are command with zero wait states.
The Choice: Enabled, Disabled.

PCI Delay Transaction: The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI specification version 2.1.
The Choice: Enabled, Disabled.

PCI #2 Access #1 Retry: This item allows you enabled/disable the PCI #2 Access #1 Retry.
The Choice: Enabled, Disabled.

Memory Parity/ECC Check: If the DRAM chip in your system support Parity/ ECC check, select Enabled.

4-4 Integrated Peripherals
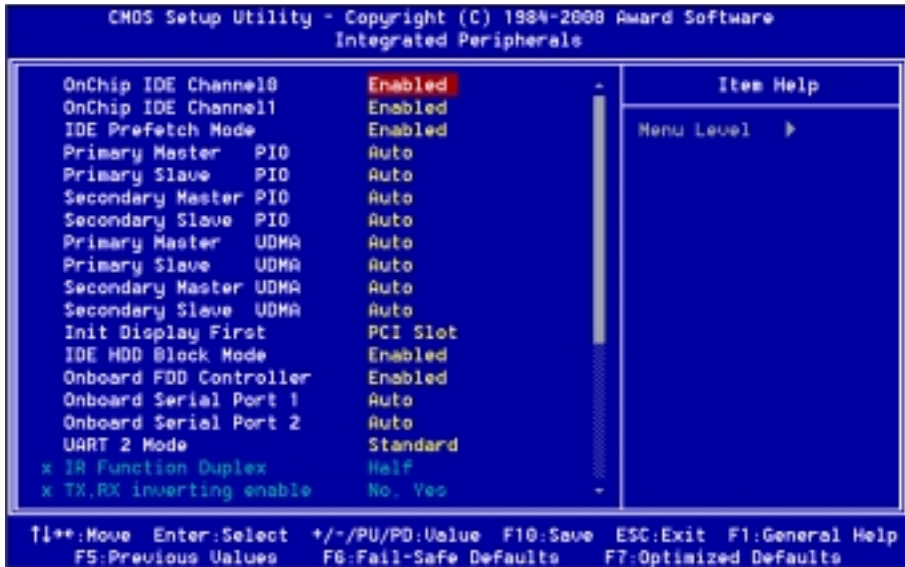
Figure 5: Integrated Peripherals

> *Note: If you do not use the Onboard IDE connector, then you will need to set Onboard Primary PCI IDE: Disabled and Onboard Secondary PCI IDE: Disabled*
> *Note: The Onboard PCI IDE cable should be equal to or less than 18 inches (45 cm.).*

OnChip IDE Channel0: The default value is Enabled.
Enabled: Enables Onboard IDE primary port.
Disabled: Disables Onboard IDE primary port.

OnChip IDE Channel1: The default is Enabled.
Enabled: Enables Onboard IDE secondary port.
Disabled: Disables Onboard IDE secondary port.

IDE Prefetch Mode: Enable prefetching for IDE drive interfaces that support its faster drive accesses. If uou are getting disk drive errors, change the setting to omit the drive interface where the errors occur. Depending on the configuration

of your IDE subsystem, this field may not appear, and it does not appear when the Internal PCI/IDE field, above, is Disabled.

The Choice: Enabled, Disabled.

Primary Master PIO: The default is Auto.

Auto: BIOS will automatically detect the Onboard Primary Master PCI IDE HDD Accessing mode.

Mode 0~4: Manually set the IDE Programmed interrupt mode.

Primary Slave PIO: The default is Auto.

Auto: BIOS will automatically detect the Onboard Primary Slave PCI IDE HDD Accessing mode.

Mode 0~4: Manually set the IDE Programmed interrupt mode.

Secondary Master PIO: The default is Auto.

Auto: BIOS will automatically detect the Onboard Secondary Master PCI IDE HDD Accessing mode.

Mode 0~4: Manually set the IDE Programmed interrupt mode.

Secondary Slave PIO: The default is Auto.

Auto: BIOS will automatically detect the Onboard Secondary Slave PCI IDE HDD Accessing mode.

Mode 0~4: Manually set the IDE Programmed interrupt mode.

