

GA - 686FX

USER'S MANUAL

Met opmerkingen [G2]:

PENTIUM Pro® PCI - ISA BUS MAINBOARD

Met opmerkingen [G3]:

REV. 1 Second Edition

Who need 82440FX?

1. If you want to get the best performance.
(Because more buffers & Quick DRAM Timing is supported.)
2. If your DATABASE is very important.
(Because single bit error correction & Multi-bit error detection is supported.)
3. If you want to use memory more than 64MB.
(Because 512MB memory size is supported.)
4. If you need more flexibility to upgrade your memory.
(Because 3 banks DRAM is supported.)
5. If you need a USB ports for C&C application.
(Because 2 USB ports will be ready in the end of Q4/96".)

Why do you need GA-686FX 82440FX motherboard?

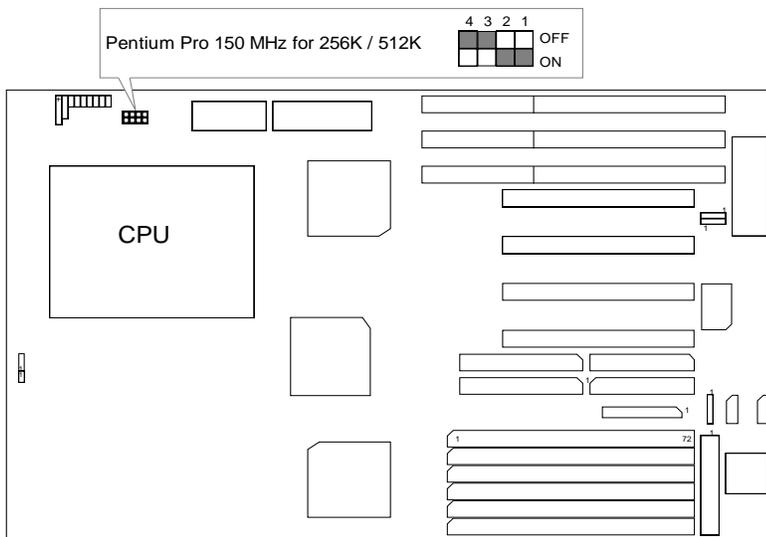
1. The motherboard supports 3 Banks (6 pcs. 72 pin Socket) memory, in order to get more flexibility way to upgrade memory size.
2. The motherboard supports automatically Detecting CPU Voltage.
3. The motherboard supports Jumperless (DIP Switch) which is easy to adjust frequency of CPU.
4. The motherboard supports Soft power-off on Windows 95.
5. The motherboard supports two serial ports for external modem ring on.
6. The motherboard supports CPU over temperature protect function. When the CPU temperature over 70 degrees, first the system will protect CPU to avoid over-heating. Secondary warning sound comes from the system speaker. At the same time turn on green LED lamp indicates the CPU temperature is too high. It is time to check your CPU cooling-fan.

Quick Installation Guide:

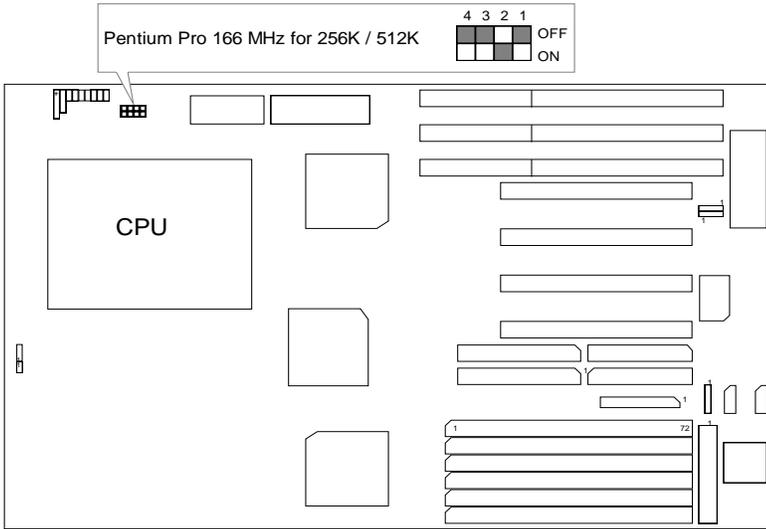
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DIP SWITCH (S1)				FREQ.	EXT.CLK.	INT.CLK.	CPU Type
1	2	3	4	RATIO	MHz	MHz	
ON	ON	OFF	OFF	2.5	60	150	PENTIUM Pro 150 MHz
OFF	ON	OFF	OFF	2.5	66	166	PENTIUM Pro 166 MHz
ON	OFF	ON	OFF	3	60	180	PENTIUM Pro 180 MHz
OFF	OFF	ON	OFF	3	66	200	PENTIUM Pro 200 MHz

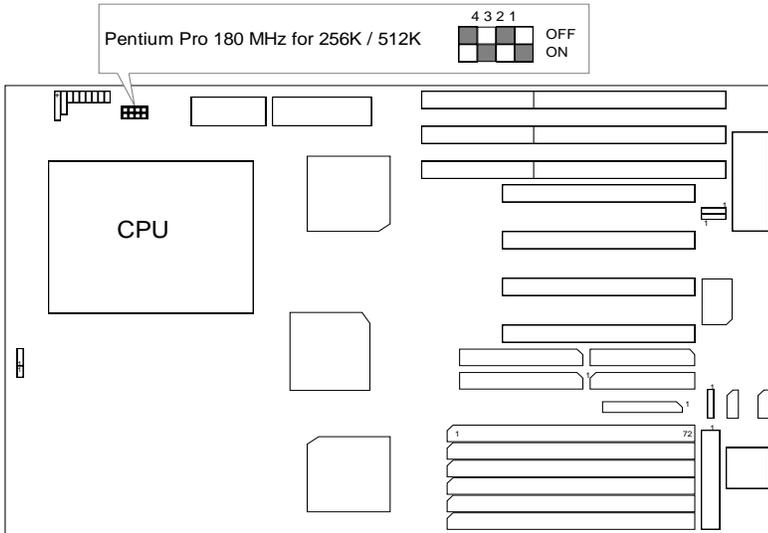
1. Pentium Pro 150 MHz



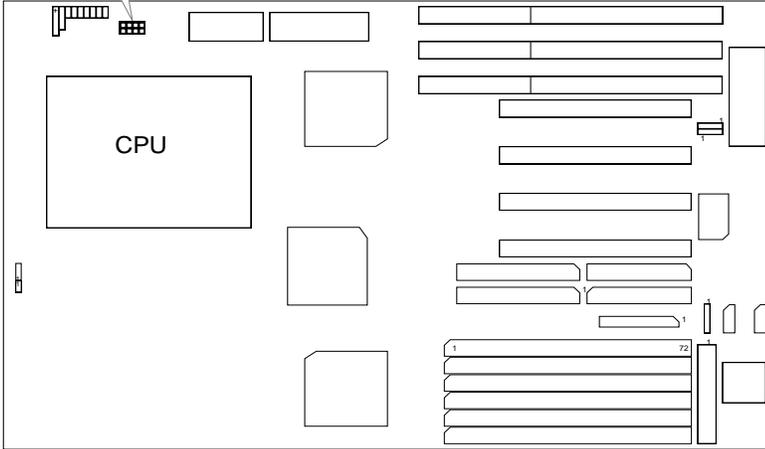
2. Pentium Pro 166 MHz



3. Pentium Pro 180 MHz

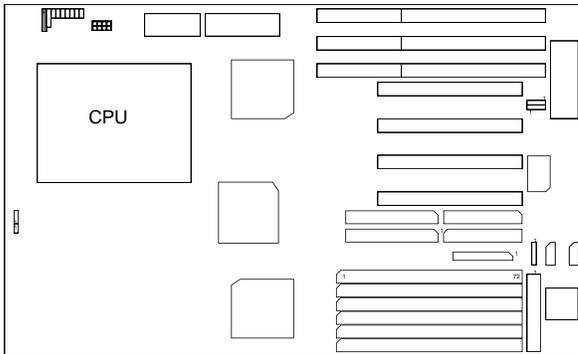


4. Pentium Pro 200 MHz

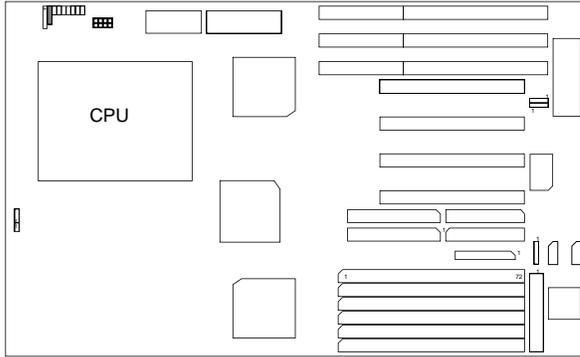
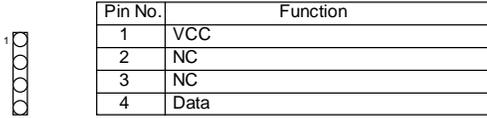


PWR : Power / Key-Lock Connector

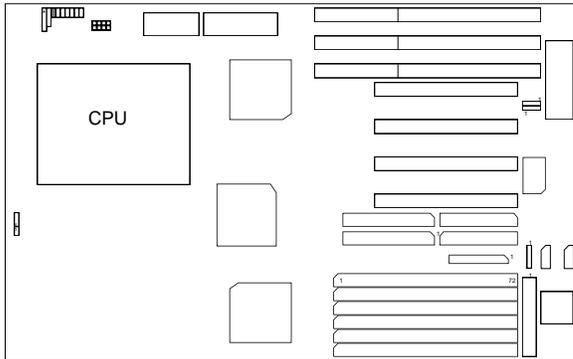
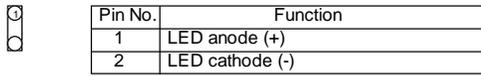
Pin No.	Function
1	LED anode (+)
2	NC
3	LED cathode (-)
4	Key Lock
5	GND.



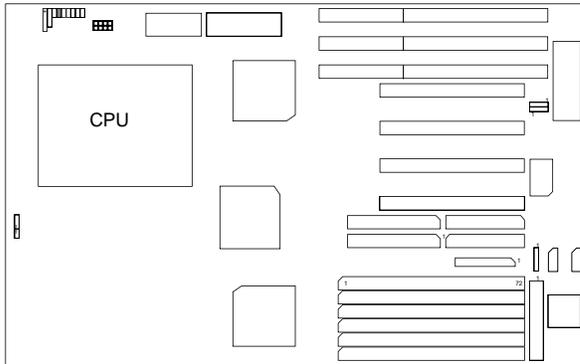
SPK : Speaker Connector



TD : Turbo LED Connector

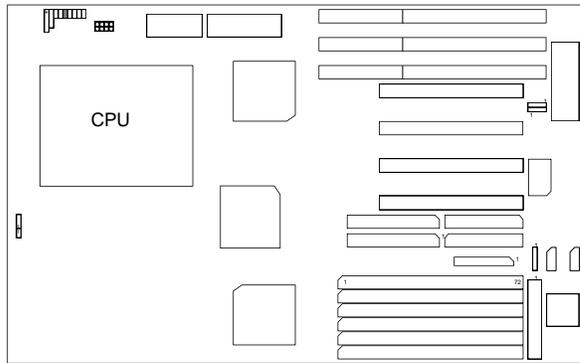


TB : Turbo Switch Connector (Function reserved)



RST : Reset Switch

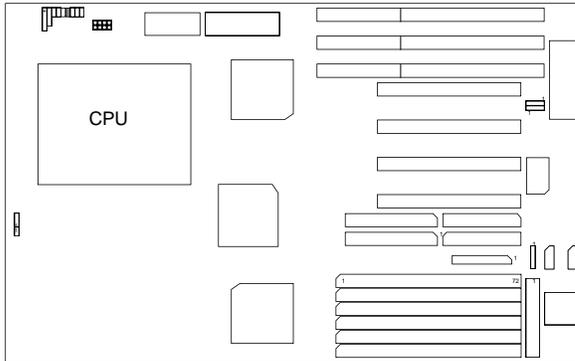
 Open : Normal operation.  Close : For hardware reset system.



GD : Green Function LED



Pin No.	Function
1	LED anode (+)
2	LED cathode (-)



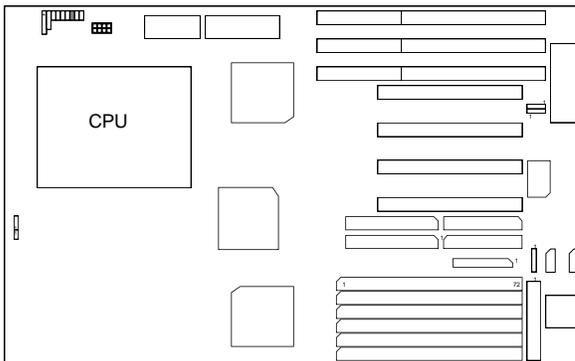
GN : Green Function Switch



Open : Normal operation.



