GA - 486AM

USER'S MANUAL

PCI-Bus 486DX / DX2 / SX / S-Series / OverDrive / P24D / P24T / DX4 Mainboard

Rev. 1 First Edition

The author assumes no responsibility for any errors or omissions which may   appear in this document nor does it make a commitment to update the information contained herein.

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1 INTRODUCTION

1.1 PREFACE

Welcome to use the **GA-486AM** motherboard. The motherboard is a 128 KB - 1 MB CACHE 486DX series PC/AT compatible system with ISA bus, PCI (Peripheral Component Interconnect) bus and has been designed to be the fastest 486 PC/AT system and the GREEN FUNCTION (Power-Down Mode) had been added. There are some new features allowing 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

- 80486 based PC/AT compatible mainboard with ISA and PCI Bus.
- Supports 3 Master PCI bus slots .
- Supports 486DX / DX2 / SX / S-Series / OverDrive / P24D / P24T / DX4 running at 25 - 100 MHz.
- Supports True Green Function.
- Supports Intel, AMD, Cyrix and UMC CPU.
- Supports 237 pin (Socket 3) ZIF White socket / LIF socket on board.
- Supports 128 / 256 / 512 KB / 1 MB 2nd cache memory operated in BURST mode.
- Write-Back cache operation.
- Supports 2 - 128 MB DRAM memory on board.
- Supports 2 channels Enhance PCI IDE ports for 4 IDE Devices.
- Supports 2xCOM (16550) ports, 1xLPT (EEP / ECP) port, 1 Floppy port.
- Supports shadow RAM for BIOS & VIDEO BIOS.
- Supports shadow RAM cacheable function to improve performance.
- Supports Hardware & Software speed change function.
- Licensed AWARD BIOS.
- 2/3 Baby AT size (22 cm x 25 cm) with 4 AT slots and 3 PCI slots .

1.3 PERFORMANCE LIST

The following performance data list is the testing results with some popular benchmark testing programs. These datas are just reference for users and there is no responsibility for different testing data values gotten by users.(The different H/W & S/W configuration will result in different benchmark testing results.)

System Benchmarks At DOS Environment with IDE Controller

- CPU : 486DX4-100/75,DX2-80/66/50,DX-40/33/P24T 63
- DRAM : 32 MB / 70ns
- CACHE : 256KB
- VGA : Genoa S3/864 2MB DRAM
- H.D. : Seagate ST31220A (1GB)
- O.S. : MS DOS V6.22

- Config.sys:
  DEVICE = C:\DOS\SETVER.EXE
  DEVICE = Using Default Setting
  DEVICE = C:\DOS\HIMEM.SYS
  DOS = HIGH
  FILES = 30

- Autoexec.bat:
  C:\DOS\SMARTDRV.EXE /X
  @ECHO OFF
  PROMPT pg
  PATH C:\;C:\DOS
  SET TEMP = C:\DOS

¡ ° Using Intel DX4-100 / 75

Software	Item	Unit	P24T 63 WB	DX4-100x3	DX4-75x3	DX2-80
LandMark Speed V2.0	CPU	MHz	360.77	363.39	272.57	267.74
	FPU	MHz	1038.62	883.65	662.79	704.77
	Video	chr/ms	12288	16384	12288	12603
Norton SI V8.0	CPU	index	198.1	198.1	148.6	158.5
	DISK	index	19.3	19.3	19.3	17.0
	Overall	index	137.3	138.4	105.4	111.2
Power Meter V1.81	MIPS	Mips	28.7	29.6	22.2	23.5
	CPU/MEM Agg.	PMUs	44895.7	39237.0	29466.0	31067.3
	Data-Xfer	KB/sec	8058.5	8058.5	8058.5	8058.5
	DISK Agg.	PMUs	1183.6	1281.4	1284.5	1284.5
PC Bench mark V9.0	DOS Mark	index	593.41	605.45	494.76	485.98
	CPU mark 16	index	116.02	113.52	86.91	86.21
	Video Score	index	3350.31	4334.13	3482.11	3469.10
	DISK Score	index	391.29	393.86	345.22	334.53

Software	Item	Unit	DX2-66	DX2-50	DX-40	DX-33
LandMark Speed V2.0	CPU	MHz	223.08	167.43	133.87	111.53
	FPU	MHz	589.08	441.38	353.49	294.52
	Video	chr/ms	16384	1228	12603	16384
Norton SI V8.0	CPU	index	144.1	108.1	86.4	72.0
	DISK	index	19.4	19.3	16.8	19.3
	Overall	index	102.4	78.4	63.2	54.4
Power Meter V1.81	MIPS	Mips	21.2	15.9	13.0	10.9
	CPU/MEM Agg.	PMUs	25764.7	19428.7	15604.0	13009.0
	Data-Xfer	KB/sec	8058.5	8058.5	8058.5	8058.5
	DISK Agg.	PMUs	1284.5	1284.7	1286.2	1288.5
PC Bench mark V9.0	DOS Mark	index	478.69	384.52	336.45	304.09
	CPU mark 16	index	84.07	63.85	53.91	47.17
	Video Score	index	4309.58	3462.69	3439.79	4251.11
	DISK Score	index	319.19	272.82	244.17	220.67

1.4 BLOCK DIAGRAM
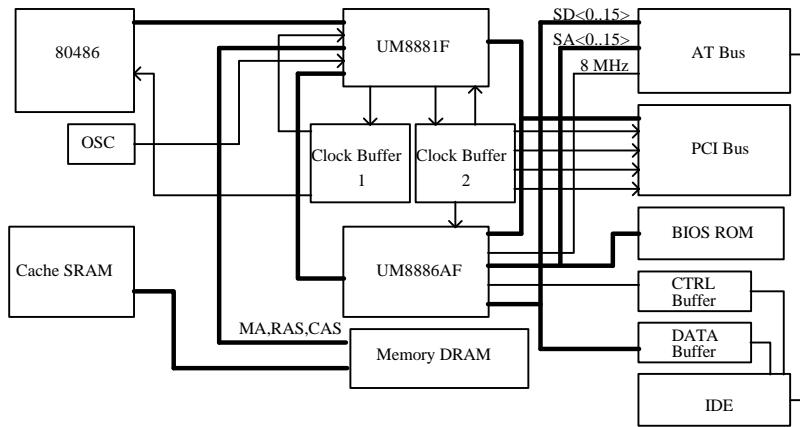
1.5 INTRODUCE THE PCI-BUS

Connecting devices to a local bus of CPU 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.

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 provide end-users with a low-cost, extendible and portable local bus design, which will allow systems and peripherals from different manufacturers to work together.

2 SPECIFICATION

2.1 HARDWARE

- CPU
  - − 80486SX/DX/DX2/S-Series, 80487SX, OverDrive, P24D, P24T, DX4.
  - − 237 pins (Socket 3) ZIF white socket / LIF socket on board.

