Declaration of Conformity

According to 47 CFR, Parts 2 and 15 of the FCC Rules

The following designated product:

EQUIPMENT: MAINBOARD

MODEL NO.: 5AGM2

is a Class B digital device that complies with 47 CFR Parts 2 and 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This declaration is given to the manufacturer:

CHAINTECH COMPUTER U.S., INC

509 Valley Way, Milpitas, CA 95035, U.S.A.

Tel: 1-408-935-6988

Fax: 1-408-935-6989

Chaintech President: Raff Tung

Signature:

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy. If this equipment is not installed and used in accordance with the manufacturer's instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for audio noise emissions from digital apparatusses set out in the Radio Interference Regulations of the Canadian Department of Communications.

Manufacturer's Disclaimer Statement

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June 1998

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Main Board
User's Manual

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Memo

Chapter 1

Introduction

1-1 Product Specifications

❒ **CPU**

- Supports up to 200MHz Intel Pentium® processors and up to **233MHz** Pentium® processors with **MMX™** technology
- Supports Intel Pentium® P54CTB **OverDrive** processors
- Supports PR166+ ~ PR200+ Cyrix/IBM 6x86L™ processors and PR166+ ~ **PR300+ 6x86MX™/M-II** processors
- Supports 166~**300 MHz K6™/K6-2** processors
- Supports 180 ~ 225MHz IDT ***WinChip*** C6 processors
- Supports 60/66/68/75/83/**100** MHz system clock speeds
- 321-pin ZIF Socket 7
- High efficiency **Switching Power Module**

↘ Supports a **full range of CPU core voltages** (2.0-3.5v) for future processors

❒ **Cache Memory**

- Standard 512KB (64k*64x1) Pipelined Burst SRAM on board

❒ **Main Memory**

- Three 3.3V unbuffered 168-pin DIMM sockets support 8/16/32/64/128MB, 64/72-bit DRAM memory modules
- Supports up to 384MB EDO and Synchronous DRAM
- Supports single-bit ECC capability

↘ Special asynchronous mode for low-speed SDRAM modules (see details in section 2-6)

❒ **Chipset**

- **VIA MVP3** (82C598MVP/82C586B) two chip AGPset

❒ **I/O Slots**

- Three 16-bit ISA slots (one PCI/ISA shared slot)
- Three 32-bit PCI slots (all are Master Mode, PCI 2.1 compliant)
- One 124-pin AGP slot (Accelerated Graphics Port v1.0 compliant)

↘ PCI slots support 3.3V capability

❒ **Boot Block Flash BIOS**
- Award System BIOS supports PnP, APM, DMI & multi-device booting such as SCSI HDD, IDE HDD, CD-ROM, LS120, ZIP-ATAPI,etc.
- Includes **Trend ChipAway Virus** for a virus-free system boot-up

❒ **On Board Ultra I/O Functions**
- ITE 8661 I/O chip
- One floppy disk drive connector supports up to 2.88MB, Japanese 3 Mode, and 1Mbps transfer rates
- Two 16550A compliant serial ports
- One Standard SPP/ECP/EPP parallel port
- Supports up to 115.2kbps IrDA IR function

❒ **Two Ultra DMA-33 PCI IDE Ports**
- Supports up to PIO Mode 4, Multi-word DMA Mode 2 & Ultra DMA-33 timings
- Complete Bus Master Drivers for well-known multi-tasking operating systems

❒ **Two Channel USB Ports**

Under compatibility testing with different peripherals

❒ **PCB Dimensions**
- Baby-AT form factor, 220mm x 240mm, 4-layer PCB
- Five mounting holes

❒ **Green PC**
- Meets EPA Green PC standard: power consumption under 30W in Doze, Standby or Suspend modes

❒ **Advanced Management Capability**
- Supports Software power off control, Over-ride power button, Power-on by modem ring, Power-on by alarm, Blinking LED in suspend, etc.
- **Poly-fuse** over-current protection for USB and keyboard
- Flash BIOS protection
- Supports **FAN-78** and included utility to simplify managing your PC

1-2 Package Contents

This product comes with the following components:

- ❒ One mainboard
- ❒ One 9-pin serial port and 25-pin parallel port ribbon cable with bracket (Figure 1-1)
- ❒ One 25-pin serial port ribbon cable with bracket (Figure 1-2)
- ❒ One 40-pin IDE connector ribbon cable (Figure 1-3)
- ❒ One 34-pin floppy disk drive ribbon cable (Figure 1-4a) or (Figure 1-4b)
- ❒ Optional USB kit with PS/2 mouse, infrared and two USB ports (Figure 1-5)
- ❒ One CD-ROM disk that includes
  - Award Flash EPROM Utility, Award DMI Utility
  - VIA IDE Bus Master Drivers for Win95 and WinNT
  - VIA ACPI Patch
  - VIA AGP VxD Drivers for Win95
  - System Monitoring Software for Win95 OR Genesys System Monitoring Software for Win95/WinNT
  - Trend PC-cillin Anti-virus v3.0 (OEM) Utility for Win95 in eight different languages
- ❒ One User's Manual

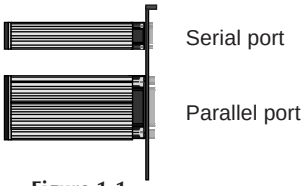


Figure 1-1

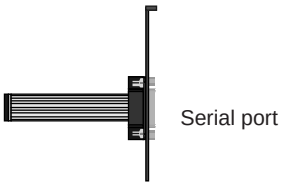


Figure 1-2

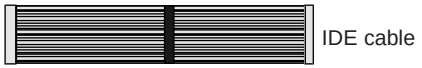


Figure 1-3

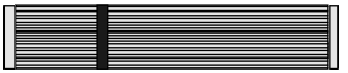


Figure 1-4a Standard floppy cable

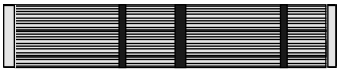


Figure 1-4b Optional 5.25 in. floppy cable

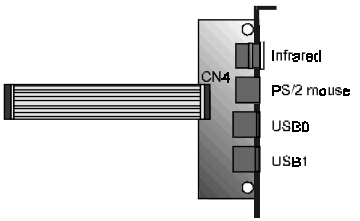
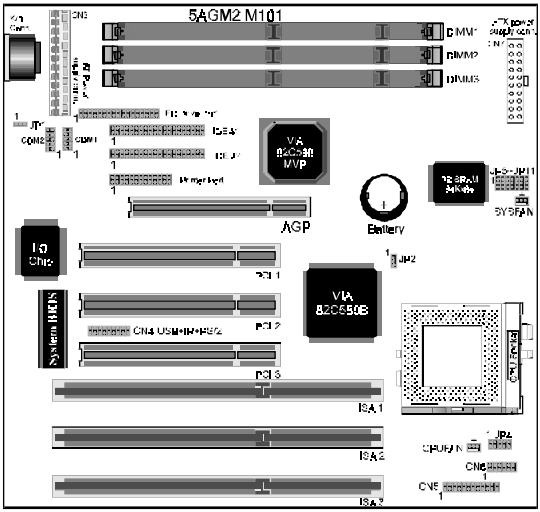


Figure 1-5 optional USB Kit

1-3 Mainboard Layout



1-4 Jumper and Connector Reference Page Chart

Jumper & Connector No.	Function	Page
JP1	AT/ATX power supply jumper	10
JP2	Clear CMOS data jumper	11
JP4	CPU voltage jumpers	8/9
JP5-7	System frequency jumpers	7
JP8-10	System frequency ratio jumpers	7
JP11	Memory-bus frequency setting jumper	16
CN3	AT Power supply connector	10
CN4	PS/2 mouse, USB, infrared connector	14
	PS/2 mouse connector	15
	USB connector	14
	Infrared connector	14
CN5	Front panel connector set	12/13
	Keyboard lock & Power indicator LED connector	12
	System reset switch connector	12
	Speaker connector	13
	Green switch & Green LED connector	13
	Turbo LED connector	13
	IDE activity LED connector	13
	Override power button (for ATX power supply)	12
CN6	FAN-78 connector	45
CN7	ATX Power supply connector	10
SYSFAN	System cooling fan connector	11
CPUFAN	CPU cooling fan connector	11

Chapter 2

Hardware Setup

If your mainboard has already been installed in your computer you may still need to refer to this chapter if you plan to upgrade your system's hardware.

Be sure to disconnect the power cable from the power source before performing any work on your mainboard, i. e. installing a CPU, memory module, changing a jumper setting, adding or removing expansion cards etc. Not doing so may result in electrical shock or severe damage to your mainboard and peripherals!

2-1 Introduction to Jumpers

Jumpers are used to select between various operating modes. A jumper consists of a row of gold colored pins that protrude from the surface of the mainboard. It is important not to confuse jumpers with connectors or headers.

Putting jumper caps on anything that is not a jumper may result in damaging your mainboard. Please refer to Section 1-3, Mainboard Layout, for the location of jumpers on your mainboard.