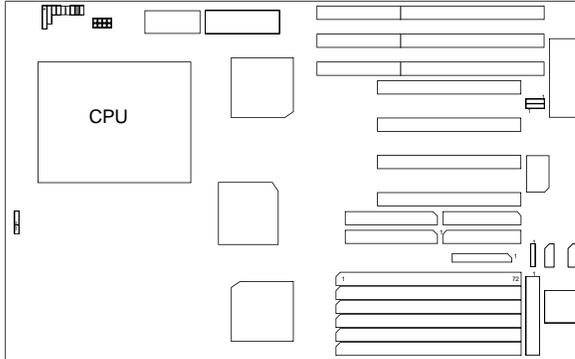
Close One Time : For system entering Green mode.



HD : IDE Hard Disk Active LED



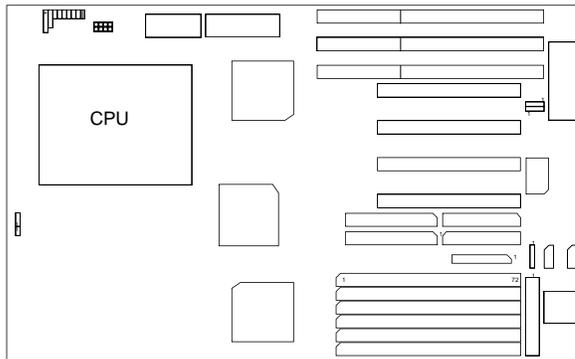
Pin No.	Function
1	LED anode (+)
2	LED cathode (-)



Soft Power Connector :



Pin No.	Function
1	GND
2	CTRL-Signal



S1-1 : System Speed Selection

4 3 2 1
 OFF
 ON For 60 MHz system speed (CPU 150, 180 MHz).

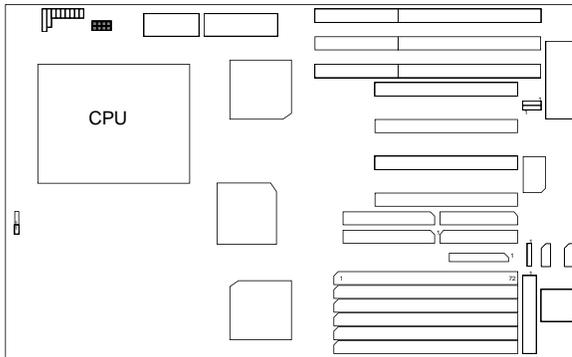
4 3 2 1
 OFF
 ON For 66 MHz system speed (CPU 166, 200 MHz).

S1-2,3,4 : CPU INT. / EXT. FREQ. RATIO

4 3 2 1
 OFF
 ON X 2.5

4 3 2 1
 OFF
 ON X 3

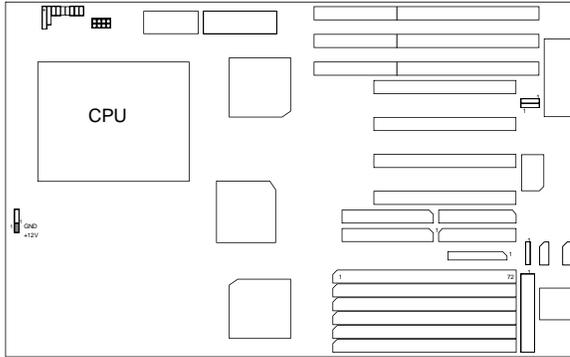
S1-2	S1-3	S1-4	Function
ON	OFF	OFF	X 2.5
OFF	ON	OFF	X 3



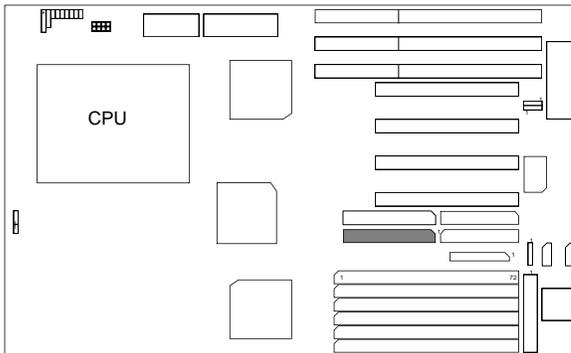
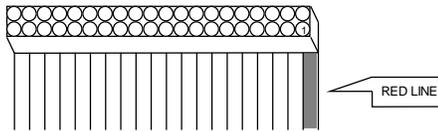
JP3 : CPU cooling FAN Power Connector



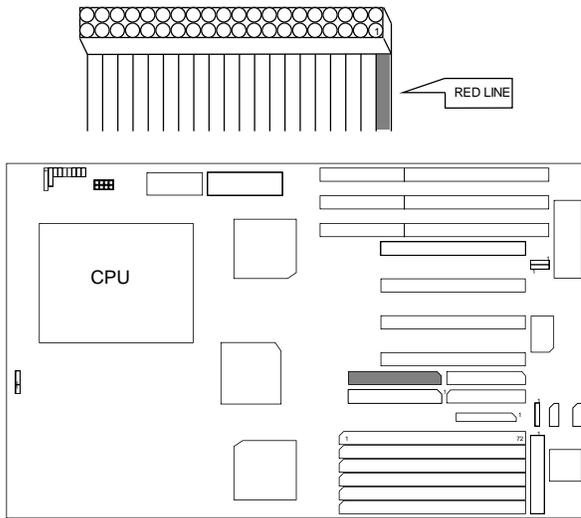
Pin No.	Function
1	GND
2	+12V



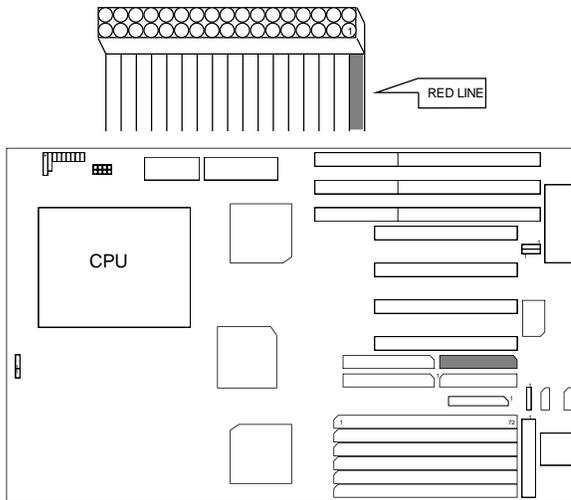
IDE1 : For Primary IDE port



IDE2 : For Secondary IDE port

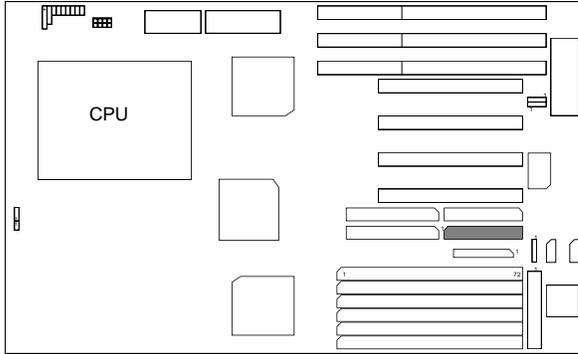


FLOPPY PORT :

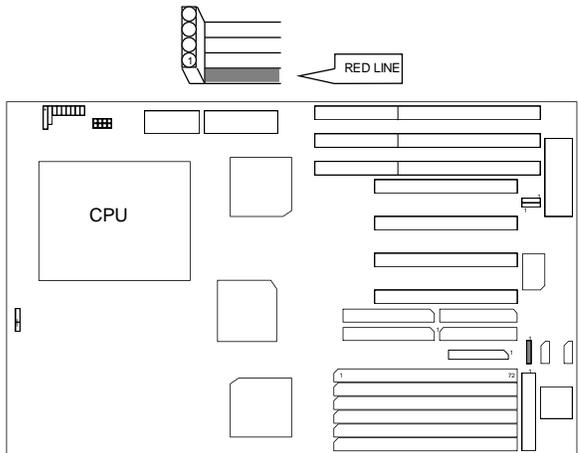


Power2 : ATX POWER Connector

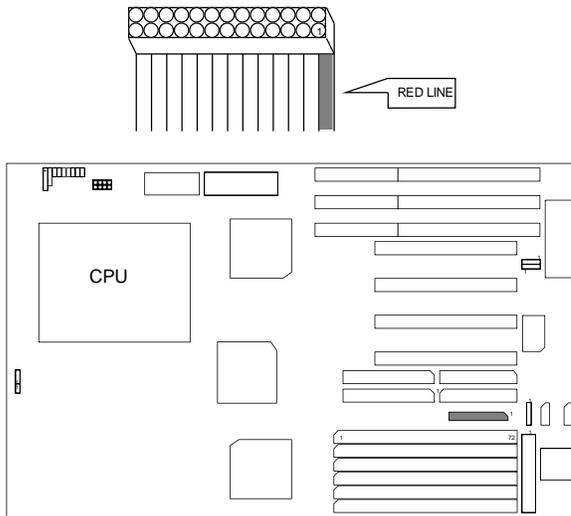
Pin No.	Function
3,5,7,13,15-17	GND
4,6,19,20	VCC (+5V)
10	+12V
12	-12V
18	-5V
8	Power Good
9	5V SB (Stand by +5V)
14	PS-ON (Soft ON/OFF)



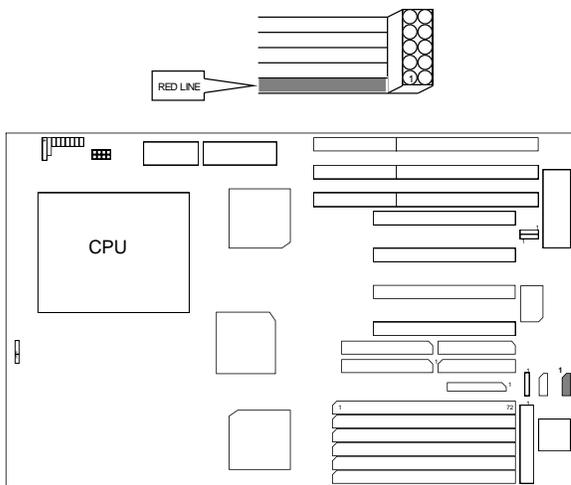
JP2 : PS/2 MOUSE:



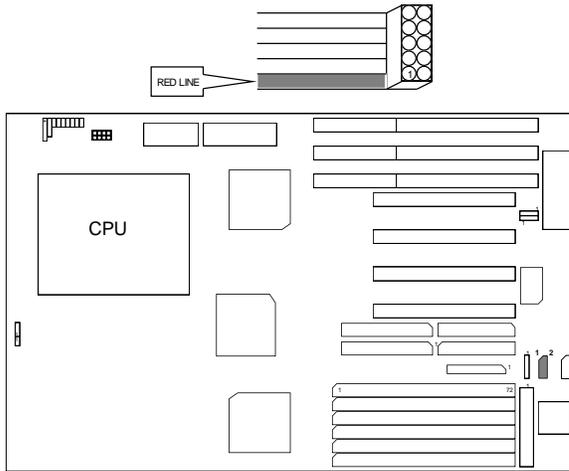
LPT PORT :



CN2 : COM B

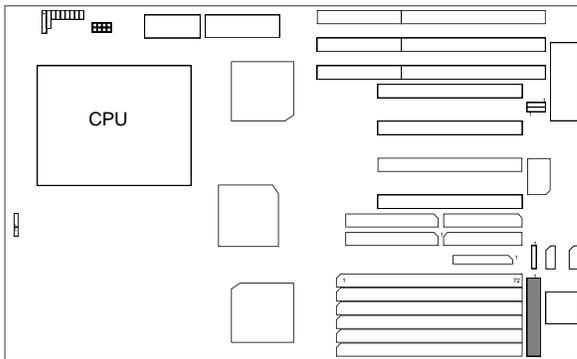


CN3 : COM A

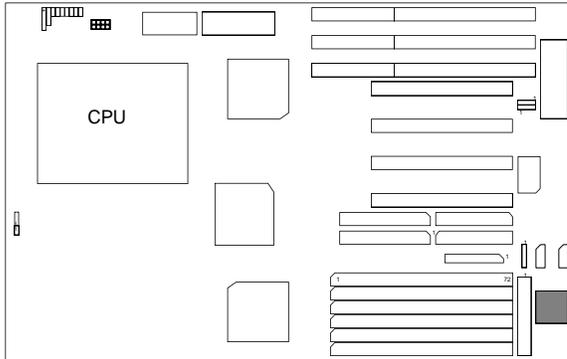
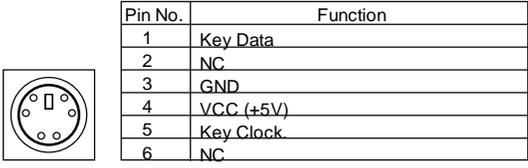


Power1 : PS/2 POWER Connector

Pin No.	Function
1	Power Good signal
2,10,11,12	VCC (+5V)
3	+12V
4	-12V
5,6,7,8	GND
9	-5V



JP1 : Keyboard Connector



Top Performance Test Setting:

ROM PCI / ISA BIOS
 CHIPSET FEATURES SETUP
 AWARD SOFTWARE, INC.