Primary Master UDMA: This allows you to select the mode of operation for the hard drive. The default is Auto.

Auto: The computer will select the optimal setting.

Disabled: The hard drive will run in normal mode.

Primary Slave UDMA: This allows you to select the mode of operation for the hard drive. The default is Auto.

Auto: The computer will select the optimal setting.

Disabled: The hard drive will run in normal mode.

Secondary Master UDMA: This allows you to select the mode of operation for the hard drive. The default is Auto.

Auto: The computer will select the optimal setting.

Disabled: The hard drive will run in normal mode.

Secondary Slave UDMA: This allows you to select the mode of operation for the hard drive. The default is Auto.
Auto: The computer will select the optimal setting.
Disabled: The hard drive will run in normal mode.

Init Display First: If two video cards are used (1 AGP and 1 PCI) this specifies which one will be the primary display adapter. The default is PCI Slot.
PCI Slots: PCI video card will be primary adapter.
AGP: AGP video card will be primary adapter.

IDE HDD Block Mode: IDE Block Mode allows the controller to access blocks of sectors rather than a single sector at a time. The default is Enabled.
Enabled: Enabled IDE HDD Block Mode. Provides higher HDD transfer rates.
Disabled: Disable IDE HDD Block Mode.

Onboard FDD Controller: This controls the state of the onboard floppy controller. The default value is Enabled.
Enabled: Enable the Onboard VIA686A Chips's floppy drive interface controller.
Disabled: Disable the Onboard VIA686A Chip's floppy drive interface controller.

Onboard Serial Port 1: This field allows the user to configure the 1st serial port. The default is Auto.
AUTO: Enable Onboard Serial port 1 and address is Auto adjusted.
COM1:   Enable Onboard Serial port 1 and address is 3F8H/IRQ4.
COM2:   Enable Onboard Serial port 1 and address is 2F8H/IRQ3.
COM3:   Enable Onboard Serial port 1 and address is 3E8H/IRQ4.
COM4:   Enable Onboard Serial port 1 and address is 2E8H/IRQ3.
Disabled: Disable Onboard SMC CHIP's Serial port 1.

Onboard Serial Port 2: This field allows the user to configure the 2nd serial port. The default is Auto.
AUTO: Enable Onboard Serial port 2 and address is Auto adjusted.
COM1:   Enable Onboard Serial port 2 and address is Auto.
COM2:   Enable Onboard Serial port 2 and address is 2F8H/IRQ3.
COM3:   Enable Onboard Serial port 2 and address is 3E8H/IRQ4.
COM4:   Enable Onboard Serial port 2 and address is 2E8H/IRQ3.
Disabled: Disable Onboard SMC CHIP's Serial port 2.

UART 2 Mode: This item allows you to determine which Infra Red (IR) function of onboard I/O chip.
The Choice: Standard, ASKIR, HPSIR.

Onboard Parallel port: This field allows the user to configure the LPT port. The default is 378H / IRQ7.
378H: Enable Onboard LPT port and address is 378H and IRQ7.
278H: Enable Onboard LPT port and address is 278H and IRQ5.
3BCH: Enable Onboard LPT port and address is 3BCH and IRQ7.
Disabled: Disable Onboard Winbond Chip's LPT port.

Onboard Parallel Port Mode: This field allows the user to select the parallel port mode.
The default is Normal.
Normal: Standard mode. IBM PC/AT Compatible bidirectional parallel port.
EPP: Enhanced Parallel Port mode.
ECP: Extended Capabilities Port mode.
EPP+ECP: ECP Mode & EPP Mode.

Onboard Legacy Audio: Legacy Audio enabled/disabled.

Sound Blaster: Sound Blaster compatible device enabled/disabled.

SB I/O Base Address: Sound Blaster I/O resource selection.

SB IRQ Select: Legacy audio device IRQ selection.

SB DMA Select: Sound Blaster DMA channel selection.

MPU-401: MPU-401 function enabled/disabled.

MPU-401 I/O Address: Built-in MPU-401 compatible MIDI I/O port selection:
300-303H
310-313H
320-323H
330-333H (default)

Game Port (200-207H): Built-in joystick port support disabled/enabled(default).