As indicated in Figure 2-1 below, a cap is used to cover the pins of a jumper, resulting in shorting those pins that it covers. If the cap is removed from the top of the pins, the jumper is left "open." The number 1 shown both in the diagram below and in all multiple pin jumper and header diagrams in this manual indicates the pin designated with the number 1. The numbering of the remaining pins follows in sequence.

A 3-pin jumper

A cap over pin 1 and pin 2 short these pins

Figure 2-1

2-2 Installing a PGA type CPU in a ZIF Socket

The Intel Socket 7, designed for the Pentium processor, has been incorporated as a standard mainboard specification and is compatible with AMD and Cyrix CPUs. To insert your CPU into Socket 7 please do the following:

1. Locate a small dot marked on the top surface of the CPU close to one if it's corners. The same corner will also be cut off, leaving a noticeable notch in the CPU's corner. These markings indicate Pin 1 of the CPU. See Figure 2-2.

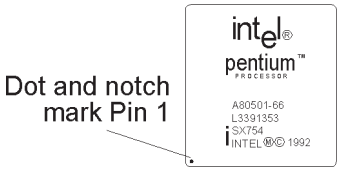


Figure 2-2 The markings on top of a CPU

2. Pull up the lever of Socket 7 so that it is perpendicular with the surface of the mainboard. Gently insert the CPU with Pin 1 at the same corner of Socket 7 that contains the end of the lever. Allow the the weight of the CPU to push itself into place. Do not apply extra pressure as doing so may result in damaging your CPU. Snap the lever back into place. See Figure 2-3.

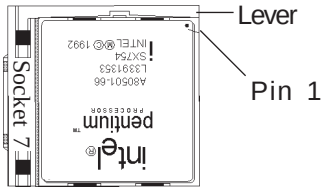


Figure 2-3 Inserting a CPU into Socket 7

Installing a heat sink and cooling fan on top of your CPU is necessary for proper heat dissipation. Failing to install these items may result in overheating and possible burn-out of your CPU.

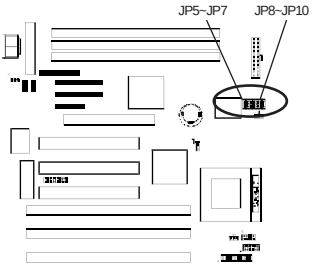
2-3 CPU Jumper Configuration

Frequency Configuration

If you install a CPU on this mainboard, you must set **JP 5-7** for **System Frequency** and **JP 8-10** for **CPU Bus Frequency Ratio.** See Figure 2-4 CPU/System Frequency Jumper Settings.

CPU Bus Frequency & Frequency Ratio Configuration

* CPU Speed = Frequency ratio x System Frequency



System Freq.	JP5~JP7
60MHz	
66MHz	
68MHz	
75MHz	
83MHz	
100MHz	

Freq. Ratio	JP8~JP10
x 1.5	
x 2	
x 2.5	
x 3	
x 3.5	
x 4	
x 4.5	
x 5	
x 5.5	

Figure 2-4 System Frequency Jumper Settings

PCI Frequency & AGP Frequency

System Freq. (MHz)	PCI Freq. (MHz)	AGP Freq. (MHz)
60	30	60
66	33	60
68.5	34	68.5
75	37.5	75
83	33	66
100	33	66

Overclocking

Operating a CPU at a higher frequency than its specification allows is called overclocking. If the CPU frequency is set at a higher frequency than its specification allows, it may or may not run at that freqency, depending on the quality of the CPU and the extent to which the the frequency has been overset. The mainboard manufacturer highly discourages overclocking as it may result in data loss, CPU burn-out, system failure, etc.

Voltage Configuration

There are two major processor types in general use--single and dual voltage processors. Most single voltage processors such as Pentium, AMD-K5, and Cyrix 6x86 processors use a single voltage value of 3.5v for both core and I/O voltage settings. Most dual voltage processors such as Pentium processors with MMX technology and Cyrix 6x86L processors use a dual voltage value of 2.8v for core and 3.3v for I/O voltage settings. To make the voltage setting for single and dual voltage processors, simply set **JP4** according to the table on the next page. The voltage range supported by this mainboard is detailed in Figure 2-5 below.

Vcore	JP4
2.2V	
2.8V	
2.9V	
3.2V	
3.3V	
3.5V	

Figure 2-5 Voltage Jumper Settings

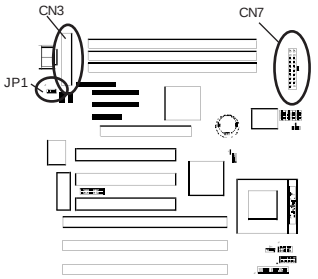
CPU-type		CPU Power Voltage			System freq.		Freq. ratio	
		I/O Vcc	Core Vcc	JP4	MHz	JP5~JP7	Speed rate	JP8~JP10
Intel	P54C-133	3.5			66		x2	
	P54C-166						x2.5	
	P54C-200						x3	
	Pentium w/MMX @166MHz	3.3	2.8				x2.5	
	Pentium w/MMX @200MHz						x3	
	Pentium w/MMX @233MHz						x3.5	
Cyrix /IBM	6x86-PR166 @133MHz	3.5			66		x2	
	6x86-PR200 @150MHz				75			
	6x86L-PR166 @133MHz	3.3	2.8		66			
	6x86L-PR200 @150MHz				75			
	6x86MX-PR166		2.9		66			
	6x86MX-PR200						x2.5	
	6x86MX-PR200				75		x2	
	6x86MX-PR233						x2.5	
					83		x2	
	MII-300				66		x3.5	
					75		x3	
AMD	K5-PR166 @116.7MHz	3.5			66		x2.5	
	K6/166	3.3	2.9					
	K6/200						x3	
	K6/233		3.2				x3.5	
	K6/266		2.2				x4	
	K6/300						x4.5	
	K6-2/266						x4	
	K6-2/300				100		x3	
IDT	C6-200	3.5			66		x3	
	C6-225				75			

2-4 Connector and Jumper Settings

Connectors are used to link the system board with other parts of the system, including the power supply, the keyboard, and the various controllers on the front panel of the system case.

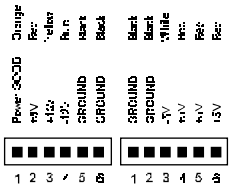
The power supply connector is the last connection to be made while installing a mainboard. Before connecting the power supply, please make sure it is not connected to the power source.

AT/ATX Power Supply Jumper (JP1)



1 AT Power 1 ATX Power

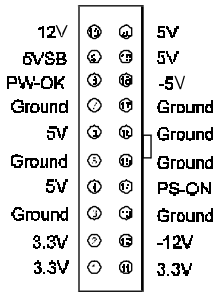
This mainboard supports two kinds of power connectors and requires a power supply of at least 200 watts. If you want to use an AT power supply, short pins 1 and 2 with the jumper cap. If you want to use an ATX power supply, short pins 2 and 3 with the jumper cap.



AT Power Supply Connector (CN3)

Most power supplies have two sets of six-wire leads. Making sure the black wires of each lead are in the center, plug both leads into the AT power supply connector. The power supply requirement is as follows:

Output voltage	Regulation tolerance
+5 Vdc	± 5%
-5 Vdc	± 10%
+12 Vdc	± 5%
-12 Vdc	± 10%



ATX Power Supply Connector (CN7)

The ATX power supply provides a single 20-pin connector interface which incorporates standard +/-5V, +/-12V, optional 3.3V and soft-power signal.

The Soft-power signal, a 5V trickle supply of at least 10mA, is continuously supplied when AC power is available. When the system is in the Soft-Off mode, this trickle supply maintains the system in it's minimum power state.

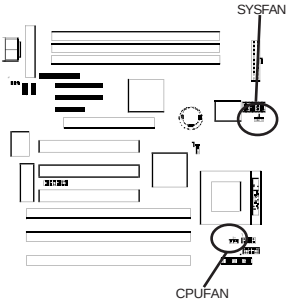
Software Power-Off Control

This mainboard can be powered down using theWindows 95 Software Power-Off function. To power down your computer, click the START button on the Windows 95 task bar. Select "Shut Down The Computer" and the system turns off. The message "It is now safe to turn off your computer" will not be shown when using this function.

Power-On By Modem

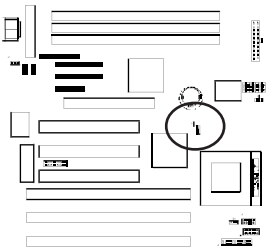
While in Soft-off state, if an external modem ring-up signal occurs, the system turns on and can be remotely accessed. Please enable the Power on by Modem function in BIOS's Power Management menu to activate this function. (See Section 3-4)

CPU/System Cooling Fan Connectors (CPUFAN/SYSFAN)



These added connectors allow the fans to draw their power from the mainboard instead of the disk drive connector. These fan connectors are available because some systems have all the disk drive power connectors in use.