Auto Configuration	: Disabled	
DRAM RAS# Precharge Time	: 3	
MA Additional Wait State	: Disabled	
RAS# To CAS# Delay	: Disabled	
DRAM Read Burst (B / E / F)	: x2 / 2 / 3	
DRAM Write Burst (B / E / F)	: x2 / 2 / 3	
ISA Bus Clock	: PCICLK / 4	
DRAM Refresh Queue	: Enabled	
DRAM ECC/PARITY Select	: Disabled	
Read-Around-Write	: Enabled	
PCI Burst Write Combine	: Enabled	
PCI-To-DRAM Pipeline	: Enabled	
CPU-To-PCI Write Post	: Enabled	
CPU-To-PCI IDE Posting	: Enabled	
Video RAM Cacheable	: Enabled	
Memory Hole At 15M-16M	: Disabled	
		ESC : Quit ↑ ↓ → ← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F7 : Load Setup Defaults

** Note:

Please Disabled Two Options when user use ET4000/W32P PCI VGA Cards:

- ① PCI Burst write Combine : Disabled
- ② Video RAM Cacheable: Disabled

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OCTOBER 14, 1996 Taipei, Taiwan

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1. INTRODUCTION

1.1. PREFACE

Welcome to use the **GA - 686FX** motherboard. The motherboard is a PENTIUM[®] Pro Processor based PC / AT compatible system with ISA bus and PCI Local Bus, and has been designed to be the fastest PC / AT system.

There are some new features allow you to operate the system with just the performance you want.

This manual also explains how to install the motherboard for operation, and how to set up your CMOS CONFIGURATION with BIOS SETUP program.

1.2. KEY FEATURES

- Intel Pentium[®] Pro Processor based PC / AT compatible mainboard.
- Socket 8 on board supports Pentium[®] Pro processor & P6T running at 150-200 MHz.
- CPU L1 / L2 Write-Back cache operation.
- Supports 8 - 512 MB DRAM memory on board.
- 4 Master / Slave PCI Bus slots, 3 ISA Bus slots.
- Supports 2 channels Enhance PCI IDE ports for 4 IDE Devices.
- Supports 2xCOM (16550), 1xLPT (EPP / ECP), 1x1.44MB Floppy port.
- Supports Green function, Plug & Play function.
- Licensed AWARD BIOS, FLASH EEPROM for BIOS update.
- BECHMARQ3287 / DALLAS 12887 / ODIN 12C887 RTC on board.
- Baby AT form-factor, 4 layers PCB.

1.3. PERFORMANCE LIST

The following performance data list is the testing results of some popular benchmark testing programs.

These data are just referred by users, and there is no responsibility for different testing data values gotten by users. (The different Hardware & Software configuration will result in different benchmark testing results.)

- CPU Pentium® Pro processor 180 / 200 MHz
- DRAM 8 MB * 4 pcs. Total 32 MB EDO (Panasonic EUXSR08XX00E)
- CACHE SIZE 256KB/512 KB included in CPU
- DISPLAY Matrox Millennium 2MB
- STORAGE Onboard IDE port + Quantum Fireball 1280AT IDE Drive
- O.S. Windows95 with Display Driver at 1024 x 768 x 256 colors & Bus Master IDE Driver.

<DOS>

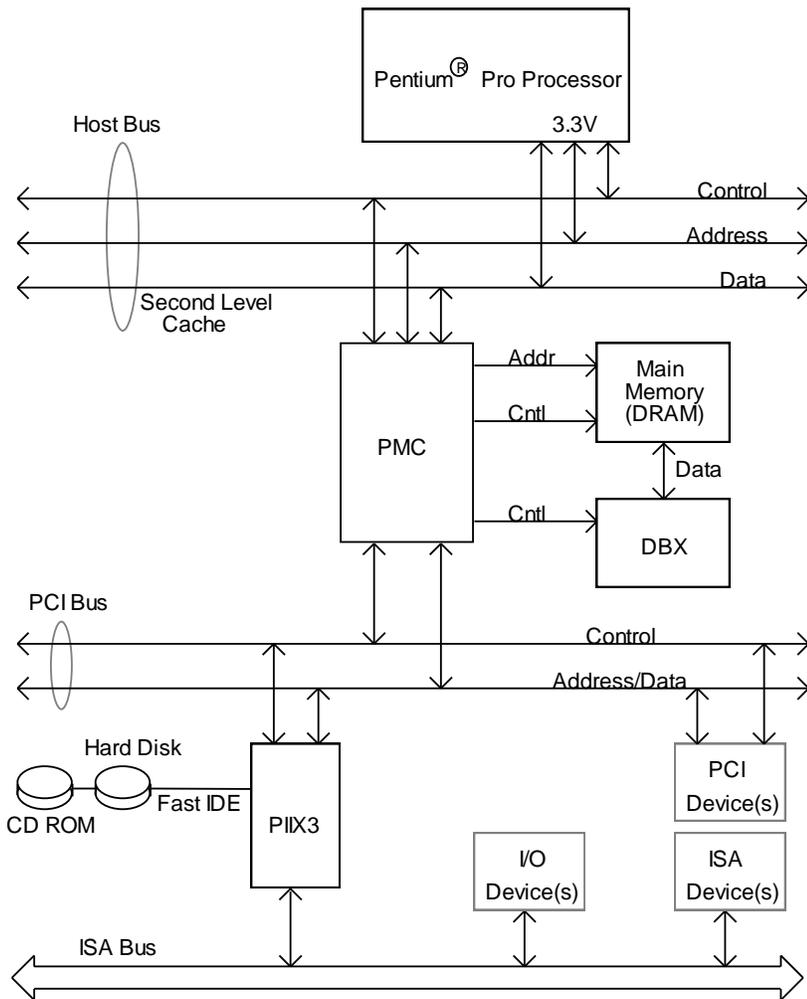
Program	Item	Unit	180MHz/ 256KB	200 MHz/ 256KB	200 MHz/ 512KB
LandMark Speed V2.0	CPU	MHz	1138.59	1265.13	1265.16
	FPU	MHz	3020.90	3356.61	3383.76
	VIDEO	chr/ms	21345.00	21370.00	21370.00
Power Meter V1.81	MIPS	Mips	86.2	94.8	94.8
	Dhrystone	K-Dstone/s	151.4	166.6	166.6
	Whetstone	K-Wstone/s	33310.4	37011.6	37011.6
	Data Transfer Rate	KB/S	8058.5	10744	10744.6
	Mean Seek	ms	10.0	10.6	10.6
	Track-Track Seek	ms	2.1	2.1	2.1
Norton System Info. V8.0	CPU	Index	451.2	501.4	501.4
	Disk	Index	22.8	24.6	25.7
Core Test V.3.02	DATA Transfer Rate	KB/S	7024	7776	7776
	Sequential Read	ms	6929	6944	6944
	Random Read	ms	2176	2176	2208
	Performance Index	Index	47.53	51.95	51.95

<Windows 95>

- With Matrox Millennium Display Driver 1024*768*256
- With Triones Bus Master IDE Driver

Program	Item	180 MHz/ 256KB	200 MHz/ 256KB	200 MHz/ 512KB
Winstone32	index	129.9	140	144.2
Winstone96	index	82.4	88.4	90.5
WinBench96	Graphics Winbench96	35.6	38.9	39
	CPUmark16	325	362	367
	CPUmark32	492	560	614

1.4. BLOCK DIAGRAM



1.5. INTRODUCE THE PCI - BUS

Connecting devices to a CPU local bus can dramatically increase the speed of I/O-bound peripherals with only a slight increase in cost over traditional systems.

This price / performance point has created a vast market potential for local bus products.

The main barrier to this market has been the lack of an accepted standard for local bus peripherals.

Many mainboard and chipset manufactures developed their own local bus implementations, but they are incompatible with each other.

The VL (Video Electronics Standards Association) local bus and PCI (Peripheral Component Interconnect) bus specification was created to end this confusion.

The PCI - bus standard, under development since Jun. 1992, which is designed to bring workstation-level performance to standard PC platform. The PCI - bus removes many of the bottlenecks that have hampered PC for several years.

On the PCI - bus, peripherals operate at the native speed of the computer system, thus enabling data transfer between peripherals and the system at maximum speed.

This performance is critical for bandwidth-constrained devices such as video, multimedia, mass storage, and networking adapters.

PCI - bus standard provides end-users with a low-cost, extendible and portable local bus design, which will allow system and peripherals from different manufactures to work together.

1.6. FEATURES

- 32 bits bus transfer mode.
- Bus Master or Slave access.
- Memory burst transfer to 132 MB/sec.
- 33 MHz operation speed.
- 10 device loading ability.
- CPU independent.

2. SPECIFICATION

2.1. HARDWARE

- CPU
 - Pentium® Pro processor 150 - 200 MHz.
 - Pentium® Pro OverDrive® processor (P6T).
 - 387 pins (socket 8) ZIF socket on board.
- COPROCESSOR
 - Included in Pentium.
- SPEED
 - 60 / 66 MHz system speed.
 - 30 / 33 PCI-Bus speed.
 - 7.5 / 8 MHz AT bus speed.
- DRAM MEMORY
 - 3 banks 72 pins SIMM module socket on board.
 - Use 4 / 8 / 16 / 32 / 64 /128 MB 60~70 ns SIMM module DRAM.
 - 8 ~ 512 MB DRAM size.
 - Supports Fast Page / EDO DRAM access mode.
- CACHE MEMORY
 - 16 KB cache memory included in CPU.
 - 256KB/512 KB 2nd cache in CPU.
 - Supports Write Back cache mode for L1/L2 Cache.
- I/O BUS SLOTS
 - 4 Master / Slave PCI-BUS.
 - 3 16 bits ISA BUS.
- IDE PORTS
 - 2 Enhanced IDE channels on board.(Using IRQ14,15)
 - Supports Mode 3,4 IDE & ATAPI CD - ROM.
- I/O PORTS
 - Supports 2 16550 COM ports. (Using IRQ4, 3)
 - Supports 1 EPP/ECP LPT port. (Using IRQ7 or 5 and DMA3 or 1)
 - Supports 1 1.44/2.88 MB Floppy port. (Using DMA2 & IRQ6)
 - Supports PS/2 Mouse. (Using IRQ12)

- GREEN FUNCTION
 - Standby & Suspend mode support.
 - Green switch & LED support.
 - IDE & Display power down support.
 - Monitor all IRQ / DMA / Display / I/O events.
- BIOS
 - 128KB FLASH EEPROM.
 - Supports Plug & Play Function.
- DIMENSION
 - Baby AT Form Factor, 4 layers PCB.

2.2. SOFTWARE

- BIOS
 - Licensed AWARD BIOS.
 - AT CMOS Setup, BIOS / Chipset Setup, Green Setup, Hard Disk Utility included.
- O.S.
 - Operation with MS-DOS®, Windows®95, WINDOWS™ NT, OS/2, NOVELL and SCO UNIX.

2.3. ENVIRONMENT

- Ambient Temp.
 - 0°C to +50°C (Operating).
- Relative Hum.
 - 0 to +85% (Operating).
- Altitude
 - 0 to 10,000 feet (Operating).
- Vibration
 - 0 to 1,000 Hz.
- Electricity
 - 4.9 V to 5.2 V.
 - Max. 20A current at 5V.

3. HARDWARE INSTALLATION

3.1. UNPACKING

The mainboard package should contain the following:

- The **GA - 686FX** mainboard.
- USER'S MANUAL for mainboard.
- Cable set for IDE , Floppy & I/O device.
- Diskette for BUS MASTER ATAPI device.

The mainboard contains sensitive electric components which can be easily damaged by static electricity, so the mainboard should be left in its original packing until it is installed.

Unpacking and installation should be done on a grounded anti-static mat.

The operator should be wearing an anti static wristband, grounded at the same point as the anti-static mat.

Inspect the mainboard carton for obvious damage. Shipping and handling may cause damage to your board. Be sure there are no shipping and handling damages on the board before proceeding.

After opening the mainboard carton, extract the system board and place it only on a grounded anti-static surface component side up. Again inspect the board for damage.

Press down on all of the socket IC's to make sure that they are properly seated. Do this only on with the board placed on a firm flat surface.