- COPROCESSOR
  - − Coprocessor included in 80486DX.

- SPEED
  - − 25 / 33 / 40 / 50 MHz system
  - − 20-33 MHz PCI- bus speed.
  - − 8 MHz (programmable) AT Bus speed.
  - − Hardware and Software speed switchable function.

- GREEN FUNCTION
  - − Power Down Timer from 0.25 min to 512 min.
  - − When enter Power Down Mode, 8 MHz system speed for non S-Series and 0 MHz system speed for Intel & Cyrix S-Series.
  - − Ext. Power Control Port for Monitor Power ON / OFF
  - − Support IDE Hard Disk Standby Mode control.
  - − Wake Up by all IRQ, DMA, and PCI Master Devices.
  - − Support Green LED Indicator and Green Switch.

- DRAM MEMORY
  - − 2 banks 72 pins SIMM module sockets on board.
  - − Use 1 / 2 / 4 / 8 / 16 / 32 MB 70 ns SIMM module DRAM.
  - − Support Fast Page DRAM access mode.

- CACHE MEMORY
  - − 8 KB cache memory included in 80486 DX / SX / DX2 / SX2 and AMD DX4.
  - − 16 KB cache memory included in INTEL DX4.
  - − 128 / 256 / 512 KB / 1 MB 2nd cache memory on board.
  - − Support 486 Burst mode on 2nd cache memory access.

- SHADOW RAM
  - − Main BIOS shadow function programmable.
  - − Video BIOS shadow function programmable.
  - − Shadow RAM cacheable function programmable.

- IDE PORTS
  - − 2 Enhanced IDE channels on board.(Using IRQ14,15)
  - − Support Mode 3 IDE & ATAPI CD-ROM.
  - − Driver Support DOS, WINDOWS, OS/2, NT, Novell.

- I/O PORTS
  - − Supports 2 16550 COM ports. (Using IRQ4,3)
  - − Supports 1 EPP/ECP LPT port. (Using DMA3 & IRQ7)
  - − Supports Floppy port. (Using DMA2 & IRQ6)

- I/O BUS SLOTS
  - − 4 AT-bus.
  - − 3 PCI-bus.

- DIMENSION
  - − 2/3 Baby AT size (22 cm x 25 cm).

2.2 SOFTWARE

- BIOS
  - Licensed AWARD BIOS.
  - AT CMOS Setup, Advanced / Chipset Setup and Power Management included.
- O. S.
  - Operation with MS-DOS, WINDOWS NT,OS/2, NOVELL, 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.
  - 3 A to 5 A current.

3 HARDWARE INSTALLATION

3.1 UNPACKING

The ainboard ackage hould ontain he ollowing:

- The **A-486AM** ainboard

- User's manual

- A Driver Diskette

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-XT 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

≺GA-486AM≻
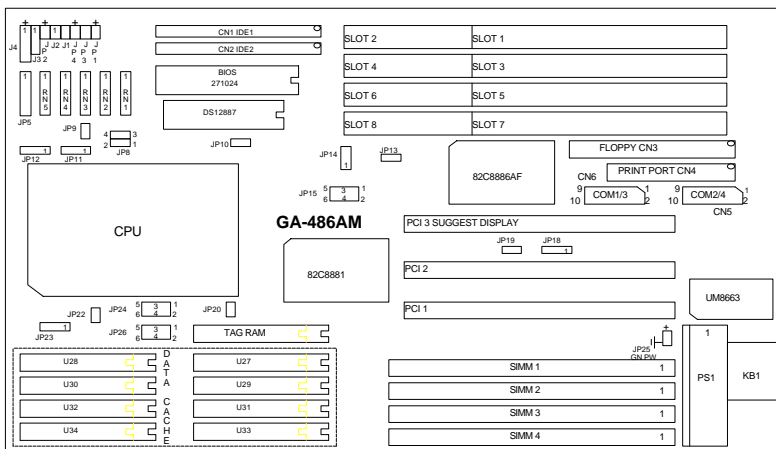
	JP15 1-2	JP15 3-4	JP15 5-6	RN1	RN2	RN3	RN4	RN5	JP5 1-2	JP5 3-4	JP5 5-6	JP5 7-8
INTEL SX-25/SX2-50	O	X	X	X	O	X	X	O	X	O	O	X
INTEL SX-25/SX2-50 S-CPU	O	X	X	X	O	X	X	O	X	O	O	X
INTEL DX-25/DX2-50	O	X	X	X	O	X	X	O	X	O	O	X
INTEL DX-25/DX2-50 S-CPU	O	X	X	X	O	X	X	O	X	O	O	X
INTEL P24T 63 WT	O	X	X	X	O	X	X	O	X	O	O	X
INTEL P24T 63 WB	O	X	X	X	O	X	X	O	X	O	O	X
INTEL DX4-75(25x3) S-CPU	O	X	X	X	O	X	X	O	X	O	O	X
INTEL SX-33/SX2-66	O	O	O	X	O	X	X	O	X	O	O	X
INTEL SX-33/SX2-66 S-CPU	O	O	O	X	O	X	X	O	X	O	O	X
INTEL DX-33/DX2-66	O	O	O	X	O	X	X	O	X	O	O	X
INTEL DX-33/DX2-66 S-CPU	O	O	O	X	O	X	X	O	X	O	O	X
INTEL P24T 83 WT	O	O	O	X	O	X	X	O	X	O	O	X
INTEL P24T 83 WB	O	O	O	X	O	X	X	O	X	O	O	X
INTEL DX-33 OVERDRIVE	O	O	O	X	O	X	X	O	X	O	O	X
INTEL DX-33 OVERDRIVE S-CPU	O	O	O	X	O	X	X	O	X	O	O	X
INTEL P24D WT S-CPU	O	O	O	X	O	X	X	O	X	O	O	X
INTEL P24D WB S-CPU	O	O	O	X	O	X	X	O	X	O	O	X
AMD Enhance DX2-66 WT	O	O	O	X	O	X	X	O	X	O	O	X
AMD Enhance DX2-66 WB	O	O	O	X	O	X	X	O	X	O	O	X
INTEL DX4-100(33X3) S-CPU	O	O	O	X	O	X	X	O	X	O	O	X
AMD Enhance DX4-100 WT	O	O	O	X	O	X	X	O	X	O	O	X
AMD Enhance DX4-100 WB	O	O	O	X	O	X	X	O	X	O	O	X
INTEL DX4-OVERDRIVE(33X3) S-CPU	O	O	O	X	O	X	X	O	X	O	O	X
INTEL DX4-100(50X2) S-CPU NOT-RECOMMEND	X	X	O	X	O	X	X	O	X	O	O	X
AMD SX-25/SX2-50	O	X	X	X	O	X	X	O	X	O	O	X
AMD DX-25/DX2-50	O	X	X	X	O	X	X	O	X	O	O	X
AMD SX-33/SX2-66	O	O	O	X	O	X	X	O	X	O	O	X
AMD DX-33/DX2-66	O	O	O	X	O	X	X	O	X	O	O	X
AMD SX-40/SX2-80	O	O	X	X	O	X	X	O	X	O	O	X
AMD DX-40/DX2-80	O	O	X	X	O	X	X	O	X	O	O	X
AMD Enhance DX2-80 WT	O	O	X	X	O	X	X	O	X	O	O	X
AMD Enhance DX2-80 WB	O	O	X	X	O	X	X	O	X	O	O	X
AMD DX4-100 (Not Enhance)	O	O	O	X	O	X	X	O	X	O	O	X
5V Cyrix SX-25/SX2-50 S-CPU	O	X	X	O	X	X	O	X	O	O	X	X
5V Cyrix DX-25/DX2-50 S-CPU	O	X	X	O	X	X	O	X	O	O	X	X
5V Cyrix SX-33/SX2-66 S-CPU	O	O	O	O	X	X	O	X	O	O	X	X
5V Cyrix DX-33/DX2-66 S-CPU	O	O	O	O	X	X	O	X	O	O	X	X
3.3 Cyrix DX2-66 S-CPU	O	O	O	O	X	X	O	X	O	O	X	X
4V Cyrix DX2-80 S-CPU	O	O	X	O	X	X	O	X	O	O	X	X
UMC SX-33 S-CPU	O	O	O	X	X	O	X	X	X	X	O	O
UMC SX-40 S-CPU	O	O	X	X	X	O	X	X	X	X	O	O