Clear CMOS Data Jumper (JP2)



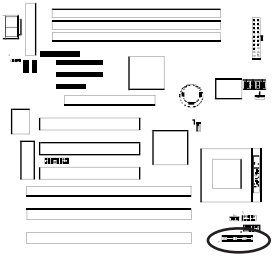
Default

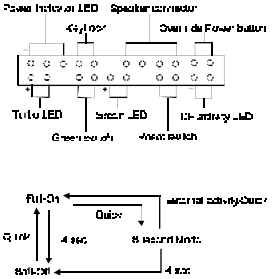
Clear CMOS Data

To clear the contents of the CMOS, please follow the steps below.

1. Disconnect the system power supply from the power source.
2. Set the jumper cap at location 2~3 for 5 seconds, then set back to the default position.
3. Connect the system's power and then start the system.
4. Enter BIOS, load the setup default settings in the CMOS Setup Utility Menu and then set the system configuration in the Standard CMOS Setup menu.

Front Panel Connector Set (CN5) A through G





Over-ride Power Button Operation

A. Over-ride Power Button Connector

The power button on the ATX chassis can be used as a normal power switch as well as a button to activate Advanced Power Management Suspend mode. This mode is used for saving electricity when the computer is not in use for long periods of time. The Soft-OFF by PWRBTN function in BIOS's Power Management Setup must set to "Delay 4 Sec." to activate this function.
(See Section 3-4)

When the Soft-off by PWRBTN function is enabled, pushing the power button rapidly will switch the system between Full-On and Suspend mode. Pushing the button rapidly again or any occurence of external activity such as pressing a key on the keyboard will bring the system back to Full-On. Pushing the button while in Full-On for more than 4 seconds will switch the system to Soft-off and pushing the button again rapidly will turn the system back to Full-on. See Over-ride Power Button Operation diagram.

B. Keyboard Lock & Power Indicator LED Connector

Plugging this connector into the lock on the front panel of the system case allows the lock to enable or disable the keyboard. This function provides limited security against casual intruders. The power indicator LED shows the system's power status and willl flash when the system is in Green mode (Suspend).

	Pin	Definition
Power indicator LED	1	+5V DC
	2	Not Connected
	3	Ground
Keyboard Lock	4	Keylock
	5	Ground

C. Green Switch/Green LED Connector

Some ATX cases provide a Green switch which is used to put the system in Suspend mode. In suspend mode, the power supply to the system is reduced to a trickle, the CPU clock is stopped, and the CPU core is in it's minimum power state. The system is woken up whenever the keyboard or mouse is touched or the Green button is pressed again. The system resumes in different ways as defined by "Power Management Setup" screen in BIOS.

D. Speaker Connector

Pin	Definition
1	Speaker Signal
2	GND
3	GND
4	+5V DC

E. System Reset Switch Connector

This connector should be connected to the reset switch on the front panel of the system case. The reset switch allows you to restart the system without turning the power off.

Pin	Definition
1	System
2	GND

F. IDE Activity LED Connector

The IDE activity LED lights up whenever the system reads/writes to the IDE devices.

G. Turbo LED Connector

This mainboard does not have turbo/de-turbo speed mode. Even though this function does not exist, the turbo LED will light when the LED is connected and the turbo button is pressed.

AT Keyboard Connector

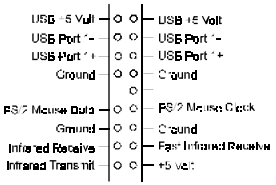
Pin	Definition
1	Keyboard Clock
2	Keyboard Data
3	(None)
4	Ground
5	+5V DC

Keyboard Connector/Pin Definitions

Poly-fuse Over Current Protection

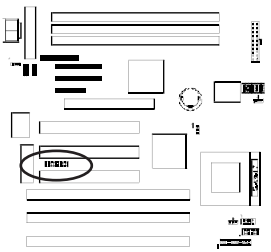
The poly-fuse protects the system from dangerous voltages the system might be exposed to via the keyboard or USB connectors. In case of such exposure, the poly-fuse will immediately be disconnected from the circuit, just like a normal fuse. After being disconnected for a certain period of time, the poly-fuse will return to its normal state, after which the keyboard or USB can function properly. Unlike conventional fuses the poly-fuse will not have to be replaced, relieving the user wasted time and inconvenience.

USB Kit Connector (CN4) A through C



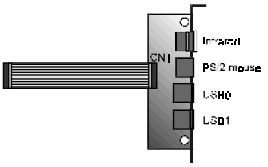
The USB Kit connector is a combination of of USB, PS/2 mouse, and Infrared functions grouped on the same connector. The USB Kit (Figure 1-5) is installed in a back panel of the chassis and is connected to the USB Kit connector with an 18-pin cable.

A. Infrared Connector



If the IR Address Select function in BIOS's Integrated Peripherals menu is not set at disabled, the COM2 port will support IR functions. (See Section 3-7)

Pin	Definition
1	Ir-Tx
2	Ir-Rx
3	Not Connected
4	Vcc (+5V)
5	GND
6	Not Connected
7	Not Connected
8	Not Connected



B. PS/2 Mouse Connector

If a PS/2 mouse is used, BIOS will automatically detect and assign IRQ12.

Pin	Definition
1	Data
2	Not Connected
3	Ground
4	+5V (fused)
5	Clock
6	Not Connected

C. Dual Channel USB(Universal Serial Bus) Connector

Enable the OnChip USB function in BIOS's Integrated Peripherals Menu if you want to use a USB keyboard. (See Section 3-7) Other USB devices do not require the enabling of this function. USB is an open industry standard, providing a simple and inexpensive way to connect up to 125 devices to a single computer port. Keyboards, mice, tablets, digitizers, scanners, bar-code readers, modems, printers and many more can all be used at the same time.

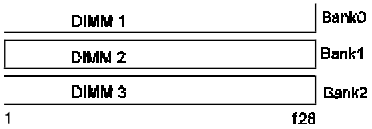
USB is a dynamically reconfigurable serial bus with an elementary data rate of 12Mbps, based on off the shelf, low cost micro-controller technology. It's modular layered software protocol supports sophisticated devices and application programs.

This board contains a USB Host controller and includes a root hub with two USB ports (meets USB Rev 1.0 spec.). Two USB peripherals or hub devices are able to be connected.

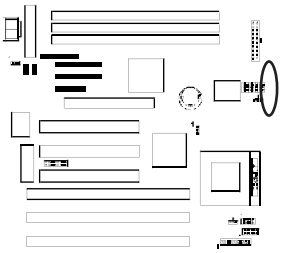
Compatibility with different USB peripherals is still being tested.

2-6 Main Memory Configuration

The DRAM memory system on board consists of 3 banks, and the memory range is **8 ~ 384** MBytes.



Memory-bus Frequency Setting Jumper (JP11)



This setting is only relevant when SDRAM-DIMM is used.

1~2 short (default): Synchronous mode
Memory-bus speed = CPU-bus speed

2~3 short: Asynchronous mode
Memory-bus speed = AGP-bus speed
(see details in section 2-3)

✍ When synchronous mode cannot be used due to speed limitations of your SDRAM modules.

DRAM Specifications

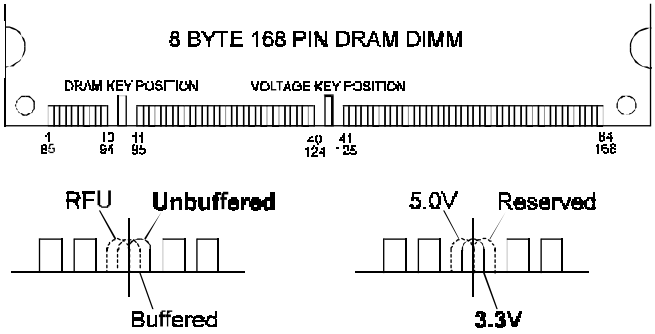
	System Frequency	SDRAM Type	Max Memory
4 unbuffered DIMM Modules	66MHz	12ns or faster	384MB
	100MHz	10ns or faster	

Types Supported	EDO(Extended Data Output) and Synchronous DRAM
Speed requirement	EDO: 70-ns (or faster) for 50 or 60MHz system frequency and 60-ns for 66MHz system frequency. SDRAM: 10/12ns
Module types & sizes	8/16/32/64/128 MBytes, single/double-sided, 3.3v DIMM
Parity	Both parity and non-parity modules may be used.

Because 128MB DIMM is not yet mainstream, the compatibility of 128MB DIMM can not be 100% guaranteed.

This mainboard supports 3.3v, unbuffered, 4-clock, SDRAM DIMM only. Buffered, 5V, or 2-clock SDRAM DIMMs should not be used.

This board has DIMM (Dual-in-line Memory Module) sockets to support SDRAM type DRAM and has the better optimized read timings (7-1-1-1). The DIMM sockets will quickly replace SIMM as the next module standard for the PC industry and will become the memory subsystems standardized 64-bit data interface. Recently, JEDEC committee passed the unbuffered DIMM pinout specification as a standard for higher speed transfer. The unbuffered DIMM allows for SDRAM, EDO and FPM DRAM compatibility as well as pinouts for x64, x72 with parity, x72 with ECC and x80 ECC. The unbuffered DIMM is distinguished by the keyed notch lying to the right of the centerline of the DRAM key position as shown in the figure below.