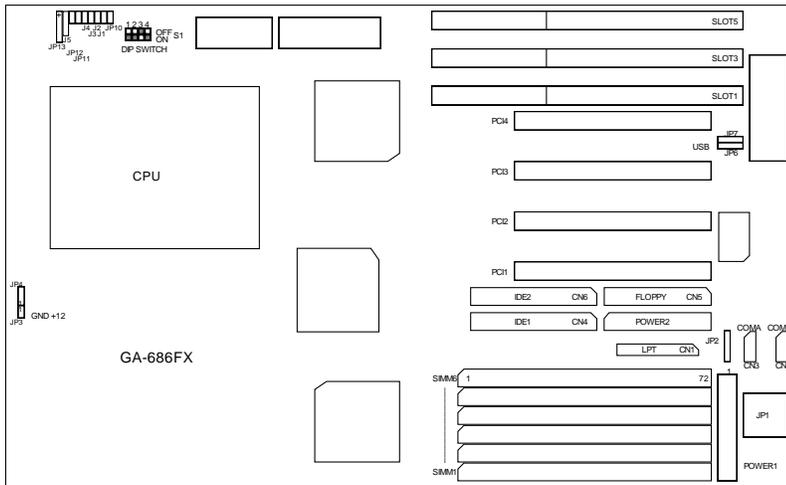
●***DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**

You are now ready to install your mainboard. The mounting hole pattern on the mainboard matches the IBM-AT system board.

It is assumed that the chassis is designed for a standard IBM XT/AT mainboard mounting. Place the chassis on the anti-static mat and remove the cover.

Take the plastic clips, Nylon stand-off and screws for mounting the system board, and keep them separate.

3.2. MAINBOARD LAYOUT



<Figure 3.1>

3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

◆ CN1-6 I/O Ports Connector	
CN1	For LPT port.
CN2	For Serial port2 (COM B).
CN3	For Serial port1(COM A).
CN4	For Primary IDE port.
CN5	For Floppy port.
CN6	For Secondary IDE port.

◆ J1: Hard Disk active LED	
Pin No.	Function
1	LED anode(+).
2	LED cathode (-).

◆ J2: GN-SW	
Pin No.	Function
Close	Force system to enter Green Mode (Suspend mode).
Open	Normal Operation.

◆ J3: GN-LED	
Pin No.	Function

1	LED anode (+).
2	LED cathode (-).

◆ J4: RESET Switch (RST)	
Pin No.	Function
1	RESET Input.
2	GND.

◆ J5: SPEAKER Connector	
Pin No.	Function
1	VCC.
2	NC.
3	NC.
4	Output.

◆ JP1: Keyboard Connector	
Pin No.	Function
1	Key Clock.
2	Key Data.
3	NC.
4	VCC (+5V).
5	GND.

◆ JP2: Mouse Connector	
Pin No.	Function
1	VCC.
2	GND.
3	Data.
4	Clock.

◆ JP3: CPU cooling FAN Power Connector	
Pin No.	Function
1	GND.
2	+12V.

◆ JP10: Soft Power Connector	
Pin No.	Function
1	GND.
2	CTRL-Signal.

◆ JP11: Tubro Switch Connector	
Function reserved.	

◆ JP12: Tubro LED Connector	
-----------------------------	--

Pin No.	Function
1	LED anode (+).
2	LED cathode (-).

◆ S1-1: System Speed Selection	
1	Function
ON	For 60 MHz system speed (CPU 150, 180 MHz).
OFF	For 66 MHz system speed (CPU 166, 200 MHz).

◆ S1-2,3,4: CPU INT. / EXT. FREQ. RATIO			
2	3	4	Function
ON	OFF	OFF	x 2.5
OFF	ON	OFF	x 3

◆ Power1: PS/2 POWER connector	
Pin No.	Function
1	Power Good signal.
2,10,11,12	VCC (+5V).
3	+12V.
4	-12V.
5,6,7,8	GND.
9	-5V.

◆ Power2: ATX POWER connector	
Pin No.	Function
3,5,7,13,15-17	GND.
4,6,19,20	VCC (+5V).
10	+12V.
12	-12V.
18	-5V.
8	Power Good.
9	5V SB (Stand by +5V).
14	PS-ON (Soft ON/OFF).

3.4. DRAM INSTALLATION

The mainboard can be installed with 4 / 8 / 16 / 32 / 64 / 128 MB 72 pins SIMM module DRAM, and the DRAM speed must be 60 or 70 ns.

The DRAM memory system on mainboard consists of bank 0, 1 & bank 2. Each bank consist of 2 PCs 72 pins SIMM module DRAM.

Because the 72 pins SIMM module is 32 bits width, using 2 PCs which can match a 64 bits system. The total memory size is 8 - 512 MB, and various configuration of DRAM types in the following TABLE are for reference:

BANK0	BANK1	BANK2	TOTAL SIZE
4MB * 2pcs.			8MB
4MB * 2pcs.	4MB * 2pcs.		16MB
8MB * 2pcs.			16MB
4MB * 2pcs.	4MB * 2pcs.	4MB * 2pcs.	24MB
8MB * 2pcs.	4MB * 2pcs.		24MB
4MB * 2pcs.	4MB * 2pcs.	8MB * 2pcs.	32MB
8MB * 2pcs.	8MB * 2pcs.		32MB
16MB * 2pcs.			32MB
8MB * 2pcs.	8MB * 2pcs.	4MB * 2pcs.	40MB
16MB * 2pcs.	4MB * 2pcs.		40MB
8MB * 2pcs.	8MB * 2pcs.	8MB * 2pcs.	48MB
16MB * 2pcs.	8MB * 2pcs.		48MB
16MB * 2pcs.	8MB * 2pcs.	4MB * 2pcs.	56MB
16MB * 2pcs.	8MB * 2pcs.	8MB * 2pcs.	64MB
16MB * 2pcs.	16MB * 2pcs.		64MB
32MB * 2pcs.			64MB
32MB * 2pcs.	4MB * 2pcs.		72MB
16MB * 2pcs.	16MB * 2pcs.	4MB * 2pcs.	72MB
32MB * 2pcs.	8MB * 2pcs.		80MB
16MB * 2pcs.	16MB * 2pcs.	8MB * 2pcs.	80MB
32MB * 2pcs.	4MB * 2pcs.	4MB * 2pcs.	80MB
32MB * 2pcs.	8MB * 2pcs.	4MB * 2pcs.	88MB
32MB * 2pcs.	8MB * 2pcs.	8MB * 2pcs.	96MB
32MB * 2pcs.	16MB * 2pcs.		96MB
16MB * 2pcs.	16MB * 2pcs.	16MB * 2pcs.	96MB
32MB * 2pcs.	16MB * 2pcs.	4MB * 2pcs.	104MB
32MB * 2pcs.	16MB * 2pcs.	8MB * 2pcs.	112MB
64MB * 2pcs.			128MB
32MB * 2pcs.	32MB * 2pcs.		128MB
32MB * 2pcs.	16MB * 2pcs.	16MB * 2pcs.	128MB
64MB * 2pcs.	4MB * 2pcs.		136MB
32MB * 2pcs.	32MB * 2pcs.	4MB * 2pcs.	136MB
64MB * 2pcs.	4MB * 2pcs.	4MB * 2pcs.	144MB
64MB * 2pcs.	8MB * 2pcs.		144MB
32MB * 2pcs.	32MB * 2pcs.	8MB * 2pcs.	144MB

64MB * 2pcs.	8MB * 2pcs.	4MB * 2pcs.	152MB
64MB * 2pcs.	8MB * 2pcs.	8MB * 2pcs.	160MB
64MB * 2pcs.	16MB * 2pcs.		160MB
64MB * 2pcs.	16MB * 2pcs.	4MB * 2pcs.	168MB
64MB * 2pcs.	16MB * 2pcs.	8MB * 2pcs.	176MB
64MB * 2pcs.	16MB * 2pcs.	16MB * 2pcs.	192MB
64MB * 2pcs.	32MB * 2pcs.		192MB
64MB * 2pcs.	32MB * 2pcs.	4MB * 2pcs.	200MB
64MB * 2pcs.	32MB * 2pcs.	8MB * 2pcs.	208MB
64MB * 2pcs.	32MB * 2pcs.	16MB * 2pcs.	224MB
64MB * 2pcs.	32MB * 2pcs.	32MB * 2pcs.	256MB
64MB * 2pcs.	64MB * 2pcs.		256MB
128MB * 2pcs.			256MB
64MB * 2pcs.	64MB * 2pcs.	4MB * 2pcs.	264MB
128MB * 2pcs.	4MB * 2pcs.		264MB
64MB * 2pcs.	64MB * 2pcs.	8MB * 2pcs.	272MB
128MB * 2pcs.	8MB * 2pcs.		272MB
128MB * 2pcs.	8MB * 2pcs.	4MB * 2pcs.	280MB
128MB * 2pcs.	8MB * 2pcs.	8MB * 2pcs.	288MB
128MB * 2pcs.	16MB * 2pcs.		288MB
128MB * 2pcs.	16MB * 2pcs.	4MB * 2pcs.	296MB
128MB * 2pcs.	16MB * 2pcs.	8MB * 2pcs.	304MB
128MB * 2pcs.	16MB * 2pcs.	16MB * 2pcs.	320MB
128MB * 2pcs.	32MB * 2pcs.		320MB
128MB * 2pcs.	32MB * 2pcs.	4MB * 2pcs.	328MB
128MB * 2pcs.	32MB * 2pcs.	8MB * 2pcs.	336MB
128MB * 2pcs.	32MB * 2pcs.	16MB * 2pcs.	352MB
128MB * 2pcs.	32MB * 2pcs.	32MB * 2pcs.	384MB
128MB * 2pcs.	64MB * 2pcs.		384MB
128MB * 2pcs.	64MB * 2pcs.	4MB * 2pcs.	392MB
128MB * 2pcs.	64MB * 2pcs.	8MB * 2pcs.	400MB
128MB * 2pcs.	64MB * 2pcs.	16MB * 2pcs.	416MB
128MB * 2pcs.	64MB * 2pcs.	32MB * 2pcs.	448MB
128MB * 2pcs.	64MB * 2pcs.	64MB * 2pcs.	512MB
128MB * 2pcs.	128MB * 2pcs.		512MB

The DRAM installation position refer to Figure 3.1, and notice the Pin 1 of SIMM module must match with the Pin 1 of SIMM socket when the DRAM SIMM module is installed.

Insert the DRAM SIMM module into the SIMM socket at 45 degree angle. If there is a wrong direction of Pin 1, the DRAM SIMM module couldn't be inserted into socket completely.

After completely insert SIMM module into socket, then press the SIMM module in vertical direction until the left and right metal holders can keep the SIMM module standing up con-firmly.

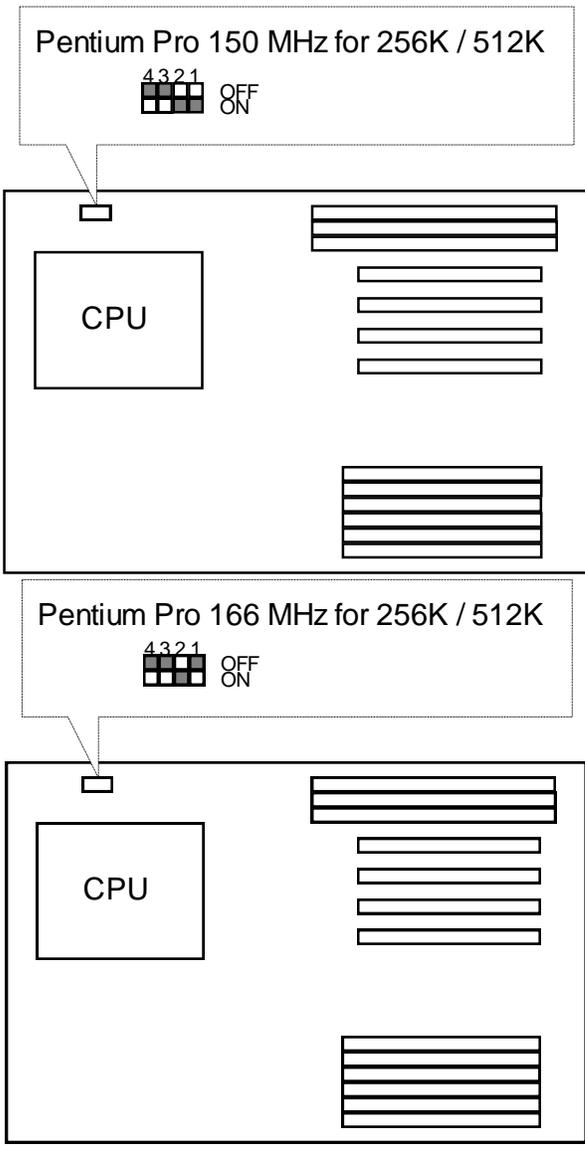
3.5. CPU INSTALLATION AND JUMPERS SETUP

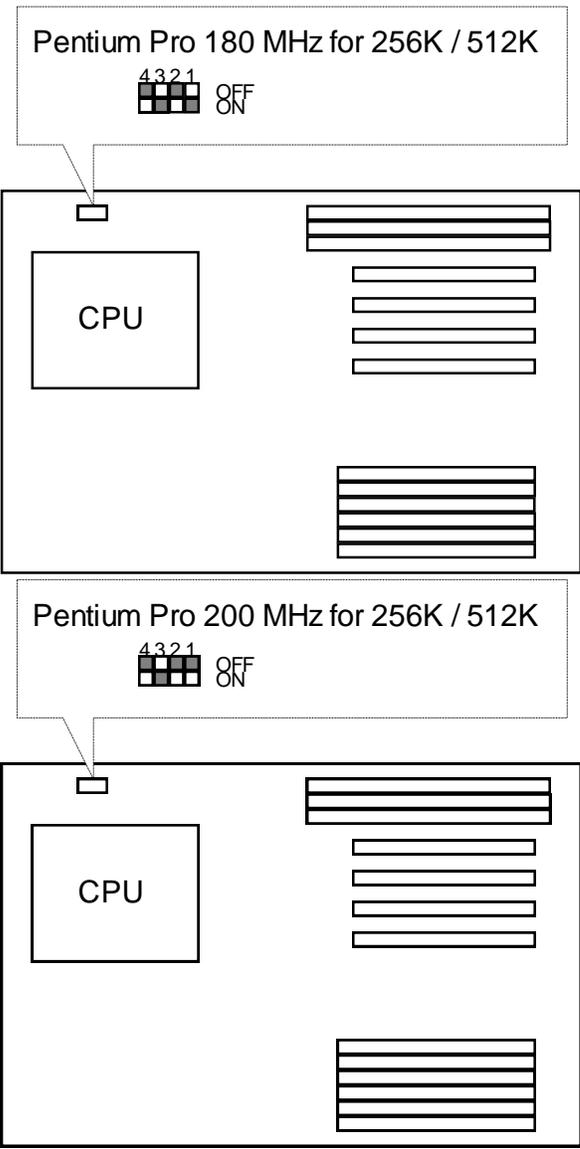
The system's speed depends on the frequency of CLOCK GENERATOR. The user can change the DIP SWITCH (**S1**) selection to set up the system speed to 60 MHz or 66 MHz for 150 - 200 MHz processor.