4-5 Power Management Setup

Choose the "POWER MANAGEMENT SETUP" in the CMOS SETUP UTILITY to display the following screen. This menu allows the user to modify the power management parameters and IRQ signals. In general, these parameters should not be changed unless it's absolutely necessary.
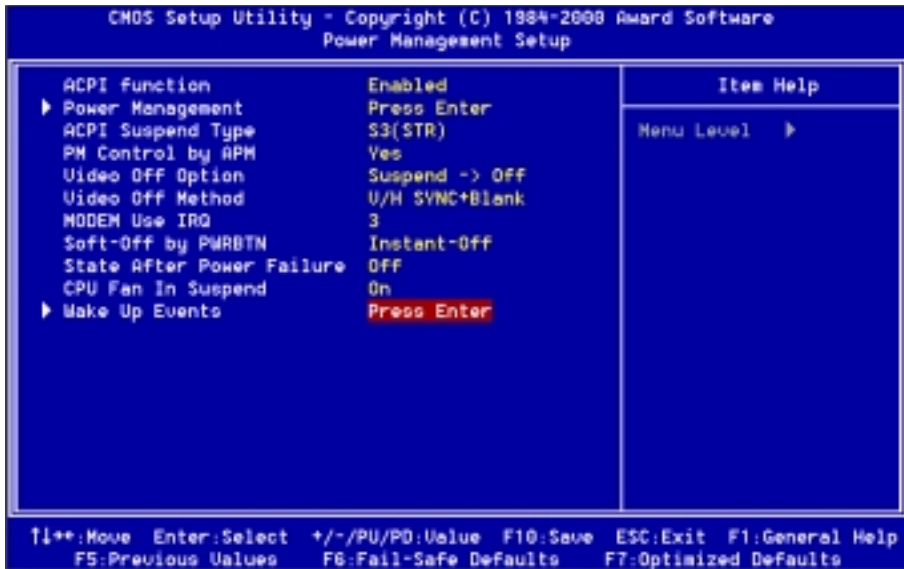
Figure 6: Power Management Setup

ACPI Function: This option allows you to select ACPI Function.
The default is Enabled.
Enabled: Support ACPI function for new O.S
Disabled: No Support ACPI function.

You can only change the content of Doze Mode, Standby Mode, and Suspend Mode when the Power Management is set to 'User Define'.

Power Management: Use this to select your Power Management selection.
The default is User define.
Disabled: The system operates in NORMAL conditions (Non-GREEN), and the Power Management function is disabled.
Max. saving: Maximum power savings. Inactivity period is 1 minute in each mode.

Min. saving: Minimum power savings. Inactivity period is 1 hour in each mode.

User define: Allows user to define PM Timers parameters to control power saving mode.

ACPI Suspend Type: This item allows you to select S1(POS) or S3(STR) function. The choice: S1(POS), S3(STR).

PM controlled APM: This option shows weather or not you want the Power Management to be controlled the Advanced Power Management (APM). The default is Yes.

Yes: APM controls your PM

No: APM does not control your PM

Video Off Option: Tells you what time frame that the video will be disabled under current power management settings. The default is Standby.

Standby: Video powers off after time shown in standby mode setting.

Doze: Video powers off after time shown in doze mode setting.

Suspend: Video powers off after time shown in suspend mode setting.

N/A: Video power off not controlled by power management.

Video Off Method: This option allows you to select how the video will be disabled by the power management. The default is V/H Sync + Blank

V/H Sync + Blank: System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.

DPMS: Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values.

Blank Screen: System only writes blanks to the video buffer.

MODEM Use IRQ: Name the interrupt request (IRQ) line assigned to the modem (if any) on your system. Activity of the selected IRQ always awakens the system. Default is IRQ 3.

N/A: No IRQ is used.	**3**: IRQ 3
4: IRQ 4	**5**: IRQ 5
7: IRQ 7	**9**: IRQ 9
10: IRQ 10	**11**: IRQ 11

Soft-Off by PWRBTN: Use this to select your soft-off function.
The default is Delay 4 sec.
Instant Off: Turns off the system instantly.
Delay 4 Second : Turns off the system after a 4 second delay. If momentary
                         press of button, the system will go into Suspend Mode. Press
                         the power botton again to take system out of Suspend Mode.