O : Jumper or Resistor installed.
X : Jumper or Resistor not installed.

	JP8 1-2	JP8 3-4	JP9	JP11 1-2	JP11 2-3	JP12 1-2	JP12 2-3	JP10	JP23 1-2	JP23 2-3	JP22	JP13	JP20
INTEL SX-25/SX2-50	O	X	O	X	O	X	O	X	O	X	X	O	O
INTEL SX-25/SX2-50 S-CPU	X	O	O	X	O	X	O	X	O	X	X	O	O
INTEL DX-25/DX2-50	O	X	O	O	X	X	O	X	O	X	X	O	O
INTEL DX-25/DX2-50 S-CPU	X	O	O	O	X	X	O	X	O	X	X	O	O
INTEL P24T 63 WT	X	O	O	O	X	X	O	X	O	X	X	O	O
INTEL P24T 63 WB	X	O	O	O	X	X	O	X	O	X	X	O	X
INTEL DX4-75(25x3) S-CPU	X	O	O	O	X	X	O	X	O	X	X	X	O
INTEL SX-33/SX2-66	O	X	O	X	O	X	O	X	O	X	X	O	O
INTEL SX-33/SX2-66 S-CPU	X	O	O	X	O	X	O	X	O	X	X	O	O
INTEL DX-33/DX2-66	O	X	O	O	X	X	O	X	O	X	X	O	O
INTEL DX-33/DX2-66 S-CPU	X	O	O	O	X	X	O	X	O	X	X	O	O
INTEL P24T 83 WT	X	O	O	O	X	X	O	X	O	X	X	O	O
INTEL P24T 83 WB	X	O	O	O	X	X	O	X	O	X	X	O	X
INTEL DX-33 OVERDRIVE	O	X	O	O	X	X	O	X	O	X	X	O	O
INTEL DX-33 OVERDRIVE S-CPU	X	O	O	O	X	X	O	X	O	X	X	O	O
INTEL P24D WT S-CPU	X	O	O	O	X	X	O	X	O	X	X	O	O
INTEL P24D WB S-CPU	X	O	O	O	X	O	X	X	O	X	X	O	O
AMD Enhance DX2-66 WT	X	O	X	O	X	X	O	X	O	X	X	O	O
AMD Enhance DX2-66 WB	X	O	X	O	X	O	X	X	O	X	X	O	O
INTEL DX4-100(33X3) S-CPU	X	O	O	O	X	X	O	X	O	X	X	X	O
AMD Enhance DX4-100 WT	X	O	X	O	X	X	O	X	O	X	X	O	O
AMD Enhance DX4-100 WB	X	O	X	O	X	O	X	X	O	X	X	O	O
INTEL DX4-OVERDRIVE(33X3) S-CPU	X	O	O	O	X	X	O	X	O	X	X	X	O
INTEL DX4-100(50X2) S-CPU NOT-RECOMMEND	X	O	O	O	X	X	O	O	O	X	X	X	O
AMD SX-25/SX2-50	O	X	X	X	O	X	O	X	O	X	X	O	O
AMD DX-25/DX2-50	O	X	X	O	X	X	O	X	O	X	X	O	O
AMD SX-33/SX2-66	O	X	X	X	O	X	O	X	O	X	X	O	O
AMD DX-33/DX2-66	O	X	X	O	X	X	O	X	O	X	X	O	O
AMD SX-40/SX2-80	O	X	X	X	O	X	O	X	O	X	X	O	O
AMD DX-40/DX2-80	O	X	X	O	X	X	O	X	O	X	X	O	O
AMD Enhance DX2-80 WT	X	O	X	O	X	X	O	X	O	X	X	O	O
AMD Enhance DX2-80 WB	X	O	X	O	X	O	X	X	O	X	X	O	O
AMD DX4-100 (Not Enhance)	O	X	X	O	X	O	X	X	O	X	X	O	O
5V Cyrix SX-25/SX2-50 S-CPU	O	X	O	X	O	X	O	X	O	X	X	O	O
5V Cyrix DX-25/DX2-50 S-CPU	O	X	O	O	X	X	O	X	O	X	X	O	O
5V Cyrix SX-33/SX2-66 S-CPU	O	X	O	X	O	X	O	X	O	X	X	O	O
5V Cyrix DX-33/DX2-66 S-CPU	O	X	O	O	X	X	O	X	O	X	X	O	O
3.3 Cyrix DX2-66 S-CPU	O	X	O	O	X	X	O	X	X	O	X	O	O
4V Cyrix DX2-80 S-CPU	O	X	O	O	X	X	O	X	X	O	O	O	O
UMC SX-33 S-CPU	O	X	X	X	O	X	O	X	O	X	X	O	O
UMC SX-40 S-CPU	O	X	X	X	O	X	O	X	O	X	X	O	O

O : Jumper or Resistor installed.
X : Jumper or Resistor not installed.

3.3 JUMPERS AND CONNECTORS SETTING

- CONNECTOR SETTING

J1: Reset Connector	
Open	Normal operation.
Close	Hardware reset system.

J2: Turbo Switch Connector	
Close	Low speed.
Open	High speed. (Default)

J3: Speaker Connector	
1	Data.
2	GND.
3	GND.
4	VCC (+5V).

J4: Power LED & Key-Lock Connector	
1	LED anode (+).
2	NC.
3	LED cathode (-).
4	Key-lock.
5	GND.