Memo

Chapter 3

Award BIOS Setup Program

Award's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This information is stored in CMOS RAM so that it can retain the setup information, even when the power is turned off.

When you turn on or reboot the system, press the Delete key to enter the Award BIOS setup program. The primary screen as shown in Figure 3-1 is a list of the menus and functions available in the setup program. Select the desired item and press enter to make changes. Operating commands are located at the bottom of this and all other BIOS screens. When a field is highlighted, on-line help information is displayed on the left bottom edge of the screen.

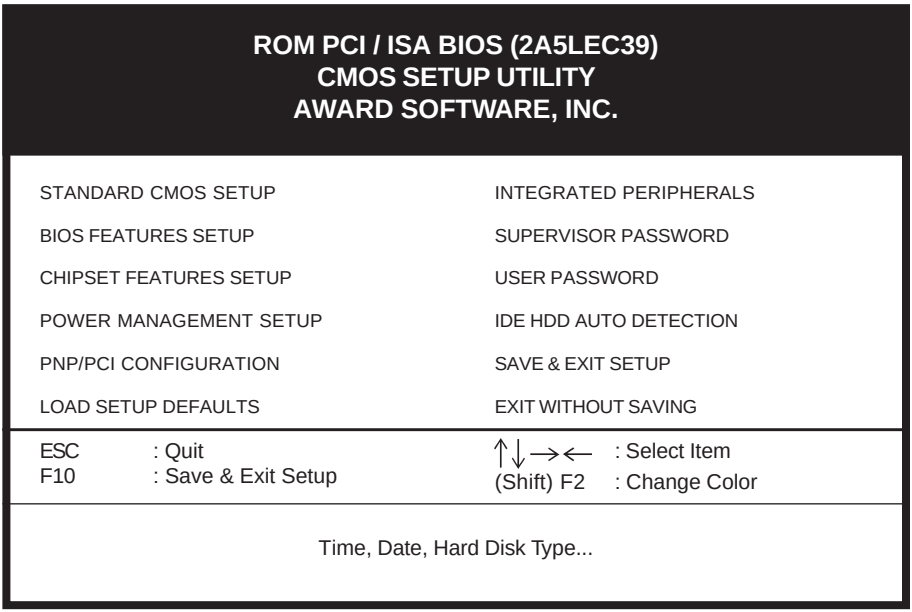


Figure 3-1 Setup Program Initial Screen

3-1 Standard CMOS Setup

The Standard CMOS Setup allows users to configure system components such as hard disk drive, floppy disk drive and video display as well as date, time and boot-up error signaling. This configuration menu should be changed when installing a mainboard for the first time, changing hardware in your system such as the HDD, FDD, video display, or when the CMOS data has been lost or contaminated. Choose the Standard CMOS Setup option from the CMOS Setup Utility menu (Figure 3-1) to display the following screen. When a field is highlighted, on-line help information is displayed on the left bottom edge of the screen.

ROM PCI / ISA BIOS (2A5LEC39)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date (mm : dd : yy) : Fri, July 25 1997
Time (hh : mm : ss) : 9: 14: 43

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master :	Auto	0	0	0	0	0	0	Auto
Primary Slave :	Auto	0	0	0	0	0	0	Auto
Secondary Master :	Auto	0	0	0	0	0	0	Auto
Secondayt Slave :	Auto	0	0	0	0	0	0	Auto

Drive A : 1.44M, 3.5 in.
Drive B : None

Video : EGA/VGA
Halt On : All, But keyboard

Base Memory : 640K
Extended Memory : 15360K
Other Memory : 384K

Total Memory : 16384K

ESC : Quit
F1 : Help
↑↓→← : Select Item
(Shift) F2 : Change Color
PU/PD/+/- : Modify

Figure 3-2 Standard CMOS Setup Screen

Date/Time
Set the date and time. Do not skip this function as all of your timed events such as power management, saving files, etc. are based on this timer.

Hard Disk Setup (Primary/Secondary; Master/Slave)
This category identifies up to four IDE hard disk drives that have been installed in the computer. This section does not show information on other IDE devices such as CD-ROM drives or other hard drive types such as SCSI drives.

Type (Auto/User/None): Use the fields under the Type column to determine the method you will use to configure the IDE devices. If you choose Auto, BIOS will automatically detect and make optimal settings for most IDE hard drives.

The mainboard manufacturer recommends that you choose Auto for all drives.

Choose User to define your own drive type manually. You must enter values indicated in the table below into each drive parameter field. This information should be included in the documentation from your hard disk vendor or system manufacturer:

TYPE	Setting method
CYLS	Number of cylinders
HEAD	Number of heads
PRECOMP	Write precompensation cylinder
LANDZ	Landing zone
SECTOR	Number of sectors
MODE	Mode type

Table 3-1 Hard Disk Drive Parameters

Cyls/Head/Sector: The number of Cylinders, Heads, and Sectors can usually be found written on the top of the hard disk. If you have a relatively new hard drive, entering this information alone is usually sufficient for normal hard disk operation. The hard disk will not work properly if you enter improper information for these categories.

Precomp: Older hard drives (i.e., MFM or RLL drives) have the same number of sectors per track at the innermost tracks as at the outermost tracks. Thus, the data density at the innermost tracks is higher and the bits are lying closer together. Even though the physical size of a sector gets progressively smaller as the track diameter diminishes, each sector must still hold 512 bytes. Write precompensation circuitry compensates for the difference in sector size by boosting the write current for inner track sectors.

Landz: This defines the address of the landing zone and is only used for older hard drives which do not have an auto-parking feature.

Mode: If the Type value is not None for any device, you must set the Mode value for that device. There are four different Mode values: Auto, Normal, Large, and LBA.

Auto - BIOS detects and enters the IDE drive type during bootup.

Normal - for IDE drives that meet the old IDE specification which support a maximum capacity of 528MB (1024 cylinders, 16 heads, and 63 sectors).

Large - for IDE drives that do not support LBA and have more than 1024 cylinders. Try this setting if your hard disk does not operate properly with

the LBA setting. Large mode is not supported by all operating systems, i.e., only certain versions of DOS support large mode.

LBA - (Large/Logical Block Addressing) With LBA, the IDE controller transforms the data address described by sector, head, and cylinder number into a physical block address, significantly improving data transfer rates. This mode is for drives with greater than 1024 cylinders and between 528MB and 8.4GB in size. This protocol is the current common standard.

Choose None for Type if there are no IDE HDD devices in your system.

✎ You can use the IDE HDD Auto Detection function to auto detect your hard drive parameters. Using this function will automatically insert the parameters discussed under Hard Disk Setup and will indicate User for the Field value. Please see Section 3-9 for more information.

Floppy Disk Drives

Choose the memory capacity and disk size that corresponds with that of your floppy disk drive(s).

Video

Select the type of video adapter present in your system. You can ignore this setting if you are using a VGA monitor since VGA BIOS automatically configures this setting.

Halt

When the system is powered on, BIOS performs a series of diagnotic tests called POST (Power On Self Test). This function stops the computer if BIOS detects a hardware error. You can tell BIOS to halt on all errors, no errors, or not to halt on specific errors.

3-2 BIOS Features Setup

By choosing the BIOS Features Setup option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the mainboard.

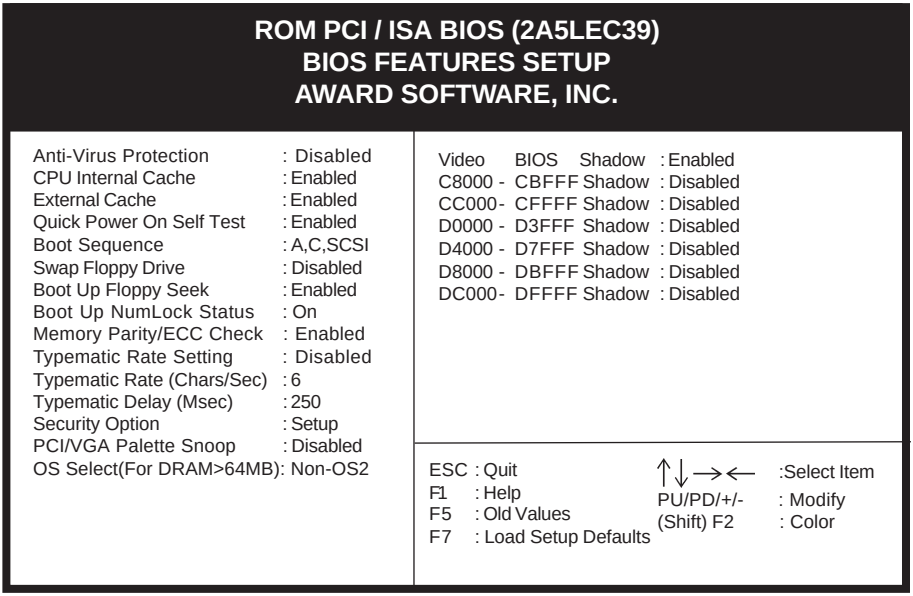


Figure 3-3 BIOS Feature Setup Screen

A. VIRUS PROTECTION

Anti-Virus Protection

This is an anti-virus code incorporated in the mainboard's BIOS firmware. During the boot-up sequence, BIOS loads before loading of the partition table or boot sector. The anti-virus code loads with BIOS and is able to detect boot-up viruses before they have a chance to infect the hard drive. This function employs rule-based logic that doesn't look for specific viruses but rather detects patterns found in every virus, eliminating the need to perform periodical version updates after new viruses have been found.