State After Power Failure: This field lets you determine the state that your PC
returns to after a power failure. If set to Off, the PC will not boot after a power
failure, if set to On, the PC will restart after a power failure.

CPU FAN In Suspend: This option is used to set if the CPU fans will turn off
during suspend mode. The default is Off.
On: The system will turn off the CPU fans during suspend mode.
Off: The system will not turn off the CPU fan during suspend mode.

VGA: When set to On (default), any event occurring at a VGA port will awaken a
system which has been powered down.

LPT & COM: When set to *On* (default), any event occurring at a COM(serial)/
LPT (printer) port will awaken a system which has been powered down.

HDD & FDD: When set to *On* (default), any event occurring at a hard or floppy
drive port will awaken a system which has been powered down.

PCI Card: When set to *On* (default), any event occurring to the DMA controller
will awaken a system which has been powered down.

Modem Ring Resume: When set to *Enabled*, any event occurring to the Modem
Ring will awaken a system which has been powered down.

RTC Alarm Resume: When set to *Enable rtc alarm resume,* you could set the
date (of month) and timer (hh:mm:ss), any event occurring at will awaken a
system which has been powered down.

Primary INTR: When set to *On* (default), any event occurring at will awaken a
system which has been powered down.

4-6 PNP/PCI Configuration

The PNP/PCI configuration program is for the user to modify the PCI/ISA IRQ signals when various PCI/ISA cards are inserted in the PCI or ISA slots.

WARNING: Conflicting IRQ's may cause the system to not find certain devices.
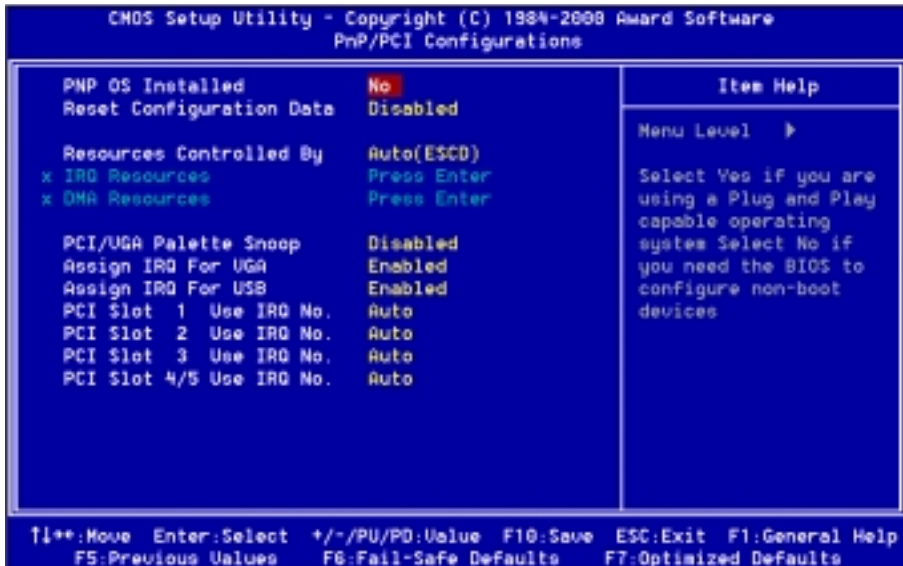
Figure 7: PCI Configuration Setup

PNP OS Installed: Do you have a PNP OS installed on your system. The default is No.

Yes: Select if you are using a PNP OS.
No: Select if your OS does not support PNP.

Resources Controlled By: Who controlled the system PNP/PCI resources. The default is Auto.

Manual: PNP Card's resources will be controlled manually. You can set which IRQ-X and DMA-X are assigned to PCI/ISA PNP or Legacy ISA Cards.

Auto: If your ISA card and PCI card are all PNP cards, BIOS will assign the interrupt resource automatically.