JP1: HDD LED (On board layout, "+" is LED anode)	
	Hard disk Read/Write indicator.

KB1: Keyboard Connector	
1	Keyboard clock.
2	Keyboard data.
3	NC.
4	VCC (+5V).
5	GND.

PS1: Power Supply Connector	
1	Power good signal.
2,10,11,12	VCC (+5V).
3	+12V.
4	-12V.
5,6,7,8	GND.
9	-5V.

- GREEN FUNCTION JUMPER SETTING

JP2: Turbo LED and Flash Green LED (On board layout, "+" is LED anode)	
	Normally, this jumper is for Turbo LED. But when system gets into Green mode, the LED on this jumper will light on once per second.

JP3: Brake Switch	
	Shorting this jumper and then releasing it immediately will force system

	into Green mode right away.

JP4: Green LED (On board layout, "+" is LED anode)	
	When system gets into Green, the LED on this jumper will be light.

JP25: Green Power Connector (On board layout, "+" is positive voltage)	
	If your power supply has signal to control the A.C. output, and then the signal can be connected to this connector; when system gets into Green mode, your power supply A.C. output will be turned OFF. By this way, you can control your monitor ON/OFF or other devices.

3.4 SRAM INSTALLATION AND JUMPERS SETUP

The cache memory system consists of two parts, one is TAG SRAM, the other is DATA SRAM. The TAG SRAM type used in this mainboard is 8Kx8, 16Kx8, 32Kx8 or 64Kx8 - 15ns, and the DATA SRAM type is 8Kx8-15ns, 32Kx8-15ns 64Kx8-20ns or 128Kx8-20ns.

The mainboard can be installed with 128, 256, 512 KB or 1MB cache memory when using 8Kx8 or 32Kx8 or 64Kx8 or 128Kx8 type DATA SRAM respectively.

- CACHE MEMORY SIZE SETTING

	Size	128K*	256K	256K*	512K	512K*	1M
JP24	1-2	OPN	SHT	SHT	SHT	SHT	SHT
JP24	3-4	OPN	OPN	OPN	SHT	SHT	SHT
JP24	5-6	OPN	OPN	OPN	OPN	OPN	SHT
JP26		3-5	1-3	3-5	2-4	3-5	4-6
DATA SRAM		32K8 4 pcs	32K8 8 pcs	64K8 4 pcs	64K8 8 pcs	128K8 4 pcs	128K8 8 pcs
TAG SRAM		8K8	16K8	16K8	32K8	32K8	64K8

¡¯ U28, U30, U32, U34 Installed only.

3.5 CPU INSTALLATION AND JUMPERS SETUP

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.

When the user installs the CPU on socket, please notice the PIN 1 of CPU is in the same corner as the PIN 1 of socket!

Before the CPU is installed, the mainboard must be placed on a flat plane in order to avoid being broken by the pressure of CPU installation.

- CPU CLOCK SETTING

The system speed depends on the frequency of CLOCK GENERATOR. The user can change the clock selection jumper to set up the system speed at 25, 33 ,40 or 50 MHz for different CPU speeds.

The mainboard can use 80486DX, DX2, SX, SX2 OverDrive, P24T, P24D and DX4 CPU, and 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.

Refer to the following table to set up the CPU clock:

Clock	JP15		
	1-2	3-4	5-6
25 MHz	Short	Open	Open
33 MHz	Short	Short	Short
40 MHz	Short	Short	Open
50 MHz	Open	Open	Short

- CPU BRAND SELECTION

BRAND	JP5	RN1	RN2	RN3	RN4	RN5
Intel, AMD	3-4, 5-6		Installed			Installed
Cyrix	1-2, 3-4	Installed			Installed	
UMC	5-6, 7-8			Installed		

- CPU TYPE SELECTION

JP8:	
1-2	Others.
2-3	Intel S series, AMD Enhance series.

JP9:	
Close	Others.
Open	AMD, UMC.

JP10:	
Close	Intel DX4 & AMD Enhance x 2.
Open	Intel DX4 & AMD Enhance x 3.

JP11:	
1-2	For DX CPU.
2-3	For SX CPU.

JP12:	
1-2	P24D & AMD Enhance WB, AMD DX4 x 3 (Not Enhance Type).
2-3	P24D & AMD Enhance WT, AMD DX4 x 2 (Not Enhance Type).

JP13:	
Close	Others.
Open	Intel DX4 & Intel DX4 OverDrive.

- CPU VOLTAGE SELECTION

JP22	JP23	INTEL	AMD	Cyrix	UMC
Open	1-2	3.3V, 5V	3.3V, 5V	5V	5V
Open	2-3			3.3V	
Close	2-3			4V	

JP20:	
Close	P24T WT.
Open	P24T WB.

Note: Please remember set CPU internal cache to WB in BIOS CHIPSET FEATURES SETUP, if you already set JP12 or JP20 to support WB CPU.

_____

3.6 DRAM INSTALLATION

This mainboard can be installed with 1, 2, 4, 8, 16 or 32 MB 72 pins SIMM module DRAM. The DRAM speed of both mainboard is using 60/70 ns. The banks of memory system on the mianboard includes from SIMM 1 to SIMM 4.

SIMM 1 and SIMM 2 is a group; SIMM 3 and SIMM 4 is the other group. One group DRAM size can be 2, 4, 8, 16, 32, 64 MB, please install the same DRAM size in one group. Total DRAM size is 2 MB ~ 128 MB.

The DRAM installation position refer to MAINBOARD LAYOUT, 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.

3.7 SPEAKER CONNECTOR INSTALLATION

There is always a speaker in AT system for sound purpose. The 4-Pins connector (J3) is used to connect speaker. The speaker can work well in both direction of connector when it is installed to the connector (J3) on mainboard.

3.8 POWER LED & KEY LOCK CONNECTOR INSTALLATION

There are a system power LED lamp and a key on the panel of case. The power LED will light on when system is powered-on, and the key can lock the keyboard input or unlock it, both of them are connected to a 5 PIN connector. The connector should   be installed to J4 of mainboard in correct direction.

3.9 TURBO SWITCH CONNECTOR INSTALLATION

The TURBO switch on the panel is used for controlling the system speed. Some program developed on XT should be executed with a low speed system, so a high speed system needs the speed switching function to change its running speed.

Because a 80486 CPU cannot accept the real clock speed change when program is executed, so the mainboard uses cache-enable or disable function to simulate TURBO switching function. The J2 on mainboard should be connected to the TURBO switch on panel, and user can push in or pop out the TURBO switch to enable or disable the cache function of system.

3.10 TURBO LED FLASH GREEN LED CONNECTOR
INSTALLATION

The TURBO LED on panel can indicate the current speed status of system. The TURBO LED connector should be installed to JP2 in correct direction. Normally, the JP2 is a TURBO LED connector. But when system gets into Green mode, the LED on JP2 will light on once per second.