B. CACHE CONTROL

CPU Internal Cache/External Cache

Cache memory is much faster than conventional DRAM system memory. These fields allow you to enable or disable the CPUs Level 1 built-in cache and Level

2 external cache. Both settings are left enabled to significantly increase the performance of your computer.

C. BOOT UP FEATURES

After turning on the system, BIOS will perform a series of device initializations and diagnostic tests discussed below.

Quick Power On Self Test (POST)
Enable this function to reduce the amount of time required to run the POST (Power On Self Test). BIOS saves time by skipping some items during POST. It is recommended that you disable this setting. Discovering a problem during bootup is better than loosing data during your work.

Boot Sequence
This option sets the sequence of drives BIOS attempts to boot from after POST completes. BIOS will search these drives for an operating system.

Swap Floppy Drive
Enabling this function will swap the floppy drive assignment so that drive A will function as drive B, and drive B will function as drive A. Note that the boot sequence assignment mentioned directly above does not inlcude booting from floppy drive B. This function is useful if floppy drives B and A are of a different format and you want to boot from floppy drive B.

Boot up Floppy Seek
During POST, BIOS will determine if the installed floppy disk drive has 40 or 80 tracks. A 360K drive has 40 tracks and 720K, 1.2M and 1.44M drives have 80 tracks. All modern floppy disk drives have 80 tracks.

Boot Up NumLock Status
This function defines the keyboard's numberpad as number keys or arrow keys.

D. Memory Parity/ECC Check

Enable this function to perform ECC (Error Check and Correct). ECC detects and corrects single-bit errors while it only detects double bit errors. Certain SDRAM modules have ECC capability. For more information on SDRAM, see Section 2-5 in this manual.

E. KEYBOARD INTERFACE

Typematic Rate Setting
When enabled, you can set the following two typematic control items. When disabled, keystrokes are determined arbitrarily by the keyboard controller in your system.

Typematic Rate (Chars/Sec)
The typematic rate sets the rate at which characters on the screen repeat when a key is pressed and held down.

Typematic Delay (Msec)
The typematic delay sets how long after you press a key that a character begins repeating.

F. Security Option

The Supervisor and/or User Password functions shown in Figure 3-1 must be set to take advantage of this function. See Section 3-8 for password setting information. When the Security Option is set to System, a password must be entered to boot the system or enter the BIOS setup program. When the Security Option is set to Setup, a password is required to enter the BIOS setup program.

G. PCI/VGA Palette Snoop

Some non-standard VGA cards or MPEG video cards may not show colors properly. Setting this function to Enabled can correct this problem.

H. OS Select (For DRAM > 64MB)

If your system's DRAM is larger than 64MB and you are running OS/2, select OS/2 as the item value. Otherwise, set the item value to Non-OS/2 for all other operating systems.

I. Shadow Memory

Software such as system BIOS, video BIOS, SCSI BIOS, etc that resides in ROM (Read Only Memory) chips is called firmware. Shadowing of firmware occurs when BIOS is copied to RAM address C0000h through DFFFFh. Video BIOS loads into the C0000-C7FFF memory area when video shadowing is enabled. If an expansion peripheral in your system contains ROM-based firmware, you need to know the address range the ROM occupies to shadow it into the correct area of RAM.

Shadowing improves the firmware's performance because the firmware can be read by the CPU through the 16- or 32-bit DRAM bus as opposed to the 8-bit XT bus. However, shadowing also results in reducing the amount of high memory (640 KB to 1 MB) for loading device drivers. Shadowing is used mostly for ROM chips on ISA cards and not for PCI cards. Shadowing and playing games at the same time may result in system instability as some games access the RAM memory area being shadowed.

3-3 Chipset Features Setup

By choosing the Chipset Features Setup option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the mainboard.

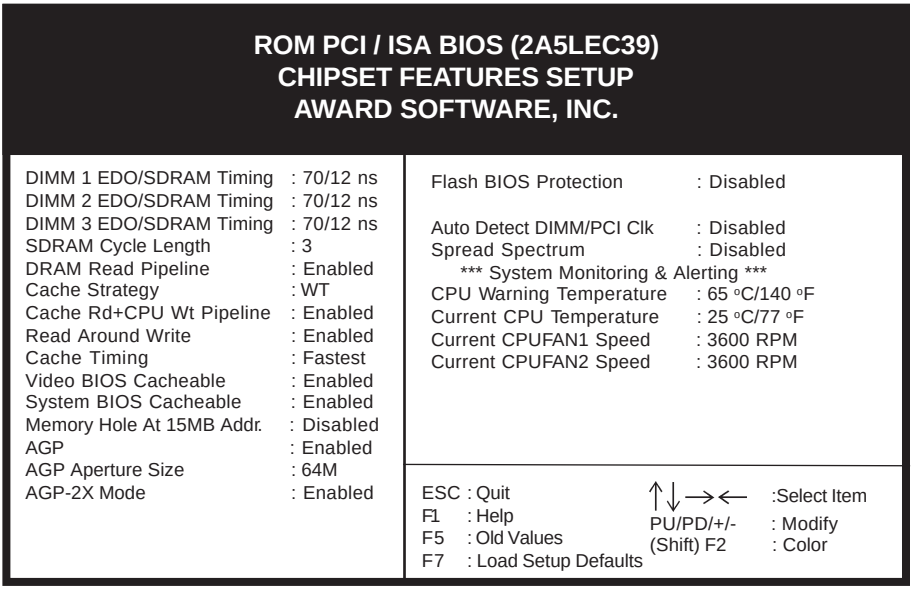


Figure 3-4 Chipset Features Setup Screen

All of the above settings have been determined by the mainboard manufacturer and should not be changed unless you are absolutely sure of what you are doing. Explanation of the DRAM timing and chipset features setup is lengthy, highly technical and beyond the scope of this manual. Below are abbreviated descriptions of the functions in this setup menu. You can look on the world wide web for helpful chipset and RAM configuration information including AWARD's web site at http://www.award.com.

A. Read Around Write

When using Intel's i740 chipset based AGP card, this item must be disabled.

B. Video BIOS Cacheable

Enabling this function allows caching of the video BIOS ROM at C0000h-C7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result. Caching the video BIOS results in better performance than shadowing the video BIOS as discussed in Section 3-2.

C. System BIOS Cacheable

Enabling this function allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. Caching the system BIOS results in better performance than shadowing the system BIOS as discussed in Section 3-2.

D. Memory Hole at 15MB Addr.

Enabling this feature will reserve the 15MB to 16MB memory address space for ISA expansion cards. However, enabling this function will result in not allowing the system to have access to memory above 16MB. Please note that some expansion cards require this setting to be enabled. The default setting is Disabled.

E. AGP

This function must be enabled when using an AGP card. If you disable this function you can still use an AGP card. However, the AGP card will only have PCI card performance.

F. AGP Aperture Size

This function determines the amount of system memory that is given to the AGP card. Options range from 4MB to 256MB. This is a dynamic memory allotment in that the AGP card will only use the amount of memory that it needs. The remaining memory not in use will be available for the system to use. For example, if 16MB is alloted to the AGP card and the card only needs 8MB, the remaining 8MB will be available for system use.

G. AGP-2X Mode

Enable this setting to utilize the 2X mode (twice as fast as 1X) offered by advanced AGP cards. Your VGA card must support 2X mode in order to take advantage of the faster speed.

H. Flash BIOS Protection

The mainboard manufacturer developed BIOS protection technology that protects the System BIOS from accidental corruption by unauthorized users or computer viruses. When enabled, the BIOS data cannot be changed when attempting to update BIOS with the the FLASH utility. When disabled, the BIOS data can be updated by using the FLASH utility.

I. System Monitoring and Alerting (Optional)

These optional system health monitoring features are available when an EISCA v1.0 compliant fan is connected to the Fan 78 connector on your mainboard. Change the CPU warning temperature according to the specifications of your CPU. For more information about EISCA fans, see Apendix II of this manual.

3-4 Power Management Setup

This section provides information on the Green PC power management funtcions. In order to enable the power management functions, please select the Power Management Setup option from the CMOS Setup Utility menu (Figure 3-1). This sample screen contains the manufacturer's default values for the mainboard.