Reset Configuration Data: This setting allows you to clear ESCD data.
The default is Disabled
Disabled: Normal Setting.
Enabled: If you have plugged in some Legacy cards to the system and they were
recorded into ESCD (Extended System Configuration Data), you can
set this field to Enabled in order to clear ESCD.

PCI/VGA Palette Snoop: Leave this field at Disabled.
The choice: Enabled, Disabled.

Slot 1 to Slot 5 Use IRQ No: These settings allow the user to specify what IRQ
will be assigned to PCI devices in the chosen slot. Options available: Auto,3,4,5,
7,9,10,11,12,14 & 15. The defaults are Auto.

4-7 PC Health Status

Current CPU Temperature: This is the current temperature of the CPU.

Current System Temperature: This is the Current temperature of the system.

Current CPU FAN Speed: The current CPU fan speed in RPMs.

Current Chassis FAN Speed: The current chassis fan speed in RPMs.

CPU(V):   The voltage level of the CPU(Vcore/Vcache).
3.3V, 5V, 12V: The voltage level of the switch power supply.

4-8 Frequency/Voltage Control

```
         CMOS Setup Utility - Copyright (C) 1984-2000 Award Software
                          Frequency/Voltage Control

    Auto Detect DIMM/PCI Clk    Enabled            Item Help
    CPU Host Clock (CPU/PCI)    Default
    100/133MHz Spread Spectrum  Enabled       Menu Level   ▶
    DRAM Clock                  Host CLK




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5:Previous Values    F6:Fail-Safe Defaults    F7:Optimized Defaults
```
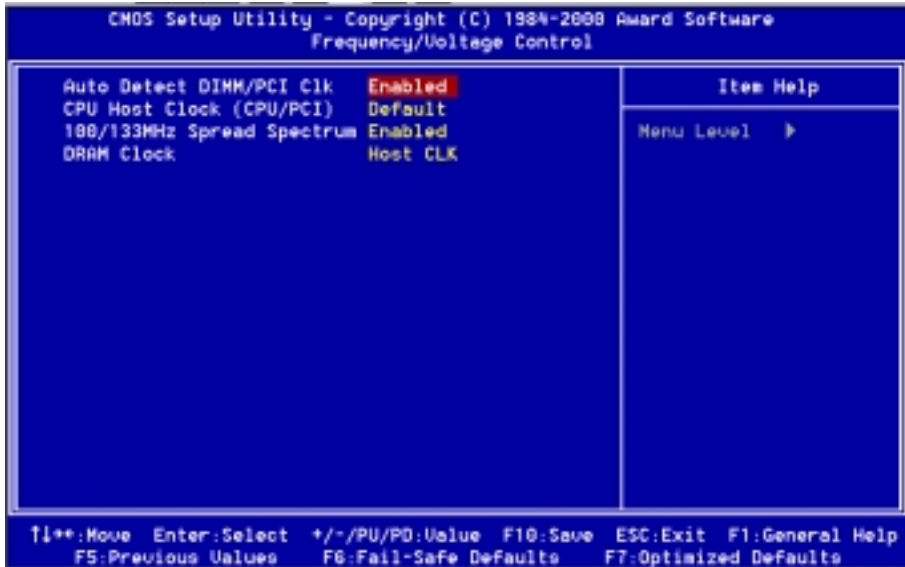
Auto Detect DIMM/PCI Clk: When enabled the motherboard will automatically disable the clock source for a DIMM socket which does not have a module in it. Same applies for PCI slots. The default is Enabled.

Enabled: Enables this option.
Disabled: Disables this option.

CPU Host Clock (CPU/PCI): Allows the external clock to be modified depending upon what FSB has been selected. Should not be used to clock processor faster than it was designed for.   The default is Default.

100/133 Spread Spectrum : The default is Enabled.
Enabled: Enables this option.
Disabled: Disables this option.

DRAM Clock : The item will synchronize/asynchronize DRAM operation clock.
Host Clock: DRAM has same working clock with CPU host bus.
2/3 Host: DRAM running with lower operation clock.