_____

3.11 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 at once. The Reset switch is a 2 PIN connector and should be installed to J1 on mainboard.

3.12 GREEN FUNCTION INSTALLATION

For the purpose of power saving, there are two jumpers, JP4 and JP3, to make sure the power saving function doing well. The JP4 is a indicator (Green LED) for Green function. If the green LED is ON, the system is operating in green mode. The JP3 is a switch to force the system into Green mode immediately.

3.13 PERIPHERAL DEVICE INSTALLATION

If a PCI-bus device is to be installed in the system, any one of three PCI-bus slots can be used no matter what Slave or Master PCI-bus device being installed.

After the peripheral device installed, the user should check everything again, and prepare to power-on the system. Now, the mainboard can be mounted into the case and fixed with screws.

3.14 SOME IMPORTANT APPLICATION NOTES

For compatibility, there are some special application notes the users should know.

Note 1: (AHA 2940 or AHA 3940 or BT 946C PCI SCSI) AND (S3 928 or WD 90C33 PCI Display)
Please put PCI SCSI CARD in PCI slot1 & PCI Display CARD in PCI slot3 & set Jumper JP14 2-3 short Jumper JP19 open.

Note 2: (Future Domain or NCR 810 or AHA 3940 PCI SCSI) AND (ET 4000/W32P or S3 864 or S3 964 PCI Display)
Please put PCI SCSI Display CARD in PCI slot1 or slot2 & PCI Display CARD in PCI slot3 & set Jumper JP18 1-2 short.

Note 3: In order to configure BT 946C PCI SCSI, Please put BT 946C in PCI slot3 & set Jumper JP18 1-2 short. After configuration, you may put BT 946C in any one of the PCI slots.

Otherwise, Please keep JP14 pin 1-2 short, JP19 close, JP18 pin 2-3 short.

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 <Del> 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 <Del> 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<Del> 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

4.3.1Main Menu

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

4.3.2Status 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 highlight 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 1) will appear on the screen. The Main Menu allows you to select from nine setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

¡ Figure 1¡ j

ROM PCI/ISA BIOS (2A4X5G03)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	LOAD SETUP DEFAULTS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	SAVE & EXIT SETUP
PCI/GREEN FUNCTION SETUP	EXIT WITHOUT SAVING
LOAD BIOS DEFAULTS	

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

Time, Date, Hard Disk Type, ...

- 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 item of power management features.

- PCI/GREEN Function Setup

  This setup page includes all the configurations of PCI slots parameters and Wake up events.

- Load BIOS Defaults

  BIOS defaults indicates the most appropriate value of the system parameter which the system would be on more safety operation.

- Load SETUP Defaults

  SETUP defaults indicate the most appropriate value of the system parameter which the system would be in maximum performance.

- Password setting

  Change, set, or disable password. It allows you to limit access to the system and Setup, or just to Setup.

- IDE HDD auto detection

  Automatically configure hard disk parameter.

- 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 2) are divided into 11 categories. Each category includes none, 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.

¡ Figure 2¡ j

```
                    ROM PCI/ ISA BIOS ( 2A4X5G03 )
                        STANDARD CMOS SETUP
                        AWARD SOFTWARE, INC.
```

Date (mm:dd:yy)   : Fri,   Feb   11   1995
Time (hh:mm:ss)   : 16 : 12 : 00

HARD DISKS	TYPE	SIZE	CYLS	HEADS	PRECOMP	LANDZ	SECTORS	MODE
Primary Master	: User	52MB	1024	16	65535	1023	63	NORMAL
Primary Slave	: None	0 MB	0	0	0	0	0	-------------
Second Master	: None	0	0	0	0	0	0	-------------
Second Slave	: None	0	0	0	0	0	0	-------------

Drive A   : 1.44 M, 3.5 in.
Drive B   : 1.2 M, 5.25 in.

Video   : EGA/VGA
Halt On   : No Errors

Base Memory:	640 K
Extended Memory:	31744 K
Other Memory:	384 K
Total Memory:	32768 K

ESC : Quit   ↑ ↓ → ←: Select Item   PU/PD/+/-   : Modify

F1   : Help   (Shift)F2   : Change Color

- **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.
yea	The year, from 1900 through 2099

r	

- **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 Master / Slave, Secondary Master / Salve

The category identify the types of hard disk drive C or drive F 4 devices that has been installed in the computer. There are 46 pre-defined types and a user definable type. Type 1 to Type 46 are pre-defined. Type User is user-definable.

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 precom
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 double-sided drive; 360 kilobyte capacity
1.2M, 5.25 in.	5-1/4 inch AT-type double-sided and high-density drive; 1.2 megabyte capacity
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 and high-density drive; 1.44 megabyte capacity
2.88M, 3.5 in.	3-1/2 inch double-sided drive; 2.88 megabyte capacity

- 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.

All errors	Whenever the BIOS detects a non-fatal error the system will be stopped and you will be prompted
No errors	The system boot will not stop for any error that may be detected
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 presented 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 64KB, the Expanded Memory Specification (EMS) swaps memory which is not utilized by DOS with a section, or frame, so these applications can access to all of the system memory. Memory can be swapped by EMS is usually 64KB within 1 MB or memory above 1 MB, depending 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 640KB to 1024KB address space. This is the 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 (2A4X5G03)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Security Option	: Setup	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	: Off		
IDE HDD Block Mode	: Disabled		
IDE 32-bit Transfer Mode	: Disabled		
IDE PIO Mode 3 Support	: Disabled		
IDE Second Channel Control	: Enabled		

ESC : Quit   ↑ ↓ → ← : Select Item
F1   : Help   PU/PD/+/-   : Modify
F5   : Old Values   (Shift)F2   : Color
F6   : Load BIOS Defaults
F7   : Load Setup Defaults

- Security Option

  The default value is Setup.

Setup	Asking password when enter CMOS Setup.
System	Asking password when enter CMOS Setup and boot system.

- 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 and causes a warning message to appear when anything attempts to access to the boot sector or hard disk partition table.
Disabled	No warning message to appear when anything attempts to access to 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.
Disabled	Disable cache.

- 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 and then hard disk drive.
C,A	System will first search for hard disk drive and 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 type is 40 tracks while 720,1.2 and 1.44 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 cannot tell from 720, 1.2 or 1.44 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 driver installed is 360.

- Boot Up NumLock Status

  The default value is Off.

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

- IDE HDD Block Mode

  The default value is Disabled.

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

- IDE 32-bit Transfer Mode

  The default value is Disabled.

Enabled	Enable IDE 32-bit Transfer Mode.
Disabled	Disable IDE 32-bit Transfer Mode.

- IDE PIO Mode 3 Support

  The default value is Disabled.

Enabled	Enable IDE PIO Mode 3 Support.
Disabled	Disable IDE PIO Mode 3 Support.