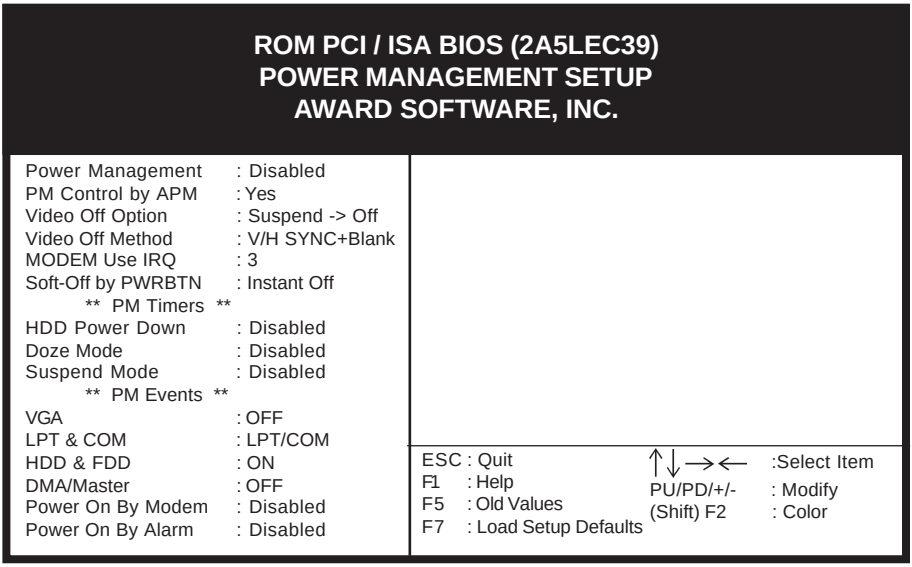


Figure 3-5 Power Management Setup Screen

A. Power Management

Power management allows the computer to save electricity when it is not in use by entering increasingly deep power saving modes as shown by the diagram below.

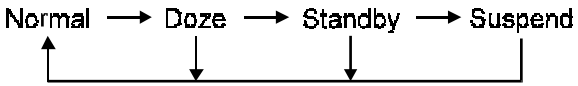


Figure 3-6 Power Saving Mode Flow Chart

The computer runs in Normal operation mode until the Doze timer expires, at which point the computer enters Doze mode. If no external activity occurs, the computer will go into Standby and Suspend modes when their respective timers expire. If external activity occurs, the computer will wake up from Power Management and return to Normal mode. To activate the function, set Power Management to Maximum Saving, User Define, or Minimum Saving described

below. For a description of the power saving modes (Doze, Standby, and Suspend) see their descriptions below.

Disabled - Turns off the Power Management functions.

Max. Saving - All timers are set at the minimum value of one minute to maximize power saving.

Min. Saving - All timers are set at the maximum value of one hour for minimal power saving.

User Define - User can configure the timer to a desired time according to the values available.

Note that enabling the Power Management function will result in enabling the HDD Power Down function (Max Saving = 15 min, Min Saving = 1 min). The HDD Power Down function is not part of the Power Management scheme as indicated in Figure 3-6 Refer to the Standby Mode, Suspend Mode, and HDD Power Down descriptions below for more informaiton on hard drive power management.

B. PM Control by APM

This function allows software other than BIOS to control Power Management features Enable this function in BIOS and make sure APM (Advanced Power Management) is present. For example, run the Power utility program located in the DOS directory, C:\DOS\POWER.EXE to use Power Management features under DOS. For Windows 3.1x and Windows 95, you need to install Windows with the APM feature.

C. Video Off Option

This setting determines when the monitor enters power saving mode. As the function name indicates, the monitor enters the power saving mode after the chosen event expires. The Power Management function must be enabled to use this function.

D. Video Off Method

This function serves as both a screen saver and power saver for monitors. See the next function, Video Off After, for setting the video timer.

Blank - BIOS will only blank the monitor's screen. The electricity saved in this mode is negligible and this function is only used as a screen saver to prevent screen damage while the screen is on but not in use.

V/H SYNC+Blank - The system turns off the vertical and horizontal synchronization ports, writes blanks to the VGA buffer and the monitor's electron gun turns off. This function requires a monitor with Green features in order to take advantage of the power saving function. If you enable this function and do not have a Green monitor, the result will be the same as if you had

selected Blank. This function serves as both a screen saver and an electricity saver.

DPMS Supported - Select this option if your video card supports the Display Power Management Signaling (DPMS) standard (i.e., you have a monitor that supports Green features). Use software supplied by your video subsystem to set video power management options.

E. Modem Use IRQ

If your computer has a modem, use this function to tell BIOS which IRQ is being occupied by the modem card. When the system is in Green mode, the modem requires an IRQ assignment to wake up the system and perform tasks. This assignment is compliant with the APM 1.2 specification and is to be used in coordination with APM 1.2 compliant operating systems.

F. Soft-Off by PWRBTN

When Enabled, this function allows the power button to put the system in Suspend, a power saving mode. See section 2-4 for operation instructions of the power button.

G. HDD Power Down

To enable this function, make sure the Power Management function is not set to disabled. When the HDD idle time has elapsed, BIOS sends a command to the hard disk to turn off the motor. Set a time between 1 and 15 to indicate time required to wait before the hard drive enters a power saving mode. Some old hard drives may not support this function.

H. Doze Mode

To enable this function, make sure the Power Management function is not set to disabled. If no interrupts have occured and the Doze timer expires, system will enter Doze mode. In Doze mode, the CPU clock runs at a lower speed while all other devices operate normaly.

✍ Power saving modes achieved in lower power saving states will either be maintained or enter higher power saving modes when switching to higher power saving states. For example, the CPU clock will not switch back to normal in Standby mode. It will maintain a decreased rate in Standby Mode and turn off in Suspend Mode.

I. Suspend Mode

To enable this function, make sure the Power Management function is not set to disabled. If the system runs in Dozemode and the Suspend timer expires, all devices regulated by power management will shut off and the CPU speed will be 0 MHz.

J. Power On By Modem

When enabled, a modem that receives a call will wake up the system from Soft-off or Green mode. To activate this function, you must leave your modem on and use the Software Power off. See the Software Power-Off control description in Section 2-4 of this manual.

K. Power On By Alarm

When enabled, this setting allows the system to turn back on at a designated time of the month. User must designate date of month and time of day. This function is only available when using an ATX pwer supply and Software Power-Off. See the Software Power-Off control description in Section 2-4 of this manual.

3-5 PNP/PCI Configuration

This section provides IRQ and DMA setting information. By choosing the PnP/PCI Configuration option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the mainboard.

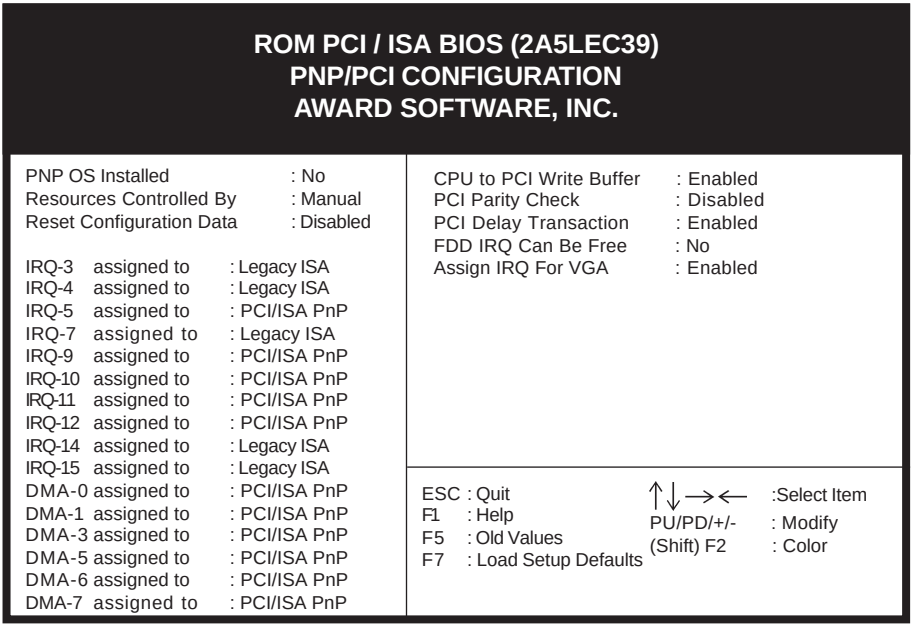


Figure 3-6 PCI & ONBOARD I/O Setup Screen

A. PNP OS installed

If you want to install a PNP compatible OS (such as Windows 95) set to **Yes**.

B. Resources Controlled By

When set to Manual the system BIOS will not refer to the ESCD for IRQ & DMA information. Instead, it will refer to the items in the setup menu for assigning IRQ & DMA. When set to Auto the system BIOS will refer to the ESCD for all legacy information.

ESCD(Extended System Configuration Data) provides a detailed format of the configuration data structures stored in flash memory. Each data structure defines the resources used by a device or a card in the system. This includes legacy and PCI/ISA PnP devices.

C. Reset Configuration Data

When Enabled the system BIOS will clear/reset the ESCD during POST. After clearing the ESCD, the BIOS will then change this item's value to "Disabled." Otherwise, the ESCD data would become useless.

D. IRQ#/DMA# assign to

When resources are controlled manually, you can assign each system interrupt & DMA channel for "Legacy ISA" or "PCI/ISA PnP" card used. While using **Legacy ISA Cards** (non-PnP ISA cards), please set the necessary corresponding resources (INT#, DMA#) from "PCI/ISA PnP" to "Legacy ISA."