The mainboard can use Intel Pentium® Pro Processor or P6T (Pentium® OverDrive® Pro Processor). The CPU speed must match with the frequency of CLOCK GEN. It will cause system hanging up if the CLOCK GEN.'S frequency is higher than CPU's.

CPU Installation Table:

DIP SWITCH (S1)				FREQ.	EXT.CLK.	INT.CLK.	CPU Type
1	2	3	4	RATIO	MHz	MHz	
ON	ON	OFF	OFF	2.5	60	150	PENTIUM Pro 150 MHz
OFF	ON	OFF	OFF	2.5	66	166	PENTIUM Pro 166 MHz
ON	OFF	ON	OFF	3	60	180	PENTIUM Pro 180 MHz
OFF	OFF	ON	OFF	3	66	200	PENTIUM Pro 200 MHz





- ⚡* **The CPU is a sensitive electric component and it can be easily damaged by static electricity, so users must keep it away from metal surface when the CPU is installed onto mainboard.**

3.6. CMOS RTC & ISA CFG CMOS SRAM

There're RTC & CMOS SRAM on board, they have a power supply from internal battery to keep the DATA inviolate & effective.

The RTC is a REAL-TIME CLOCK device which provides the DATE & TIME to system.

The CMOS SRAM is used for keeping the information of ISA device system configuration, so the system can automatically boot OS. every time.

Due to the life-time of RTC internal battery is 5 years, the user can change a new RTC to replace old one after it can not work. The new one's brand and type must be same with old one.

3.7. SPEAKER CONNECTOR INSTALLATION

There is always a speaker in AT system for sound purpose. The 4 - Pins connector **J5** is used to connect speaker.

The speaker can work well in both direction of connector when it is installed to the connector **J5** on mainboard.

3.8. HARDWARE RESET SWITCH CONNECTOR INSTALLATION

The RESET switch on panel provides users with HARDWARE RESET function which is almost the same as power-on/off.

The system will do a cold start after the RESET switch is pushed and released by user. The RESET switch is a 2 PIN connector and should be installed to **J4** on mainboard.

3.9. POWER LED CONNECTOR INSTALLATION

There are a system power LED lamp on the panel of case. The power LED will light on when system is powered-on, which is connected to a 3 PIN connector. The connector should be connected to **JP13** of mainboard in correct direction.

3.10. GREEN FUNCTION INSTALLATION

For the purpose of power saving, there are two jumpers, **J2** and **J3**, to make sure the power saving function doing well.

The **J3** is a indicator (green LED) for green function. If the green LED is ON, the system is operating in green mode. The **J2** is a switch to force the system get into green mode immediately.

3.11. ATAPI DEVICE INSTALLATION

There are two Enhance PCI IDE ports (**CN4,6**) on board, which following ATAPI standard SPEC. Any one IDE port can connected to two ATAPI devices (IDE Hard Disk, CD-ROM & Tape Driver), so total four ATAPI devices can exist in a system.

The booting Hard Disk should be the Master device of 1st IDE channel. The **J1** is the active LED port for ATAPI device.

3.12. PERIPHERAL DEVICE INSTALLATION

After the I/O device installation and jumpers setup, the mainboard can be mounted into the case and fixed by screw. To complete the mainboard installation, the peripheral device could be installed now. The basic system needs a display interface card.

If the PCI - Bus device is to be installed in the system, any one of four PCI - Bus slots can be used if Slave PCI - Bus device being installed; any one of four PCI-Bus slots can be used if Bus Master PCI-Bus device being installed.

3.13. KEYBOARD & PS/2 MOUSE INSTALLATION

The main board supports keyboard connector (**JP1**) & PS/2 Mouse (**JP2**).

The BIOS will auto detect whether the PS/2 Mouse is installed or nor & assign IRQ12 for Mouse port if which was installed. After installing the peripheral device, the user should check everything again, and prepare to power-on the system.

3.14. KEYBOARD SETTING FUNCTION

After booting the O.S., there are some special functions used by keyboard as follows:

"CTRL_ALT_DEL"	- Pressing these keys simultaneously will cause system to Warm Start (Software Reset).
----------------	--

4. BIOS CONFIGURATION

Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration.

This type of information is stored in battery-backed CMOS SRAM so that it retains the Setup information when the power is turned off.

4.1. ENTERING SETUP

Power ON the computer and press immediately will allow you to enter Setup.

The other way to enter Setup is to power on the computer, when the below message appears briefly at the bottom of the screen during the POST (Power On Self Test), press key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys.

- **TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY**

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" bottom on the system case.

You may also restart by simultaneously press <Ctrl>,<Alt>, and keys.

If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to,

- **PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP**

4.2. CONTROL KEYS

Up arrow	Move to previous item.
Down arrow	Move to next item.
Left arrow	Move to the item in the left hand.
Right arrow	Move to the item in the right hand.
Esc key	Main Menu - Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu - Exit current page and return to Main Menu.
PgUp key	Increase the numeric value or make changes.
PgDn key	Decrease the numeric value or make changes.
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu.
F2 key	Change color from total 16 colors.
F3 key	Calendar, only for Status Page Setup Menu.
F4 key	Reserved.
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu.
F6 key	Load the default CMOS value from BIOS default table, only for Option Page Setup Menu.
F7 key	Load the default.
F8 key	Reserved.
F9 key	Reserved.
F10 key	Save all the CMOS changes, only for Main Menu.

4.3. GETTING HELP

4.3.1. Main Menu

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

4.3.2. Status Page Setup Menu / Option Page Setup Menu

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc>.

4.4. THE MAIN MENU

Once you enter Award BIOS CMOS Setup Utility, the Main Menu (Figure 4.1) will appear on the screen.

The Main Menu allows you to select from seven setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

ROM PCI / ISA BIOS
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS	SAVE & EXIT SETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Quit F10 : Save & Exit Setup	
↑ ↓ → ← : Select Item (Shift)F2 : Chang Color	
Time, Date, Hard Disk Type, ...	

Figure 4.1: Main Menu

- Standard CMOS setup
This setup page includes all the items in a standard compatible BIOS.

- BIOS features setup
This setup page includes all the items of Award special enhanced features.
- Chipset features setup
This setup page includes all the items of chipset special features.
- Power management setup
This setup page includes all the items of Green function features.
- PNP/PCI configuration
This setup page includes all the items of PNP/PCI configuration features.
- Load BIOS defaults
BIOS defaults indicates the most appropriate value of the system parameter which the system would be in safe configuration.
- Load setup defaults
BIOS defaults indicates the most appropriate value of the system parameter which the system would be in safe configuration.
- Integrated Peripherals
This setup page includes all the items of peripherals features.
- Supervisor Password
Change, set, or disable password. It allows you to limit access to the system and Setup, or just to Setup.
- User Password
Change, set, or disable password. It allows you to limit access to the system.
- IDE HDD auto detection
Automatically configure hard disk parameter.
- HDD low level format
Low level format IDE Hard Disk.
- Save & exit setup
Save CMOS value changes to CMOS and exit setup.
- Exit without save
Abandon all CMOS value changes and exit setup.

4.5. STANDARD CMOS SETUP MENU

The items in Standard CMOS Setup Menu (Figure 4.2) are divided into 9 categories. Each category includes no, one or more than one setup items. Use the arrows to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

ROM PCI / ISA BIOS
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date (mmdd:yy): Mon, Oct 7 1996																	
Time (hh:mm:ss): 17 : 10 : 14																	
HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR MODE										
Primary Master	: Auto	0	0	0	0	0	0 Auto										
Primary Slave	: None	0	0	0	0	0	0 -----										
Secondary Master	: None	0	0	0	0	0	0 -----										
Secondary Slave	: None	0	0	0	0	0	0 -----										
Driver A : 1.44M, 3.5 inch.																	
Driver B : None																	
Floppy 3 Mode Support : Disabled																	
Video : EGA/VGA																	
Halt On: No Errors																	
<table border="1" style="margin-left: auto; margin-right: 0;"> <tr> <td>Base Memory:</td> <td>640 K</td> </tr> <tr> <td>Extended Memory:</td> <td>15360 K</td> </tr> <tr> <td>Other Memory:</td> <td>384 K</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black;">Total Memory:</td> </tr> <tr> <td></td> <td>16384 K</td> </tr> </table>								Base Memory:	640 K	Extended Memory:	15360 K	Other Memory:	384 K	Total Memory:			16384 K
Base Memory:	640 K																
Extended Memory:	15360 K																
Other Memory:	384 K																
Total Memory:																	
	16384 K																
ESC : Quit		↑ ↓ → ← : Select Item			PU/PD/+/- : Modify												
F1 : Help		(Shift)F2 : Chang Color															

Figure 4.2: Standard CMOS Setup Menu

- Date

The date format is <day>, <date> <month> <year>. Press <F3> to show the calendar.

day	The day, from Sun to Sat, determined by the BIOS and is display-only
date	The date, from 1 to 31 (or the maximum allowed in the month)
month	The month, Jan. through Dec.
year	The year, from 1900 through 2099

- Time

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

The time is calculated base on the 24-hour military-time clock.

For example, 1 p.m. is 13:00:00.

- Primary HDDs / Secondary HDDs

The category identify the types of hard disk drive C drive F 4 devices that has been installed in the computer.

There are 45 pre-defined types and a user definable type.

Type 1 to Type 45 are pre-defined. Type User is user-definable and type Auto will automatically detect HDD's type..

Press PgUp or PgDn to select a numbered hard disk type or type the number and press <Enter>.

Note that the specifications of your drive must match with the drive table.

The hard disk will not work properly if you enter improper information for this category.

If your hard disk drive type is not matched or listed, you can use Type User to define your own drive type manually.

If you select Type User, related information is asked to be entered to the following items.

Enter the information directly from the keyboard and press <Enter>.

Those information should be provided in the documentation form your hard disk vendor or the system manufacturer.

CYLS.	number of cylinders
HEADS	number of heads
PRECOMP	write precomp
LANDZONE	landing zone
SECTORS	number of sectors

If a hard disk has not been installed select NONE and press <Enter>.

- Drive A type / Drive B type

The category identify the types of floppy disk drive A or drive B that has been installed in the computer.

None	No floppy drive installed
360K, 5.25 in.	5-1/4 inch PC-type standard drive; 360 kilobyte capacity.

1.2M, 5.25 in.	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity (3-1/2 inch when 3 Mode is Enabled).
720K, 3.5 in.	3-1/2 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in.	3-1/2 inch double-sided drive; 1.44 megabyte capacity.
2.88M, 3.5 in.	3-1/2 inch double-sided drive; 2.88 megabyte capacity.

- Floppy 3 Mode Support (for Japan Area)

Disable	Normal Floppy Drive.
Drive A	Drive A is 3 mode Floppy Drive.
Drive B	Drive B is 3 mode Floppy Drive.
Both	Drive A & B are 3 mode Floppy Drive.

- Video

The category detects the type of adapter used for the primary system monitor that must match your video display card and monitor.

Although secondary monitors are supported, you do not have to select the type in setup.

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SVGA, or PGA monitor adapters
CGA 40	Color Graphics Adapter, power up in 40 column mode
CGA 80	Color Graphics Adapter, power up in 80 column mode
MONO	Monochrome adapter, includes high resolution monochrome adapters

- Halt on

The category determines whether the computer will stop if an error is detected during power up.