- IDE Second Channel Control

    The default value is Enabled.

Enabled	Enable IDE Second Channel.
Disabled	Disable IDE Second Channel.

- Video BIOS Shadow

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

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 16K 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 (2A4X5G03)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	CPU-to-PCI Post Write	: 1 WS
AT Bus Clock	: PCICLK/4	CPU-to-PCI Burst Write	: Enabled
DRAM Read Wait States	: 1 WS	Enhance PCI performance	: Enabled
DRAM Write Wait States	: 1 WS	CPU Clock / PCI Clock	: 1 : 1
Cache Burst Read	: 2-1-1-1	Onboard FDD Controller	: Enabled
Internal Cache WB/WT	: Write Thru	Onboard Parallel Mode	: SPP Mode
External Cache WB/WT	: Write Back	Onboard Parallel Port	: 378H
System BIOS Cacheable	: Enabled	Onboard Serial Port1	: COM1
Video BIOS Cacheable	: Enabled	Onboard Serial Port2	: COM2
Memory Hole Size	: None		
I/O Recovery Time	: 1 WS		
Ext-Cache with Dirty Bit	: Yes		
Slow Refresh (1/4 Freq)	: Enabled		
PCI Posted Memory Write	: Enabled		

ESC : Quit   ↑ ↓ → ←   : Select Item
F1   : Help   PU/PD/+/-   : Modify
F5   : Old Values   (Shift)F2   : Color
F6   : Load BIOS Defaults
F7   : Load Setup Defaults

- Auto Configuration

  The default value is Enabled.

Enabled	To Enable auto configuration function.
Disabled	To Disable auto configuration function.

- AT Bus Clock

  The default value is PCICLK/4.

PCICLK/2	For 40 MHz system.
PCICLK/3	For 25 MHz system.
PCICLK/4	For 33 MHz system.

- DRAM Read Wait States

  The default value is 1 WS.

0WS	For 25 MHz system.
1WS	For 33 MHz system.
2WS	For 40 MHz system.
3WS	

- DRAM Write Wait States

  The default value is 1 WS.

0WS	For 25 MHz system.
1WS	For 33 MHz system.
2WS	For 40 MHz system.
3WS	

- Cache Burst Read

  Cache Burst Read cycle can be set to 2-1-1-1 or 2-2-2-2 or 3-1-1-1 or 3-2-2-2.

  The default value is 2-1-1-1.

- Internal Cache WB / WT

  The default value is Write Through.

Write Thru	Using write through for the configuration of CPU internal cache.
Write Back	Using write back for the configuration of CPU internal cache.

- External Cache WB / WT

  The default value is Write Back.

Write Thru	Using write through for the configuration of external cache.
Write Back	Using write back for the configuration of external cache.

- System BIOS Cacheable

  The default value is Cacheable.

Cacheable	Cache and Shadow system BIOS.
Non-cacheable	Shadow system BIOS only.

- Video BIOS Cacheable

  The default value is Cacheable.

Cacheable	Cache and Shadow video BIOS.
Non-cacheable	Shadow video BIOS only.

- Memory Hole Size

  The default value is None.

None	System doesn't assign any memory below 16 MB to AT Bus.
64K	System assign 64 KB memory size below 16 MB to AT Bus.
128K	System assign 128 KB memory size below 16 MB to AT Bus.
256K	System assign 256 KB memory size below 16 MB to AT Bus.
512K	System assign 512 KB memory size below 16 MB to AT Bus.
1MB	System assign 1 MB memory size below 16 MB to AT Bus.
2MB	System assign 2 MB memory size below 16 MB to AT Bus.
4MB	System assign 4 MB memory size below 16 MB to AT Bus.
8MB	System assign 8 MB memory size below 16 MB to AT Bus.

- I/O Recover Time

  The default value is 1 WS.

1W	For 33MHz,40 MHz or 50 MHz system.
0W	For 25 MHz system.

- Ext-Cache with Dirty Bit

  The default value is Yes.

Yes	Second Cache with Dirty Bit.
No	Second Cache without Dirty Bit.

- Slow Refresh (1/4 Freq)

  The default value is Enabled.

Enabled	Refresh memory per 60£ g.
Disabled	Refresh memory per 15£ g.

- PCI Posted Memory Write

  The default value is Enabled.

Enabled	Enable PCI posted memory write.
Disabled	Disable PCI posted memory write.

- CPU-to-PCI Post Write

  The default value is 1 WS.

1W	For 33MHz,40 MHz or 50 MHz system.
0W	For 25 MHz system.

- CPU-to-PCI Burst Write

  The default value is Enabled.

Enabled	Enable CPU-to -PCI Burst Write.
Disabled	Disable CPU-to -PCI Burst Write.

- Enhance PCI performance

  The default value is Enabled.

Enabled	Enable Enhance PCI performance.
Disabled	Disable Enhance PCI performance.

- CPU Clock / PCI Clock

  The default value is 1 : 1.

1 1	:	For 25 MHz or 33 MHz system.
1 1/2	:	For 40 MHz or 50 MHz system.

- Onboard FDD Controller

  The default value is Enabled.

Enabled	Enable Onboard FDD Controller.
Disabled	Disable Onboard FDD Controller.

- Onboard Parallel Mode

  The defaults value is SPP .

Disabled	Disable onboard LPT port.
SPP Mode	Using Parallel port as Standard Printer port.
EPP Mode	Using Parallel port as Enhanced Parallel port.
ECP Mode	Using Parallel port as Extended Capabilities port.

- Onboard Parallel Port

  The defaults value is 378H.

378H	Enable onboard LPT port and address is 378H.
278H	Enable onboard LPT port and address is 278H.
NONE	Disable onboard LPT port.

- Onboard Serial Port1

  The defaults value is COM1.

COM1	Enable onboard Serial port1 and address is 3F8H.
COM3	Enable onboard Serial port1 and address is 3E8H.
NONE	Disable onboard Serial port1.

- Onboard Serial Port2

  The defaults value is COM2.

COM2	Enable onboard Serial port2 and address is 2F8H.
COM4	Enable onboard Serial port2 and address is 2E8H.
NONE	Disable onboard Serial port2.

4.8 POWER MANAGEMENT SETUP

ROM PCI/ISA BIOS (2A4X5G03)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

```
Green Function            : Enable          *Monitor Event In Full On Mode
Green Timer               : 2 Min           Monitor PCI1 Master Card        : Enabled
VGA Adaptor Type          : Non-Green       Monitor PCI2 Master Card        : Enabled
HDD Power Down            : Disable         Monitor PCI3 Master Card        : Enabled
Network Card Instlalled   : No              Monitor Video Action            : Enabled
PM Control By APM         : Disabled        Monitor I/O port                : 300h-33Fh
Non-S CPU PMI IRQ         : IRQ10



                                            ESC : Quit        ↑ ↓ → ←  : Select Item
                                            F1   : Help       PU/PD/+/-      : Modify
                                            F5   : Old Values  (Shift)F2     : Color
                                            F6   : Load BIOS Defaults
                                            F7   : Load Setup Defaults
```

- Green Function

The default value is Enable.