- ✍ All ISA non-PnP devices are legacy devices that select resources (I/O Addr., INT# or DMA#) by using hardware jumpers on these devices.
- ✍ IRQ-3/4/7/12/14/15 have been set as default for on board devices (COM2,COM1, Printer port, PS/2 mouse, IDE1 and IDE2).

E. FDD IRQ Can Be Free

This function allows users to choose if the FDD IRQ is able to be freed for use with other processes that require IRQ.

F. Assign IRQ For VGA

This function allows BIOS to make an IRQ available to VGA cards. Current VGA card models do not require this function to be enabled.

3-6 Load Setup Defaults

Load Setup Defaults loads the default system values directly from the CMOS Setup Utility menu (Figure3-1). If the stored record created by the setup program becomes corrupted and therefore unusable, these defaults will be loaded automatically when you turn on the computer.

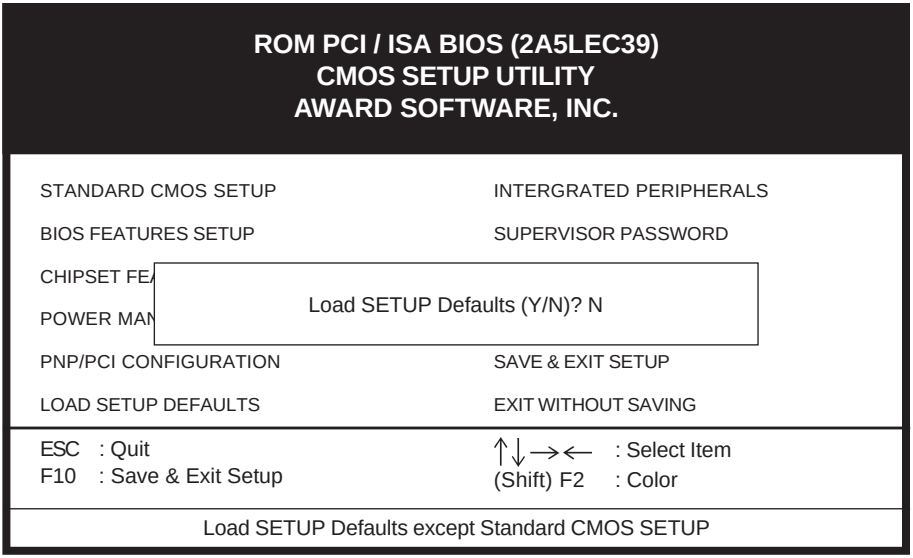


Figure 3-7 Load Setup Defaults Screen

3-7 Integrated Peripherals

This section provides information on setting peripheral devices. By choosing the Integrated Peripherals option from the CMOS Setup Utility menu (Figure 3-1), the screen below is displayed. This sample screen contains the manufacturer's default values for the mainboard.

ROM PCI / ISA BIOS (2A5LEC39)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.

OnChip IDE First Channel	: Enabled
OnChip IDE Second Channel	: Enabled
IDE Prefetch Mode	: Enabled
IDE HDD Block Mode	: Enabled
IDE Primary Master PIO	: Auto
IDE Primary Slave PIO	: Auto
IDE Secondary Master PIO	: Auto
IDE Secondary Slave PIO	: Auto
IDE Primary Master UDMA	: Auto
IDE Primary Slave UDMA	: Auto
IDE Secondary Master UDMA	: Auto
IDE Secondary Slave UDMA	: Auto
Onboard FDC Controller	: Enabled
Onboard Serial Port 1	: 3F8/IRQ4
Onboard Serial Port 2	: 2F8/IRQ3
IR Address Select	: Disabled
Onboard Parallel Port	: 378/IRQ7
Parallel Port Mode	: SPP
OnChip USB	: Disabled

ESC : Quit
F1 : Help
F5 : Old Values
F7 : Load Setup Defaults
↑↓→← :Select Item
PU/PD/+/- : Modify
(Shift) F2 : Color

Figure 3-8 PCI & ONBOARD I/O Setup Screen

A. On-chip Primary/Secondary PCI IDE

Disable these settings to turn off the built-in IDE controller.

B. IDE Prefetch Mode

This mode is involved in multiple sector read/writes and improves the performance of your system. Enabling this function improves the performance of your computer.

C. IDE HDD Block Mode

Enable this mode to improve the performance of your system. Block Mode is also referred to as block transfer or multiple sector read/write. When this setting is enabled, the maximum number of block read/writes per sector supported by the the drive is detected. Most new hard drives support this mode.

D. On Board IDE Control

The following settings are used to configure the on-board IDE controller.

IDE Primary/Secondary Master/Slave PIO/UDMA
The four IDE PIO (programmed Input/Output) fields let you set a PIO mode (0-4) for each IDE device that the internal PCI IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

E. On Board FDC Controller

Enabling the floppy disk controller (FDC) allows for normal use of the floppy drive connected to the mainboard. If you install an add-in FDC or the system has no floppy drive, disable this function.

F. IR Address Select

Make sure this function is not set to Disabled to activate IR functions. When this function is enabled, you must also indicate and IR Mode and designate and IRQ to be used by your IR port.

G. OnChip USB

Enable the on-board Universal Serial Bus (USB) controller if you want to connect a USB keyboard to your system. Note that if this setting is disabled, you can still temporarily use a USB keyboard during bootup so that you can enter BIOS and enable this setting. If you pass the bootup stage without enabling this function, your PS/2 keyboard will no longer work.

3-8 Supervisor Password & User Password Setting

There are four different variables that control password settings. The first two are located under the Security Option function in BIOS Features Setup Menu (Figure 3-3). When the Security Option function is set to Setup, a password is required to enter BIOS and change BIOS settings. When the Securitiy Option function is set to System, a password is required to to enter both BIOS and the the computer's operating system (for example Windows 95) found on the boot drive. This is shown in Figures 3-9 and 3-10.

The third and fourth variables are user password and supervisor password selected in BIOS (Figure 3-1). The main purpose of separating user and supervisor is to allow only the supervisor to have control over the settings in BIOS. The user, on the other hand, is only allowed to access the computer's operating system and change the user passorword in BIOS (See Figure 3-10 below). Note that when there is no supervisor password set, the user password controls access to all BIOS settings (See Figure 3-9 below).

A. Set Either Supervisor Password or User Password

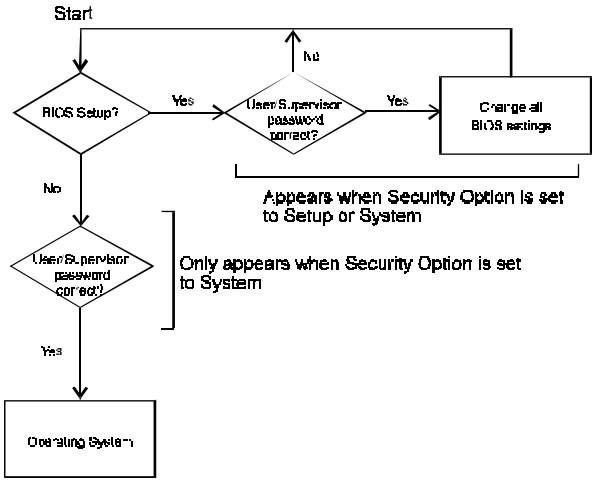


Figure 3-9 Set Either Supervisor or User Password

B. Set Both Supervisor Password and User Password

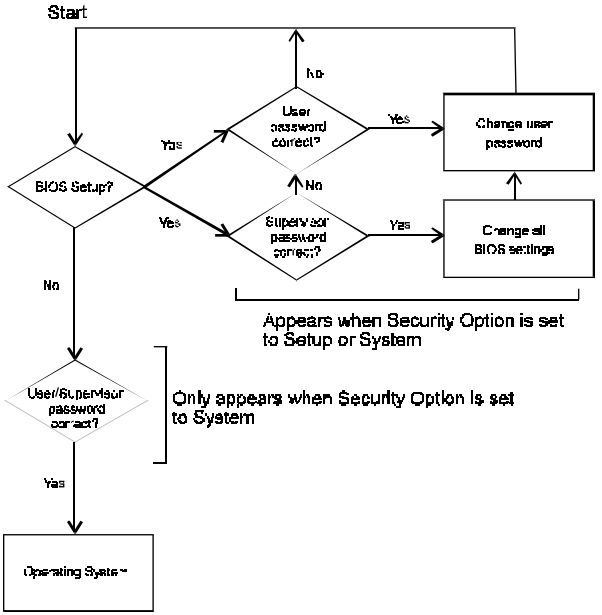


Figure 3-10 Set Both Supervisor and User Password

3-9 IDE HDD Auto Detection

This utility can automatically detect IDE hard disk type and parameters. The detection process take about 5 seconds for each physical drive. After the utility detects the disk drive, type Y and press [Enter] to automatically load the parameters in the Hard Disk section of the Standard CMOS Setup menu. Otherwise, leave the option set at N and press [Enter] or the [Esc] key to skip the detected drive. After detecting your hard drive(s), return to the Standard CMOS menu to check your settings.