NO errors	The system boot will not be stopped for any error that may be detected
All errors	Whenever the BIOS detects a non-fatal error the system will be stopped and you will be prompted

All,But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors

- Memory

The category is display-only which is determined by POST (Power On Self Test) of the BIOS.

Base Memory

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system.

The value of the base memory is typically 512 K for systems with 512 K memory installed on the motherboard, or 640 K for systems with 640 K or more memory installed on the motherboard.

Extended Memory

The BIOS determines how much extended memory is present during the POST.

This is the amount of memory located above 1 MB in the CPU's memory address map.

Expanded Memory

Expanded Memory in memory defined by the Lotus/Intel/Microsoft (LIM) standard as EMS.

Many standard DOS applications can not utilize memory above 640 K, the Expanded Memory Specification (EMS) swaps memory which not utilized by DOS with a section, or frame, so these applications can access all of the system memory.

Memory can be swapped by EMS is usually 64 K within 1 MB or memory above 1 MB, depends on the chipset design.

Expanded memory device driver is required to use memory as Expanded Memory.

Other Memory

This refers to the memory located in the 640 K to 1024 K address space. This is memory that can be used for different applications.

DOS uses this area to load device drivers to keep as much base memory free for application programs. Most use for this area is Shadow RAM.

4.6. BIOS FEATURES SETUP

ROM PCI / ISA BIOS
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

CPU TEMPERATURE PROTECT: YES	Video BIOS Shadow : Enabled
Virus Warning : Disabled	C8000 - CBFFF Shadow : Disabled
CPU Internal Cache : Enabled	CC000 - CFFFF Shadow : Disabled
External Cache : Enabled	D0000 - D3FFF Shadow : Disabled
Quick Power On Self Test : Enabled	D4000 - D7FFF Shadow : Disabled
Boot Sequence : A, C	D8000 - DBFFF Shadow : Disabled
Swap Floppy Drive : Disabled	DC000 - DFFFF Shadow : Disabled
Boot Up Floppy Seek : Enabled	
Boot Up NumLock Status : On	
Security Option : Setup	
PCI/VGA Palette Snoop : Disabled	
OS Select For DRAM >64MB : Non-OS2	
ESC : Quit ↑ ↓ → ← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F7 : Load Setup Defaults	

Figure 4.3: BIOS Features Setup

- CPU TEMPERATURE PROTECT

The default value is YES.

Yes	Enable CPU TEMPERATURE PROTECT.
No	Disable CPU TEMPERATURE PROTECT.

- Virus Warning

This category flashes on the screen. 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 the following error message will appear, in the mean time, you can run anti-virus program to locate the problem.

The default value is Disabled.

Enabled	Activate automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message to appear when anything attempts to access the boot sector or hard disk partition table.

- CPU Internal Cache / External Cache

These two categories speed up memory access. However, it depends on CPU / chipset design.

The default value is Enabled.

Enabled	Enable cache function.
Disabled	Disable cache function.

- Quick Power On Self Test

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

The default value is Enabled.

Enabled	Enable quick POST.
Disabled	Normal POST.

- Boot Sequence

This category determines which drive computer searches first for the disk operating system (i.e., DOS).

The default value is A,C.

A,C	System will first search for floppy disk drive then hard disk drive.
C,A	System will first search for hard disk drive then floppy disk drive.
C, CD-ROM, A	System will first search for hard disk drive, second for CD-ROM drive then floppy disk drive.
CD-ROM, C, A	System will first search for CD-ROM drive, second for hard disk drive then floppy disk drive.

- Swap Floppy Drive

The default value is Disabled.

Enabled	Floppy A & B will be swapped under DOS.
Disabled	Floppy A & B will be normal definition.

- **Boot Up Floppy Seek**

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360 K type is 40 tracks while 720 K, 1.2 M and 1.44 M are all 80 tracks.

The default value is Enabled.

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Note that BIOS can not tell from 720 K, 1.2 M or 1.44 M drive type as they are all 80 tracks.
Disabled	BIOS will not search for the type of floppy disk drive by track number. Note that there will not be any warning message if the drive installed is 360 K.

- **Boot Up NumLock Status**

The default value is On.

On	Keypad is number keys.
Off	Keypad is arrow keys.

- **Security Option**

This category allows you to limit access to the system and Setup, or just to Setup. The default value is Setup.

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

- **To disable security, select **PASSWORD SETTING** at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.**

- **PCI/VGA Palette Snoop**

The default value are Disabled.

Enabled	For having Video Card on ISA Bus and VGA Card on PCI Bus.
Disabled	For VGA Card only.

- OS Select For DRAM>64MB

The default value is Non-OS2.

Non-OS2	Using non-OS2 operating system.
OS2	Using OS2 operating system and DRAM>64MB.

- Video BIOS Shadow

It determines whether video BIOS will copied to RAM, however, it is optional from chipset design. Video Shadow will increase the video speed. The default value is Enable.

Enabled	Video shadow is enabled.
Disabled	Video shadow is disabled.

- C8000 - CFFFF Shadow / D0000 - DFFFF Shadow

These categories determine whether optional ROM will be copied to RAM by 16 K byte. The default value are Disabled.

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

4.7. CHIPSET FEATURES SETUP

ROM PCI / ISA BIOS
 CHIPSET FEATURES SETUP
 AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	
DRAM RAS# Precharge Time	: 4	
MA Additional Wait State	: Enabled	
RAS# To CAS# Delay	: Enabled	
DRAM Read Burst (B / E / F)	: x2 / 3 / 4	
DRAM Write Burst (B / E / F)	: x3 / 3 / 4	
ISA Bus Clock	: PCICLK / 4	
DRAM Refresh Queue	: Enabled	
DRAM ECC/PARITY select	: Disabled	
Read-Around-Write	: Enabled	
PCI Burst Write Combine	: Disabled	
PCI-To-DRAM Pipeline	: Enabled	
CPU-To-PCI Write Post	: Enabled	ESC : Quit ↑ ↓ → ← : Select Item
CPU-To-PCI IDE Posting	: Enabled	F1 : Help PU/PD/+/- : Modify
Video RAM Cacheable	: Disabled	F5 : Old Values (Shift)F2 : Color
Memory Hole At 15M-16M	: Disabled	F7 : Load Setup Defaults

Figure 4.4: Chipset Features Setup

- Auto Configuration

The default value is Enabled.

Enable	Enabled Auto Configuration.
Disable	Disabled Auto Configuration.

- DRAM RAS# Precharge Time

The default value is 4.

3	Set DRAM RAS# Precharge Time to 3.
4	Set DRAM RAS# Precharge Time to 4.

- MA Additional Wait Sate

The default value is Enabled.

Enable	Enabled MA Additional Wait Sate.
Disable	Disabled MA Additional Wait Sate.

- RAS# To CAS# Delay

The default value is Enabled.

Enable	Enabled RAS# To CAS# Delay.
Disable	Disabled RAS# To CAS# Delay.

- DRAM Read Burst (B / E / F)

The default value is x2 / 3 / 4.

x3 / 4 / 4	Set DRAM Read Burst (B / E / F) to x3 / 4 / 4.
x2 / 3 / 4	Set DRAM Read Burst (B / E / F) to x2 / 3 / 4.
x2 / 2 / 3	Set DRAM Read Burst (B / E / F) to x2 / 2 / 3.
x1 / 2 / 3	Set DRAM Read Burst (B / E / F) to x1 / 2 / 3.

- DRAM Write Burst (B / E / F)

The default value is x3 / 3 / 4.

x4 / 4 / 4	Set DRAM Write Burst (B / E / F) to x4 / 4 / 4.
x3 / 3 / 4	Set DRAM Write Burst (B / E / F) to x3 / 3 / 4.
x3 / 3 / 3	Set DRAM Write Burst (B / E / F) to x3 / 3 / 3.
x2 / 2 / 3	Set DRAM Write Burst (B / E / F) to x2 / 2 / 3.

- ISA Bus Clock

The default value is PCICLK/4.

PCICLK/3	For 50 MHz system.
PCICLK/4	For 66,60 MHz system.

- DRAM Refresh Queue

The default value is Enabled.

Enable	Enabled DRAM Refresh Queue.
Disable	Disabled DRAM Refresh Queue.

- DRAM ECC/PARITY select

The default value is Disabled.

ECC	Enable ECC function when using 36 bit DRAM Module.
PARITY	Enable PARITY function when using 36 bit DRAM Module.
Disabled	Disable ECC & PARITY function.

- Read-Around-Write

The default value is Enabled.

Enable	Enabled Read-Around-Write.
--------	----------------------------

Disable	Disabled Read-Around-Write.
---------	-----------------------------

- PCI Burst Write Combine

The default value is Disabled.

Enable	Enabled PCI Burst Write Combine.
Disable	Disabled PCI Burst Write Combine.

- PCI-To-DRAM Pipeline

The default value is Enabled.

Enable	Enabled PCI-To-DRAM Pipeline
Disable	Disabled PCI-To-DRAM Pipeline.

- CPU-To-PCI Write Post

The default value is Enabled.

Enable	Enabled CPU-To-PCI Write Post.
Disable	Disabled CPU-To-PCI Write Post.

- CPU-To-PCI IDE Posting

The default value is Enabled.

Enable	Enabled CPU-To-PCI IDE Posting.
Disable	Disabled CPU-To-PCI IDE Posting.

- Video RAM Cacheable

The default value is Disabled.

Disabled	Disable this function.
Enabled	Enable this function to better VGA performance;while some brands of VGA must be disabled this function (e.g.ET4000W32P).

- Memory Hole At 15M-16M

The default value is Disabled.

Disabled	Normal Setting.
Enabled	Set Address=15~16MB remap to ISA BUS.

4.8. POWER MANAGEMENT SETUP

ROM PCI / ISA BIOS
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management	: Enabled	** Power Down & Resume Events **
PM Control by APM	: Yes	IRQ3 (COM 2) : ON
Video Off Method	: DPMS	IRQ4 (COM 1) : ON
Standby Mode	: Disabled	IRQ5 (LPT 2) : OFF
Suspend Mode	: Disabled	IRQ6 (Floppy Disk) : ON
HDD Power Down	: Disabled	IRQ7 (LPT 1) : OFF
** Wake Up Events In Doze & Standby **		IRQ9 (IRQ2 Redir) : OFF
IRQ3 (Wake-Up Event)	: ON	IRQ10 (Reserved) : OFF
IRQ4 (Wake-Up Event)	: ON	IRQ11 (Reserved) : OFF
IRQ12 (Wake-Up Event)	: ON	IRQ12 (PS/2 Mouse) : ON
		IRQ14 (Hard Disk) : ON
		IRQ15 (Reserved) : ON
		ESC : Quit ↑ ↓ → ← : Select Item
		F1 : Help PU/PD/+/- : Modify
		F5 : Old Values (Shift)F2 : Color
		F7 : Load Setup Defaults

Figure 4.5: Power Management Setup

- Power Management

The default value is Enabled.

Enabled	Enable Green function.
Disabled	Disable Green function.

Please disable Green Function for Non-S CPU in OS/2, Unix, Window NT & Novell system.

- PM Control by APM

The default value is Yes.

Yes	Enable software APM function.
No	Disable software APM function.

- Video off Method

The default value is DPMS Support.

V/H SYNC + Blank	BIOS will turn off V/H-SYNC when gets into Green mode for Green monitor power saving.
Blank Screen	BIOS will only black monitor when gets into Green mode.
DPMS	BIOS will use DPMS Standard to control VGA card. (The Green type VGA card will turn of V/H-SYNC automatically.)

- Standby Mode (for Network Card using)

The default value is Disable.

Disable	Disable Standby Mode.
1 min - 1 Hour	Setup the timer to enter Standby Mode.

- Suspend mode (for CPU stop clock Mode)

The default value is Disable.

Disable	Disable Suspend Mode.
1 min - 1 Hour	Setup the timer to enter Suspend Mode.

- HDD Power Down

The default value is Disable.

Disable	Disable HDD Power Down mode function.
1-15 mins	Enable HDD enter Power Down mode between 1 to 15 mins.

- IRQX (3,4,5,6,7,9,10,11,12,14,15)

The default value is On.

On	The system will return to normal mode from Green Mode when the IRQX is active.
Off	The system will not return to normal mode from Green Mode when the IRQX is active.

4.9. PNP/PCI CONFIGURATION

ROM PCI / ISA BIOS
PNP/PCI CONFIGURATION
AWARD SOFTWARE, INC.