4-9 Defaults Menu

Selecting "Defaults" from the main menu shows you two options which are described below

Load Fail-Safe Defaults

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

     Load Fail-Safe 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.

4-10 Supervisor/User Password Setting

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

supervisor password : can enter and change the options of the setup menus.
user password   : just 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 pass-
word 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 the password will be disabled. Once the pass-
word 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 (see Section 3). 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.

4-11 Exit Selecting

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit without saving (Y/N)? Y

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

Appendix A

A-1 MEMORY MAP

Address Range	Size	Description
[00000-7FFFF]	512K	Conventional memory
[80000-9FBFF]	127K	Extended Conventional memory
[9FC00-9FFFF]	1K	Extended BIOS data area if PS/2 mouse is installed
[A0000-C7FFF]	160K	Available for Hi DOS memory
[C8000-DFFFF]	96K	Available for Hi DOS memory and adapter ROMs
[E0000-EEFFF]	60K	Available for UMB
[EF000-EFFFF]	4K	Video service routine for Monochrome & CGA adaptor
[F0000-F7FFF]	32K	BIOS CMOS setup utility
[F8000-FCFFF]	20K	BIOS runtime service routine (2)
[FD000-FDFFF]	4K	Plug and Play ESCD data area
[FE000-FFFFF]	8K	BIOS runtime service routine (1)

A-2 I/O MAP

[000-01F]	DMA controller.(Master)
[020-021]	INTERRUPT CONTROLLER.(Master)
[022-023]	CHIPSET control registers. I/O ports.
[040-05F]	TIMER control registers.
[060-06F]	KEYBOARD interface controller.(8042)
[070-07F]	RTC ports & CMOS I/O ports.
[080-09F]	DMA register.
[0A0-0BF]	INTERRUPT controller.(Slave)
[0C0-0DF]	DMA controller.(Slave)
[0F0-0FF]	MATH COPROCESSOR.
[1F0-1F8]	HARD DISK controller.
[278-27F]	PARALLEL port 2.
[2B0-2DF]	GRAPHICS adapter controller.

[2F8-2FF]   SERIAL port 2.
[360-36F]   NETWORK ports.
[378-37F]   PARALLEL port 1.
[3B0-3BF]   MONOCHROME & PARALLEL port adapter.
[3C0-3CF]   EGA adapter.
[3D0-3DF]   CGA adapter.
[3F0-3F7]   FLOPPY DISK controller.
[3F8-3FF]   SERIAL port 1.

A-3 TIMER & DMA CHANNELS MAP

TIMER MAP:
TIMER   Channel 0   System timer interrupt.
TIMER   Channel 1   DRAM REFRESH request.
TIMER   Channel 2   SPEAKER tone generator.
DMA CHANNELS:
DMA Channel 0   Available.
DMA Channel 1   Onboard ECP (Option).
DMA Channel 2   FLOPPY DISK (SMC CHIP).
DMA Channel 3   Onboard ECP (default).
DMA Channel 4   Cascade for DMA controller 1.
DMA Channel 5   Available.
DMA Channel 6   Available.
DMA Channel 7   Available

A-4 INTERRUPT MAP

NMI :
Parity check error.
IRQ (H/W):
0   System TIMER interrupt from TIMER 0.
1   KEYBOARD output buffer full.
2   Cascade for IRQ 8-15.
3   SERIAL port 2.
4   SERIAL port 1.
5   PARALLEL port 2.

6	FLOPPY DISK (SMC CHIP).
7	PARALLEL port 1.
8	RTC clock.
9	Available.
10	Available.
11	Available.
12	PS/2 Mouse.
13	MATH coprocessor.
14	Onboard HARD DISK (IDE1) channel.
15	Onboard HARD DISK (IDE1) channel.

A-5 RTC & CMOS RAM MAP

RTC & CMOS:

00	Seconds.
01	Second alarm.
02	Minutes.
03	Minutes alarm.
04	Hours.
05	Hours alarm.
06	Day of week.
07	Day of month.
08	Month.
09	Year.
0A	Status register A.
0B	Status register B.
0C	Status register C.
0D	Status register D.
0E	Diagnostic status byte.
0F	Shutdown byte.
10	FLOPPY DISK drive type byte.
11	Reserve.
12	HARD DISK type byte.
13	Reserve.
14	Equipment type.
15	Base memory low byte.