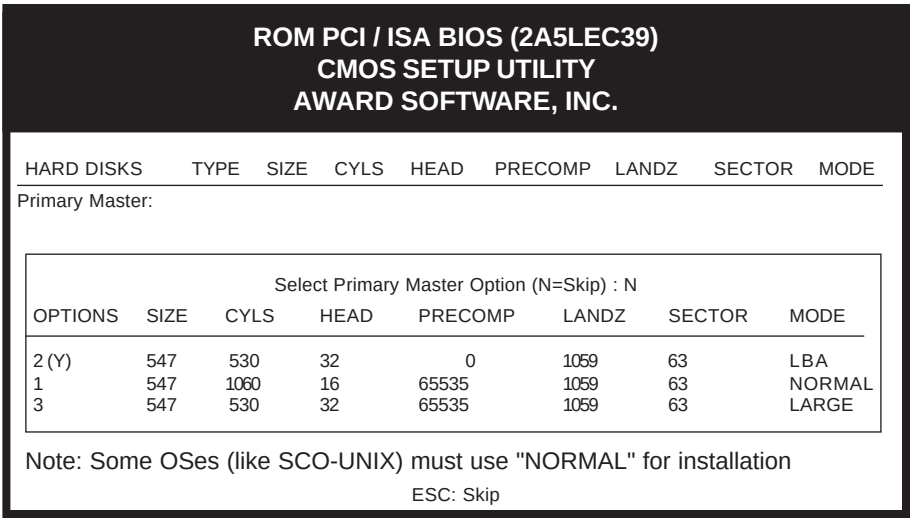


Figure 3-11 IDE HDD Auto Detection Screen

3-10 Save and Exit Setup

If you select this and type Y (for yes) followed by the [Enter] key, the values entered in the setup utilities will be recorded in the CMOS memory of the BIOS chip.

3-11 Exit Without Saving

Selecting this option and pressing Y followed by the [Enter] key lets you exit the Setup program without recording any new values or changing old ones.

Memo

Chapter 4

Mainboard Software Guide

The Mainboard Software Guide is found on the CD-ROM that is enclosed with your mainboard and is a PDF file which must be viewed with Adobe's freeware called Acrobat® Reader. The Acrobat Reader software is also included on the same CD-ROM. See the Readme.txt file in the CD-ROM's root directory for installation instructions of the Acrobat Reader. The Mainboard software guide discusses the following items:

- VIA ACPI Patch for Win 95
- VIA IDE Bus Master Drivers for Win95 and WinNT
- VIA AGP VxD Drivers for Win 95
- Trend Antivirus Utility for Win95
- Shepherd System Monitoring Software for Win95 OR Genesys System Monitoring Software for Win95/WinNT
- Award Flash Utility
- Award DMI Configuration Utility

Memo

Appendix I

On Board I/O Addresses & IRQ Maps

System Resource	IRQ	I/O Address
1. Timer	IRQ0	040, 043
2. Keyboard	IRQ1	060, 064
3. Programmable INT	IRQ2	0020, 0021, 00A0, 00A1
4. COM2(B)	IRQ3	2F8, 2FF
5. COM1(A)	IRQ4	3F8, 3FF
6. Floppy	IRQ6	3F0, 3F7
7. LPT1	IRQ7	378, 37F
8. Real Time Clock	IRQ8	070, 071
9. PS/2 Mouse	IRQ12	060, 064
10.Math coprocessor	IRQ13	0F0, 0FF
11.IDE 1	IRQ14	1F0, 1F7
12.IDE 2	IRQ15	170, 177

✍ **IRQ 5, 9, 10 and 11 are available for interface cards.**

Memo

Appendix II

FAN78-*SMART* Technology Upgrade Kit

FAN78

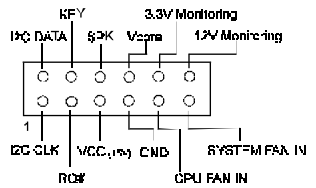
System Monitor Software for Win95

The FAN78 upgrade kit provides a PC self-dialogistic capability called the ***SMART*** (System Monitoring and Alerting) technology.

Features

- Detects four on-board voltages (CPU Core Voltage, 3.3V, 5V, 12V)
- Two fan speed sensing
- One precise CPU temperature sensor and one chassis temperature sensor
- Four types of speaker-driver signal output
- Supports system monitor software and drivers for **LDCM™** utility V3.1
- EISCA v1.0 compliant

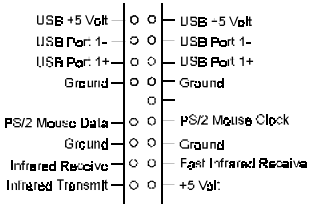
FAN78 Connector

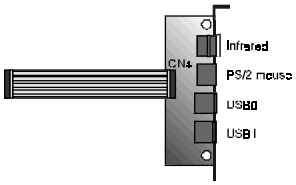


Memo

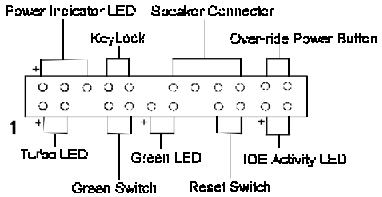
Quick Connector and Jumper Reference

CN4: PS/2 mouse, USB, Infrared connector with optional USB kit





CN5: Front Panel connector set



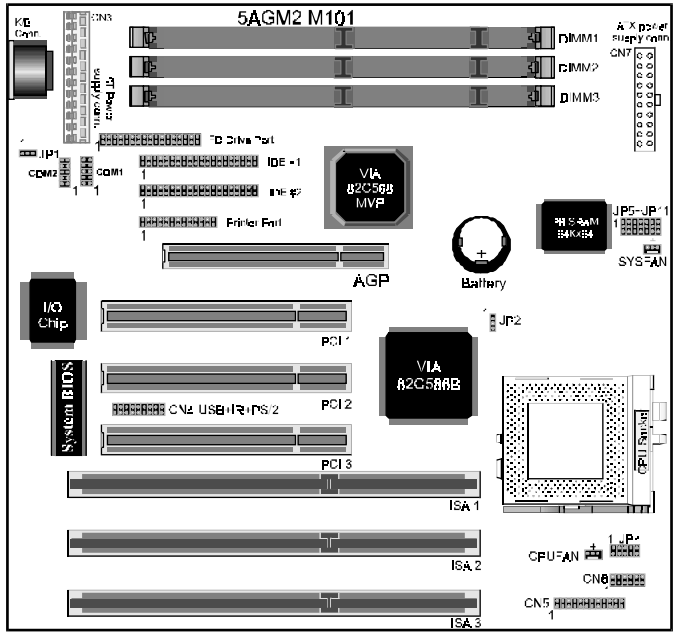
CN6: FAN78 connector

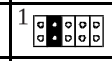
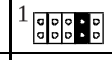
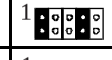
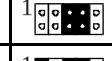
CPUFAN/SYSFAN: CPU/System cooling fan connector

JP1: AT/ATX power supply jumper
1~2 : AT power
2~3 : ATX power

JP2: Clear CMOS data jumper
1~2 : Normal(default)
2~3 : Clear CMOS data

JP11: 1~2 : SDRAM module runs at CPU CLK
2~3 : SDRAM module runs at AGP CLK



Vcore	JP4
2.2V	
2.8V	
2.9V	
3.2V	
3.3V	
3.5V	

System Freq.	JP5~JP7
60MHz	
66MHz	
68MHz	
75MHz	
83MHz	
100MHz	

Freq. Ratio	JP8~JP10
x 1.5	
x 2	
x 2.5	
x 3	
x 3.5	
x 4	
x 4.5	
x 5	
x 5.5	

CPU-type		CPU Power Voltage			System freq.		Freq. ratio	
		I/O Vcc	Core Vcc	JP4	MHz	JP5~JP7	Speed rate	JP8~JP10
Intel	P54C-133	3.5			66		x2	
	P54C-166						x2.5	
	P54C-200						x3	
	Pentium w/MMX @166MHz	3.3	2.8				x2.5	
	Pentium w/MMX @200MHz						x3	
	Pentium w/MMX @233MHz						x3.5	
Cyrix /IBM	6x86-PR166 @133MHz	3.5			66		x2	
	6x86-PR200 @150MHz				75			
	6x86L-PR166 @133MHz	3.3	2.8		66			
	6x86L-PR200 @150MHz				75			
	6x86MX-PR166		2.9		66		x2.5	
	6x86MX-PR200							
	6x86MX-PR200				75		x2	
	6x86MX-PR233						x2.5	
	MII-300				83		x2	
					66		x3.5	
					75		x3	
AMD	K5-PR166 @116.7MHz	3.5			66		x2.5	
	K6/166	3.3	2.9				x3	
	K6/200							
	K6/233		3.2				x3.5	
	K6/266		2.2				x4	
	K6/300						x4.5	
	K6-2/266						x4	
	K6-2/300				100		x3	
IDT	C6-200	3.5			66		x3	
	C6-225				75			