Resources Controlled by	: Manual	PCI IRQ Activated By	: Level
Reset Configuration Data	: Disabled	PCI IDE IRQ Map To	: PCI-AUTO
IRQ-3 assigned to	: Legacy ISA	Primary IDE INT#	: A
IRQ-4 assigned to	: Legacy ISA	Secondary IDE INT#	: B
IRQ-5 assigned to	: PCI/ISA PnP		
IRQ-7 assigned to	: Legacy ISA		
IRQ-9 assigned to	: PCI/ISA PnP		
IRQ-10 assigned to	: PCI/ISA PnP		
IRQ-11 assigned to	: PCI/ISA PnP		
IRQ-12 assigned to	: Legacy ISA		
IRQ-14 assigned to	: Legacy ISA		
IRQ-15 assigned to	: Legacy ISA		
DMA-0 assigned to	: PCI/ISA PnP		
DMA-1 assigned to	: PCI/ISA PnP		
DMA-3 assigned to	: PCI/ISA PnP		
DMA-5 assigned to	: PCI/ISA PnP	ESC : Quit	↑ ↓ → ← : Select Item
DMA-6 assigned to	: PCI/ISA PnP	F1 : Help	PU/PD/+/- : Modify
DMA-7 assigned to	: PCI/ISA PnP	F5 : Old Values (Shift)F2	: Color
		F7 : Load Setup Defaults	

Figure 4.6: PCI Slot Configuration

- Resources Controlled by

The default value is Manual.

Manual	User can set the PnP resource (I/O Address, IRQ & DMA channels) used by legacy ISA DEVICE.
Auto	BIOS automatically use these PnP rescuers.

- IRQ (3,4,5,7,9,10,11,12,14,15),DMA(0,1,3,5,6,7) assigned to

The default value is "Legacy ISA" or "PCI/ISA PnP".

Legacy ISA	The resource is used by Legacy ISA device.
PCI/ISA PnP	The resource is used by PCI/ISA PnP device (PCI or ISA).

- PCI IRQ Activated By

Level	For some PCI SCSI or Lan device using same PCI INT.
Edge	Normal operating.

- PCI IDE IRQ Map To

PCI-Auto	Map PCI IDE IRQ to PCI slot automatically.
----------	--

ISA	Map PCI IDE IRQ to ISA slot.
PCI-Slot1~PCI-Slot4	Map PCI IDE-IRQ to PCI-Slot1~PCI-Slot4.

- Primary/Secondary IDE INT#

A	Set INTA for primary/secondary PCI IDE.
B	Set INTB for primary/secondary PCI IDE.
C	Set INTC for primary/secondary PCI IDE.
D	Set INTD for primary/secondary PCI IDE.

4.10. LOAD BIOS DEFAULTS

ROM PCI / ISA BIOS
LOAD SETUP DEFAULTS
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERUSER PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS	LOAD BIOS Defaults (Y/N)? N
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Quit F10 : Save & Exit Setup	
↑ ↓ → ← : Select Item (Shift)F2 : Chang Color	
Load BIOS Defaults except Standard CMOS SETUP	

Figure 4.7: Load BIOS Defaults

- Load BIOS Defaults

To load BIOS defaults value to CMOS SRAM, enter "Y". If not, enter "N".

4.11. LOAD SETUP DEFAULTS

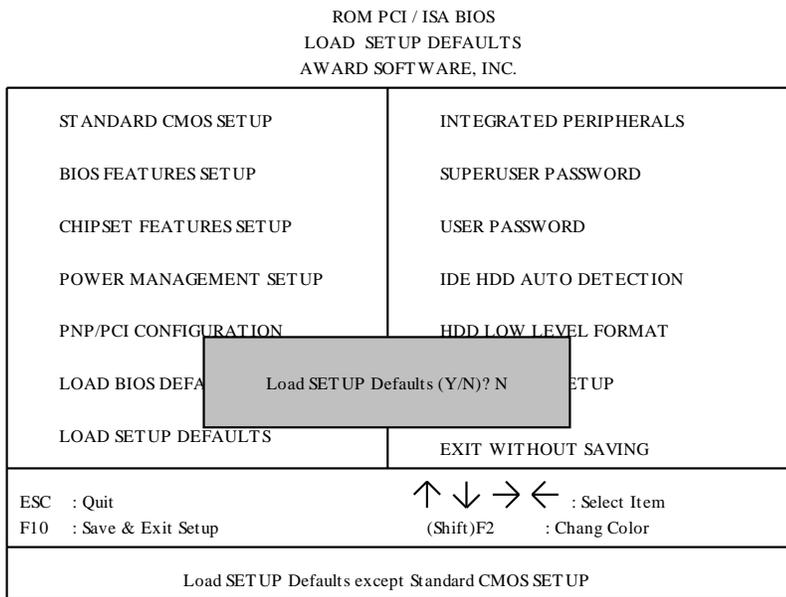


Figure 4.8: Load Setup Defaults

- Load SETUP Defaults

To load SETUP defaults value to CMOS SRAM, enter "Y". If not, enter "N".

●* If there is any problem occurred, loading SETUP DEFAULTS step is recommended.

4.12. INTEGRATED PERIPHERALS

ROM PCI / ISA BIOS
 INTEGRATED PERIPHERALS
 AWARD SOFTWARE, INC.

IDE HDD Block Mode	: Enabled	USB Controller	: Disabled
IDE Primary Master PIO	: Auto		
IDE Primary Slave PIO	: Auto		
IDE Secondary Master PIO	: Auto		
IDE Secondary Slave PIO	: Auto		
On-Chip Primary PCI IDE	: Enabled		
On-Chip Secondary PCI IDE	: Enabled		
PCI Slot IDE 2nd Channel	: Enabled		
Onboard FDD Controller	: Enabled		
Onboard Serial Port 1	: COM1/3F8		
Onboard Serial Port 2	: COM2/2F8		
Onboard Parallel Port	: 378/IRQ7		
Onboard Parallel Mode	: SPP		
* ECP Mode Use DMA	: 3		
		ESC : Quit ↑ ↓ → ← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F7 : Load Setup Defaults	

Figure 4.9: Load Setup Defaults

* This item will show up only if On board Parallel Mode set to ECP or ECP/EPP.

- IDE HDD Block Mode

The default value is Enabled.

Enabled	Enable IDE HDD Block Mode
Disabled	Disable IDE HDD Block Mode

- IDE Primary Master PIO (for onboard IDE 1st channel).

The default value is Auto.

Auto	BIOS will automatically detect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- IDE Primary Slave PIO (for onboard IDE 1st channel).

The default value is Auto.

Auto	BIOS will automatically detect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- IDE Secondary Master PIO (for onboard IDE 2nd channel).

The default value is Auto.

Auto	BIOS will automatically detect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- IDE Secondary Slave PIO (for onboard IDE 2nd channel).

The default value is Auto.

Auto	BIOS will automatically detect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- On-Chip Primary PCI IDE

The default value is Enabled.

Enabled	Enable onboard 1st channel IDE port.
Disabled	Disable onboard 1st channel IDE port.

- On-Chip Secondary PCI IDE

The default value is Enabled.

Enabled	Enable onboard 2nd channel IDE port.
Disabled	Disable onboard 2nd channel IDE port.

- PCI Slot IDE 2nd Channel

The default value is Enabled.

Enabled	Enable PCI BUS DEVICE's 2nd IDE Channel
Disabled	Disable PCI BUS DEVICE's 2nd IDE Channel

- Onboard FDD Controller

The default value is Enabled.

Enabled	Enable onboard FDD port.
Disabled	Disable onboard FDD port.

- Onboard Serial Port 1

The default value is COM1/3F8.

COM1/3F8	Enable onboard Serial port A and address is 3F8H.
COM2/2F8	Enable onboard Serial port A and address is 2F8H.
COM3/3E8	Enable onboard Serial port A and address is 3E8H.
COM4/2E8	Enable onboard Serial port A and address is 2E8H.
Disabled	Disable onboard Serial port A.

- Onboard Serial Port 2

The default value is COM2/2F8.

COM1/3F8	Enable onboard Serial port B and address is 3F8H.
COM2/2F8	Enable onboard Serial port B and address is 2F8H.
COM3/3E8	Enable onboard Serial port B and address is 3E8H.
COM4/2E8	Enable onboard Serial port B and address is 2E8H.
Disabled	Disable onboard Serial port B.

- Onboard Parallel port

The default value is 378/IRQ7.

378/IRQ7	Enable onboard LPT port and address is 378/IRQ7.
278/IRQ5	Enable onboard LPT port and address is 278/IRQ5.
Disabled	Disable onboard LPT port.
3BC/IRQ7	Enable onboard LPT port and address is 3BC/IRQ7.

- Onboard Parallel Mode

The default value is SPP.

SPP	Using Parallel port as Normal Printer Port.
EPP/SPP	Using Parallel port as Enhanced Parallel Port/ Normal Printer Port.
ECP	Using Parallel port as Extended Capabilities Port. ✱
ECP/EPP	Using Parallel port as Extended Capabilities Port mode/Enhanced Parallel Port. ✱

✱ As ECP,ECP/EPP Mode is selected, two options can be defined:

1. ECP Mode use DMA: 3
2. ECP Mode use DMA: 1

4.13. SUPERVISOR / USER PASSWORD

If you select System at Security Option of BIOS Features Setup Menu, you will be prompted for the password every time the system is rebooted or any time you try to enter Setup.

If you select Setup at Security Option of BIOS Features Setup Menu, you will be prompted only when you try to enter Setup.

4.14. IDE HDD AUTO DETECTION

ROM PCI / ISA BIOS
IDE HDD AUTO DETECTION
AWARD SOFTWARE, INC.

HARD DISKS	TYPE	SIZE	CYLS.	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Select Primary Master Option (N=Skip): N								
OPTION	SIZE	CYLS.	HEAD	PRECOMP	LANDZ	SECTOR	MODE	
1 (Y)	521	1060	16	65535	1059	63	NORMAL	
2	521	530	32	0	1059	63	LBA	
3	521	530	32	65535	1059	63	LARGE	
ESC : Skip								

Figure 4.11: IDE HDD Auto Detection

Type "Y" will accept the H.D.D. parameter reported by BIOS.

Type "N" will keep the old H.D.D. parameter setup. If the hard disk cylinder NO. is over 1024, then the user can select LBA mode or LARGER mode for DOS partition LARGER than 528 MB.

4.15. HDD LOW LEVEL FORMAT

ROM PCI / ISA BIOS
 CMOS SETUP UTILITY
 AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS	SAVE & EXIT SETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift)F2 : Chang Color
Hard Disk Low Level Format Utility	

Figure 4.12: HDD Low Level Format

HDD Low Level Format Utility:

In main manual: There are three options to choose:

one is: SELECT DRIVE: "C" or "D".

another one is: BAD TRACK LIST: User can auto, add, modify, delete, clear for bad track of HDD.

the other one is : PREFORMAT: Lower Level Format HDD.

4.16. SAVE & EXIT SETUP

ROM PCI / ISA BIOS
 SAVE & EXIT SETUP
 AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERUSER PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS	SAVE to CMOS and EXIT (Y/N)? N
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Quit F10 : Save & Exit Setup	
↑ ↓ → ← : Select Item (Shift)F2 : Chang Color	
Save Data to CMOS & Exit SETUP	

Figure 4.13: Save & Exit Setup

Type "Y" will quit the Setup Utility and save the user setup value to RTC CMOS SRAM.

Type "N" will return to Setup Utility.

4.17. EXIT WITHOUT SAVING

ROM PCI / ISA BIOS
 EXIT WITHOUT SAVING
 AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERUSER PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING

Quit Without Saving (Y/N)? N

ESC : Quit F10 : Save & Exit Setup	↑ ↓ → ← : Select Item (Shift)F2 : Chang Color
---------------------------------------	--

Abandon all Datas & Exit SETUP

Figure 4.14: Exit Without Saving

Type "Y" will quit the Setup Utility without saving to RTC CMOS SRAM.

Type "N" will return to Setup Utility.

5. AT TECHNICAL INFORMATION

5.1. I/O BUS CONNECTOR PIN OUT

5.1.1. ISA SLOT PIN OUT

GND	B01	A01	-I/O CH CHK
RESET	B02	A02	SD07
+5V	B03	A03	SD06
IRQ9	B04	A04	SD05
-5V	B05	A05	SD04
DRQ2	B06	A06	SD03
-12V	B07	A07	SD02
0WS	B08	A08	SD01
+12V	B09	A09	SD00
GND	B10	A10	-I/O CH RDY
-SMEMW	B11	A11	AEN
-SMEMR	B12	A12	SA19
-IOW	B13	A13	SA18
-IOR	B14	A14	SA17
-DACK3	B15	A15	SA16
-DRQ3	B16	A16	SA15
-DACK1	B17	A17	SA14
-DRQ1	B18	A18	SA13
-REFRESH	B19	A19	SA12
BCLK	B20	A20	SA11
IRQ7	B21	A21	SA10
IRQ6	B22	A22	SA09
IRQ5	B23	A23	SA08
IRQ4	B24	A24	SA07
IRQ3	B25	A25	SA06
-DACK2	B26	A26	SA05
T/C	B27	A27	SA04
BALE	B28	A28	SA03
+5V	B29	A29	SA02
OSC	B30	A30	SA01
GND	B31	A31	SA00
-MEMCS16	D01	C01	SBHE
-I/OCS16	D02	C02	LA23
IRQ10	D03	C03	LA22
IRQ11	D04	C04	LA21
IRQ12	D05	C05	LA20
IRQ15	D06	C06	LA19
IRQ14	D07	C07	LA18
-DACK0	D08	C08	LA17
DRQ0	D09	C09	MEMR
-DACK5	D10	C10	MEMW
DRQ5	D11	C11	SD08
-DACK6	D12	C12	SD09
DRQ6	D13	C13	SD10
-DACK7	D14	C14	SD11
DRQ7	D15	C15	SD12
+5V	D16	C16	SD13
-MASTER	D17	C17	SD14
GND	D18	C18	SD15

5.2. I/O & MEMORY MAP

MEMORY MAP:	[0000000-009FFFFF]	System memory used by DOS and application program.
	[00A0000-00BFFFFF]	Display buffer memory for VGA/ EGA/CGA/MONOCROME adapter.
	[00C0000-00DFFFFF]	Reserved for I/O device BIOS ROM or RAM buffer.
	[00E0000-00EFFFFF]	Reserved for PCI device ROM.
	[00F0000-00FFFFFF]	System BIOS ROM.
	[0100000-BFFFFFFF]	System extension memory.
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]	MONOCROME & PRINTER adapter.
	[3C0-3CF]	EGA adapter.
	[3D0-3DF]	CGA adapter.
	[3F0-3F7]	FLOPPY DISK controller.
	[3F8-3FF]	SERIAL port-1.