16   Base memory high byte.
17   Extension memory low byte.
18   Extension memory high byte.
19-2d
2E-2F
30   Reserved for extension memory low byte.
31   Reserved for extension memory high byte.
32   DATE CENTURY byte.
33   INFORMATION FLAG.
34-3F   Reserve.
40-7F   Reserved for CHIPSET SETTING DATA.

Appendix B

B-1 POST CODES

For BIOS 6.0 Code

POST (hex)	DESCRIPTION
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization:
	- Disable shadow RAM
	- Disable L2 cache (socket 7 or below)
	- Program basic chipset registers
C1h	Detect memory
	- Auto-detection of DRAM size, type and ECC.
	- Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen
	2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface
	2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips.
	2. Enable keyboard interface.
09h	Reserved
0Ah	1. Disable PS/2 mouse interface (optional).
	2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional).

	3. Reset keyboard for Winbond 977 series Super I/O chips.
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to PURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute.
	2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead.

	3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.
	4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots.

	5. Early PCI initialization:
	   - Enumerate PCI bus number
	   - Assign memory & I/O resource
	   - Search for a valid VGA device & VGA BIOS, and put it into C000:0.

24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address.
	2. Initialize the APIC for Pentium class CPU.
	3. Program early chipset according to CMOS setup. Example: onboard IDE controller.
	4. Measure CPU speed.
	5. Invoke video BIOS.
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved
2Dh	1. Initialize multi-language
	2. Put information on screen display, including Award title, CPU type, CPU speed ….
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved

35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page.
	2. Program write allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU
	2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range.
	3. Initialize the APIC for P6 class CPU.
	4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB
51h	Reserved

52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo
	2. Early ISA PnP initialization
	- Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch.
	2. Initialize Init_Onbaord_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices.

	2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Eh	Reserved
6Fh	1. Initialize floppy controller
	2. Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if :
	- AWDFLASH is found in floppy drive.
	- ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..
76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported.
	- If errors occur, report errors & wait for keys
	- If no errors occur or F1 key is pressed to continue:
	◆Clear EPA or customization logo.
80h	Reserved
81h	Reserved
82h	1. Call chipset power management hook.
	2. Recover the text fond used by EPA logo (not for full screen logo)
	3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices

85h	1. USB final Initialization
	2. NET PC: Build SYSID structure
	3. Switch screen back to text mode
	4. Set up ACPI table at top of memory.
	5. Invoke ISA adapter ROMs
	6. Assign IRQs to PCI devices
	7. Initialize APM
	8. Clear noise of IRQs.
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache
	2. Program boot up speed
	3. Chipset final initialization.
	4. Power management final initialization
	5. Clear screen & display summary table
	6. Program K6 write allocation
	7. Program P6 class write combining
95h	1. Program daylight saving
	2. Update keyboard LED & typematic rate
96h	1. Build MP table
	2. Build & update ESCD
	3. Set CMOS century to 20h or 19h
	4. Load CMOS time into DOS timer tick
	5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

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Appendix C

NOTE:
The "**LOAD Optimized DEFAULTS**" function loads the system default data directly from ROM and initializes the associated hardware properly. This function will be necessary when you accept this mainboard, or the system CMOS data is corrupted.

CMOS Setup Utility - Copyright (C)   1984-1998

Standard CMOS Feature	Frequency/Voltage Control
Advanced BIOS Feature	Load Fail-Safe Defaults
Advanced Chipset Feature	Load Optimized Defaults
Integrated Peripherals	Set Supervisor Password
Power Management S	Load Optimized Defaults (Y/N)? Y
PnP/PCI Configuratio	
PC Health Status	Exit Without Saving

Esc : Quit	↑↓←→ : Select Item
F10 : Save & Exit Setup	

Time, Date, Hard Disk Type….

LOAD Optimized DEFAULTS

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