Enable	Enable Green function.
Disable	Disable Green function.

¡ **Please disable Green Function for Non-S CPU   in OS/2, Unix, Window NT & Novell system. (For example AMD not Enhance CPU.)**

- Green Timer

The default value is 2 minute.

0.25 min - 512 min	Enable System's Green Timer function between 0.25 minute to 512 minute.

- VGA Adaptor Type

This category can be accessed while S-Series CPU installed.

The default value is Non-Green.

Green	BIOS will turn off H-SYNC & V-SYNC when gets into Green mode for Green monitor power saving.
Non-Green	BIOS will only black monitor when gets into Green mode.

- HDD Power Down

  The default value is Disabled.

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

- Network Card Installed

  The default value is NO.

YES	Network Card Installed.
NO	Network Card not Installed.

  If you set "Network Card Installed" to "Yes", the JP4 Green LED will not be light when system get into Green mode.

- PM Control By APM

  The default value is Disabled.

Enabled	BIOS will combine DOS 6.2 (power.exe) & Windows 3.1 (DOS with APM) to get into Green mode.
Disabled	BIOS will not combine DOS 6.2 (power.exe) & Windows 3.1 (DOS with APM) to get into Green mode.

- Non-S CPU PMI IRQ

  The default value is IRQ10.

IRQ10	use IRQ10 to close monitor in DOS system only.

  ¡ This option is for Non-S CPU only. (AMD not Enhance) If you use S CPU, you will not see this option.

- Monitor PCI1-3 Master Card.

  The system gets into green mode or not depending on the status of PCI1-3 Master Card, Video Action. The default value is Enabled.

Enabled	System will not get into green mode when PCI1-3 Master Card, Video Action is active.
Disabled	System will get into green mode no matter what PCI1-3 Master Card, Video Action is active or not.

- Monitor I/O port

  System will not get into green mode when I/O port is active.

  The default value is 300h ~ 33Fh.

  I/O port include: 100h ~ 13Fh, 140h ~ 17Fh
  180h ~ 1BFh, 1C0h ~ 1FFh
  200h ~ 23Fh, 240h ~ 27Fh
  280h ~ 2BFh, 2C0h ~ 2FFh
  300h ~ 33Fh, 340h ~ 37Fh
  380h ~ 3BFh, 3C0h ~ 3FFh
  Disabled

4.9 PCI /GREEN FUNCTION SETUP

ROM PCI/ISA BIOS (2A4X5G03)
PCI / GREEN FUNCTION SETUP
AWARD SOFTWARE, INC.

Slot 1 Using INT#	: AUTO	*WakeUp Event In Inactive Mode:	
Slot 2 Using INT#	: AUTO	Monitor IRQ3	: Enabled
Slot 3 Using INT#	: AUTO	Monitor IRQ5	: Disabled
GA-410 Using INTA IN	: SLOT1	Monitor IRQ7	: Disabled
1st Available IRQ	: 11	Monitor IRQ9	: Disabled
2nd Available IRQ	: 12	Monitor IRQ10	: Disabled
3rd Available IRQ	: 9	Monitor IRQ12	: Disabled
4th Available IRQ	: 10		
PCI IRQ Actived By	: Edge		
Onboard PCI IDE	: Enabled		

ESC : Quit   ↑ ↓ → ←   : Select Item
F1   : Help   PU/PD/+/-   : Modify
F5   : Old Values   (Shift)F2   : Color
F6   : Load BIOS Defaults
F7   : Load Setup Defaults

- SLOT 1~3 Using INT#

    The default value is AUTO.

AUTO	The BIOS auto detect the PCI device using INTA ~ D and auto set up a available IRQ to let device use.
A ~ D	For some not PCI specification compliant device, the user must set up IRQ manually.

- GA-410 Using INTA IN

    The default value SLOT1.

    The GA-410 NCR 810 PCI SCSI card has a Jumper to select the card to be Primary or Secondary card. If the card is been set up to Primary then the user must set up the selection correctly (and the INT#A must be used). If the card is been set up to Secondary then the user only set up the above selections.

- Available IRQ

    The default value is shown on the above table.

    These available IRQs are Mapped to be PCI INT# by BIOS for PCI device automatically. If some one IRQ is used by ISA device then the user must keep the IRQ out of the available table.

- PCI IRQ Actived By

  The default value is Edge.

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

- Onboard PCI / IDE

  The default value is Enable.

Enabled	Enable onboard PCI IDE Function.
Disabled	Disable onboard PCI IDE Function.

- PCI IDE IRQ Map To

  You will see this option if you Disable Onboard PCI/IDE.
  The default value is ISA.

ISA	Map PCI IDE IRQ to ISA slot.
PCI-SLOT1	Map PCI IDE IRQ to PCI slot1.
PCI-SLOT2	Map PCI IDE IRQ to PCI slot2.
PCI-SLOT3	Map PCI IDE IRQ to PCI slot3.
PCI-AUTO	Map PCI IDE IRQ to PCI slot automatically.

- Primary / Secondary IDE INT#

  You will see this option if you set PCI IDE   IRQ MAP TO PCI-slot1, PCI-slot2, PCI-slot3 or PCI-AUTO.
  Set INT# for Primary / Secondary PCI IDE. The Default value is A / B.

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.

- Monitor IRQ3

  The default value is Enabled.

Enabled	System will wake up when IRQ3.
Disabled	System will not wake up no matter what IRQ3.

- Monitor IRQ5,7,9,10,12

  The default value is Disabled.

Enabled	System will wake up when IRQ5,7,9,10,12 acting.
Disabled	System will not wake up no matter what IRQ5,7,9,10,12 acting.