5.3. 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 IBM SDLC
 DMA Channel-2 FLOPPY DISK adapter
 DMA Channel-3 Available
 DMA Channel-4 Cascade for DMA controller 1
 DMA Channel-5 Available
 DMA Channel-6 Available
 DMA Channel-7 Available

5.4. 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 adapter

7 PARALLEL port 1

8 RTC clock

9 Available

10 Available

11 Available

12 P/S 2 Mouse

13 MATH coprocessor

14 HARD DISK adapter

15 Available

5.5. 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 byte
	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 A: POST MESSAGE

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP will be shown in the information box at the bottom.

- POST BEEP

Currently there is only one beep code in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps.

- ERROR MESSAGE

Once or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes message for both the ISA and the EISA BIOS.

- ☒ CMOS BATTERY HAS FAILED

CMOS battery is no longer functional. It should be replaced.

- ☒ CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

- ☒ DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.

- ☒ DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to re-configure the drive type correctly.

- ☒ DISPLAY SWITCH IS SET INCORRECTLY

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup.

Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

⊗ DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

⊗ EISA Configuration Checksum Error

PLEASE RUN EISA CONFIGURATION UTILITY

The EISA non-volatile RAM checksum is incorrect or cannot correctly read the EISA slot. This can indicate either the EISA non-volatile memory has become corrupt or the slot has configured incorrectly. Also be sure the card is installed firmly in the slot.

⊗ EISA Configuration Is Not Complete

PLEASE RUN EISA CONFIGURATION UTILITY

The slot configuration information stored in the EISA non-volatile memory is incomplete.

☞ When either of these errors appear, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

⊗ ERROR ENCOUNTERED INITIALIZING HARD DRIVE

Hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

⊗ ERROR INITIALIZING HARD DISK CONTROLLER

Cannot initialize controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly in the hard drive.

⊗ FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

⊗ Invalid EISA Configuration

PLEASE RUN EISA CONFIGURATION UTILITY

The non-volatile memory containing EISA configuration information was programmed incorrectly or has become corrupt. Re-run EISA configuration utility to correctly program the memory.

☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

⊗ KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

⊗ Memory Address Error at ...

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

⊗ Memory parity Error at ...

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

⊗ MEMORY SIZE HAS CHANGED SINCE LAST BOOT

Memory has been added or removed since the last boot. In EISA mode use Configuration Utility to re-configure the memory configuration.

In ISA mode enter Setup and enter the new memory size in the memory fields.

⊗ Memory Verify Error at ...

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

☒ OFFENDING ADDRESS NOT FOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

☒ OFFENDING SEGMENT:

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

☒ PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

☒ PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

☒ RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

☒ Should Be Empty But EISA Board Found

PLEASE RUN EISA CONFIGURATION UTILITY

A valid board ID was found in a slot that was configured as having no board ID.

☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

☒ Should Have EISA Board But Not Found

PLEASE RUN EISA CONFIGURATION UTILITY

The board installed is not responding to the ID request, or no board ID has been found in the indicated slot.

- ☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.
- ☒ Slot Not Empty
 - Indicates that a slot designated as empty by the EISA Configuration Utility actually contains a board.
- ☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.
- ☒ SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...
 - Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.
- ☒ Wrong Board In Slot
 - PLEASE RUN EISA CONFIGURATION UTILITY
 - The board ID does not match the ID stored in the EISA non-volatile memory.
- ☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

APPENDIX B: POST CODES

☞ EISA POST codes are typically output to port address 300h. ISA POST codes are typically output to port address 80h.

POST	Name	Description
C0	Turn Off Chipset Cache	OEM Specific-Cache control.
1	Processor Test 1	Processor Status (1 FLAGS) Verification. Test the following processor status flags carry, zero, sign, overflow, The BIOS will set each of these flags, verify they are set, then turn each flag off and verify it is off.
2	Processor Test 2	Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00.
3	Initialize Chips	Disable NMI, PIE, AIE, UEI, SQWV. Disable video, parity checking, DMA. Reset math coprocessor. Clear all page registers, CMOS shutdown byte. Initialize timer 0, 1, and 2, including set EISA timer to a known state. Initialize DMA controllers 0 and 1. Initialize interrupt controllers 0 and 1. Initialize EISA extended registers.
4	Test Memory Refresh Toggle	RAM must be periodically refreshed in order to keep the memory from decaying. This function assures that the memory refresh function is working properly.
5	Blank video, Initialize keyboard	Keyboard controller initialization.
6	Reserved	
7	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery.
BE	Chipset Default Initialization	Program chipset registers with power on BIOS defaults.
C1	Memory presence test	OEM Specific-Test to size on-board memory.
C5	Early Shadow	OEM Specific-Early Shadow enable for fast boot.
C6	Cache presence test	External cache size detection.

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8	Setup low memory	Early chip set initialization. Memory presence test. OEM chip set routines. Clear low 64 K of memory. Test first 64 K memory.
9	Early Cache Initialization	Cyrix CPU initialization. Cache initialization.
A	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT-HDLR and initialize INT 00h-1Fh according to INT_TBL.
B	Test CMOS RAM Checksum	Test CMOS RAM Checksum, if bad, or insert key pressed, load defaults.
C	Initialize keyboard	Detect type of keyboard controller (optional). Set NUM_LOCK status.
D	Initialize Video Interface	Detect CPU clock. Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
E	Test Video Memory	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
F	Test DMA Controller 0	BIOS checksum test. Keyboard detect and initialization.
10	Test DMA Controller 1	
11	Test DMA Page registers	Test DMA Page Registers.
12-13	Reserved	
14	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
15	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
17	Test Stuck 8259's Interrupt Bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 8259 Interrupt Functionality	Force an interrupt and verify the interrupt occurred.

19	Test Stuck NMI Bits (Parity/IO Check)	Verify NMI can be cleared.
1A		Display CPU clock.
1B-1E	Reserved	
1F	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests and clear EISA mode flag. Test EISA Configuration Memory Integrity (checksum & communication interface).
20	Enable Slot 0	Initialize slot 0 (System Board).
21-2F	Enable Slots 1-15	Initialize slot 1 through 15.
30	Size Base and Extended Memory	Size base memory from 256 K to 640 K extended memory above 1 MB.
31	Test Base and Extended Memory	Test base memory from 256 K to 640 K and extended memory above 1 MB using various patterns. ☞ This will be skipped in EISA mode and can be "skipped" with ESC key in ISA mode.
32	Test EISA Extended Memory	If EISA Mode flag is set then test EISA memory found in slots initialization. ☞ This will be skipped in ISA mode and can be "skipped" with ESC key in EISA mode.
33-3B	Reserved	
3C	Setup Enabled	
3D	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Setup Cache Controller	Initialize cache controller.
3F	Reserved	
BF	Chipset Initialization	Program chipset registers with Setup values.
40		Display virus protect disable or enable.
41	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
42	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
43	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
44	Reserved	

Appendix B: Post Codes

45	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
46	Reserved	
47	Reserved	
48-4D	Reserved	
4E	Manufacturing POST Loop or Display Messages	Reboot if Manufacturing POST Loop pin is set. Otherwise display any messages (i.e., any non-fatal errors that were detected during POST) and enter Setup.
4F	Security Check	Ask password security (optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.
51	Pre-boot Enable	Enable parity checker. Enable NMI, Enable cache before boot.
52	Initialize Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh. ☞ When FSCAN option is enabled, will initialize from C8000h to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h: BIOS area.
60	Setup Virus Protect	Setup virus protect according to Setup
61	Set Boot Speed	Set system speed for boot
62	Setup NumLock	Setup NumLock status according to Setup
63	Boot Attempt	Set low stack. Boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display Press F1 to disable NMI, F2 reboot.
E1-EF	Setup Pages	E1 - Page 1, E2 - Page 2, etc.
FF	Boot	

APPENDIX C: BIOS DEFAULT DRIVE TABLE

Type	Size (MB)	Cylinders	Heads	Sectors	Write / Precomp	Land Zone	Example Model
1	10 MB	306	4	17	128	305	TEAC SD510 MMI 112, 5412
2	20 MB	615	4	17	300	615	Seagate ST225, ST4026
3	31 MB	615	6	17	300	615	
4	62 MB	940	8	17	512	940	
5	47 MB	940	6	17	512	940	
6	20 MB	615	4	17	65535	615	Seagate ST125 Tandon TM262
7	31 MB	462	8	17	256	511	
8	30 MB	733	5	17	65535	733	Tandon TM703
9	112 MB	900	15	17	65535	901	
10	20 MB	820	3	17	65535	820	
11	35 MB	855	5	17	65535	855	
12	50 MB	855	7	17	65535	855	
13	20 MB	306	8	17	128	319	Disctron526, MMI M125
14	43 MB	733	7	17	65535	733	
16	20 MB	612	4	17	0	663	Microscience HH725 Syquest3250, 3425
17	41 MB	977	5	17	300	977	
18	57 MB	977	7	17	65535	977	
19	60 MB	1024	7	17	512	1023	
20	30 MB	733	5	17	300	732	
21	43 MB	733	7	17	300	732	
22	30 MB	733	5	17	300	733	Seagate ST4038
23	10 MB	306	4	17	0	336	
24	54 MB	925	7	17	0	925	Seagate ST4051
25	69 MB	925	9	17	65535	925	Seagate ST4096
26	44 MB	754	7	17	754	754	Maxtor2085

Appendix C: BIOS Default Drive Table

27	69 MB	754	11	17	65535	754	Maxtor2140, Priam S14
28	41 MB	699	7	17	256	699	Maxtor2190, Priam S19
29	68 MB	823	10	17	65535	823	Maxtor1085 Micropolis1325
30	53 MB	918	7	17	918	918	Maxtor1105, 1120, 4780
31	94 MB	1024	11	17	65535	1024	Maxtor1170
32	128 MB	1024	15	17	65535	1024	CDC9415
33	43 MB	1024	5	17	1024	1024	
34	10 MB	612	2	17	128	612	
35	77 MB	1024	9	17	65535	1024	
36	68 MB	1024	8	17	512	1024	
37	41 MB	615	8	17	128	615	
38	25 MB	987	3	17	987	987	
39	57 MB	987	7	17	987	987	Maxtor1140, 4380
40	41 MB	820	6	17	820	820	Seagate ST251
41	41 MB	977	5	17	977	977	Seagate ST4053 Miniscribe3053/ 6053
42	41 MB	981	5	17	981	981	Miniscribe3053/ 6053 RLL
43	48 MB	830	7	17	512	830	Miniscribe 3650
44	69 MB	830	10	17	65535	830	Miniscribe 3650 RLL
45	114 MB	917	15	17	65535	918	Conner CP3104
46	152 MB	1224	15	17	65535	1223	Conner CP3204
User							

APPENDIX D: PROBLEM SHEET

1. Customer Data

Name
Address
Tel. No.
Fax. No.
Purchase Date

2. Mainboard Date

Model NO. GA-
Serial No.
Rev. No.

3. System Configuration

CPU Type:
CPU Brand:
CPU Speed:
DRAM Type: 1 2 4 8 16 32 MB
DRAM Speed: 80 70 60 ns
DRAM Total Size: MB
DRAM Brand:
SRAM Size: 64KB 128 KB 256 KB 512 KB
SRAM Part No. TAG: DATA:
Video Card:
Video Chip or Brand:
Floppy Drive A Capacity & Brand:
Floppy Drive B Capacity & Brand:
Storage Controller Type MFM RLL IDE EDSI SCSI
Hard Drive C Brand & Type:
Hard Drive D Brand & Type:
LAN Controller Type:
LAN Card Brand & Model:
Serial / Parallel Chip Brand & Model:
Mouse Brand & Model:
O.S. DOS OS/2 NETWARE UNIX / XENIX Ver.:

4. AUTOEXEC.BAT & CONFIG.SYS File:

5. Problem Description:

R-01-02-061030