4.10 LOAD BIOS DEFAULTS

ROM PCI/ISA BIOS (2A4X5G03)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│     STANDARD CMOS SETUP              LOAD SETUP DEFAULTS           │
│                                                                   │
│     BIOS FEATURES SETUP              PASSWORD SETTING              │
│                                                                   │
│     CHIPSET FEATURES SETUP           IDE HDD AUTO DETECTION        │
│                    ┌─────────────────────────────────┐            │
│     POWER MANAGEMEN│   Load BIOS Defaults (Y/N)? N   │UP          │
│                    │                                 │            │
│     PCI / GREEN FUNCTIO└─────────────────────────────┘VING        │
│                                                                   │
│     LOAD BIOS DEFAULTS                                            │
│                                                                   │
├─────────────────────────────────────────────────────────────────┤
│ ESC   : Quit              ↑ ↓ → ←    : Select Item               │
│ F10   : Save & Exit Setup    (Shift)F2    : Change Color          │
├─────────────────────────────────────────────────────────────────┤
│            Load SETUP Defaults except Standard CMOS SETUP         │
└─────────────────────────────────────────────────────────────────┘
```

• Load BIOS Defaults

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

4.11 LOAD SETUP DEFAULTS

ROM PCI/ISA BIOS (2A4X5G03)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

```
STANDARD CMOS SETUP            LOAD SETUP DEFAULTS

BIOS FEATURES SETUP            PASSWORD SETTING

CHIPSET FEATURES SETUP         IDE HDD AUTO DETECTION

POWER MANAGEMEN    Load SETUP Defaults (Y/N)? N    UP

PCI / GREEN FUNCTIO                             VING

LOAD BIOS DEFAULTS
```

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

Load SETUP Defaults except Standard CMOS SETUP

- Load Setup Defaults

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

4.12 PASSWORD SETTING

PASSWORD SETTING

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

```
                    ROM PCI/ISA BIOS ( 2A4X5G03 )
                         CMOS SETUP UTILITY
                        AWARD SOFTWARE, INC.
```

STANDARD CMOS SETUP	LOAD SETUP DEFAULTS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMEN Enter Password: UP	
PCI / GREEN FUNCTIO	T SAVING
LOAD BIPS DEFAULTS	

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

Change / Set / Disabled Password

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

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

PASSWORD DISABLED

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.

4.13IDE HDD AUTO DETECTION

ROM PCI/ ISA BIOS (2A4X5G03)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

HARD DISKS	TYPE	SIZE	CYLS	HEADS	PRECOMP	LANDZ	SECTOR	MODE
Primary Master:								

Select Primary Master Option (N:Skip): N

OPTIONS	SIZE	CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
2(Y)	1081	524	64	0	2098	63	LAB
1	1082	2099	16	65535	2098	63	NORMAL
3	1083	1049	32	65535	2098	63	LARGE

ESC : Skip

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 LARGE than 528 MB.

4.14SAVE & EXIT SETUP

```
                    ROM PCI/ISA BIOS ( 2A4X5G03 )
                        CMOS SETUP UTILITY
                        AWARD SOFTWARE, INC.
```

```
┌──────────────────────────────────────────────────────────────────┐
│                                                                    │
│   STANDARD CMOS SETUP            LOAD SETUP DEFAULTS                │
│                                                                    │
│   BIOS FEATURES SETUP            PASSWORD SETTING                   │
│                                                                    │
│   CHIPSET FEATURES SETUP         IDE HDD AUTO DETECTION             │
│                       ┌──────────────────────────────┐             │
│   POWER MANAGEMEN      │   SAVE to CMOS and EXIT (Y/N)? N   │  UP    │
│                       │                              │             │
│   PCI / GREEN FUNCTIO  └──────────────────────────────┘  G         │
│                                                                    │
│   LOAD BIOS DEFAULTS                                                │
│                                                                    │
├──────────────────────────────────────────────────────────────────┤
│  ESC  : Quit              ↑ ↓ → ←  : Select Item                   │
│  F10  : Save & Exit Setup    (Shift)F2    : Change Color           │
├──────────────────────────────────────────────────────────────────┤
│                  Save Data CMOS & 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.

4.15 EXIT WITHOUT SAVING

ROM PCI/ISA BIOS (2A4X5G03)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│   STANDARD CMOS SETUP            LOAD SETUP DEFAULTS               │
│                                                                   │
│   BIOS FEATURES SETUP            PASSWORD SETTING                  │
│                                                                   │
│   CHIPSET FEATURES SETUP         IDE HDD AUTO DETECTION            │
│                                                                   │
│   POWER MANAGEMEN ┌──────────────────────────────┐  UP            │
│                   │  Quit Without Saving (Y/N) N  │               │
│   PCI / GREEN FUNCTIO └──────────────────────────┘  G             │
│                                                                   │
│   LOAD BIOS DEFAULTS                                              │
│                                                                   │
├───────────────────────────────────────────────────────────────────┤
│  ESC  : Quit             ↑ ↓ → ←  : Select Item                   │
│  F10  : Save & Exit Setup    (Shift)F2  : Change Color            │
├───────────────────────────────────────────────────────────────────┤
│              Abandom all Dats & Eixt SETUP                        │
└───────────────────────────────────────────────────────────────────┘
```

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

4.16 KEYBOARD SETTING FUNCTION

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

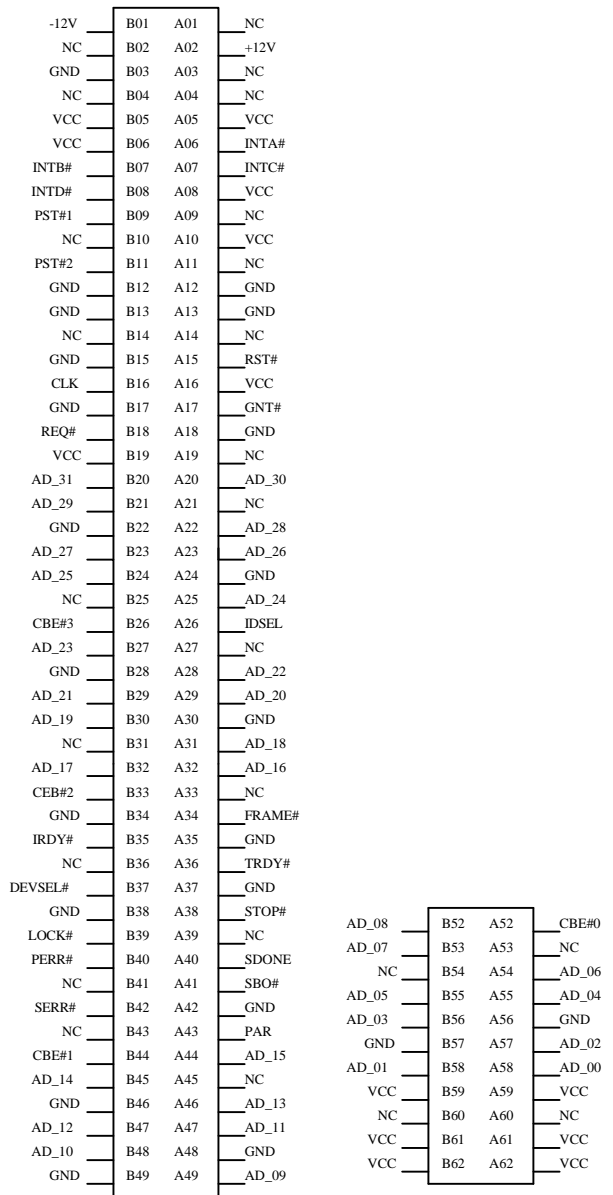|	
"CTRL_ALT_DEL"	Pressing these keys simultaneously will cause system a WARM START (Soft Reset).
"CTRL_ALT_[+]"	If J2 open, pressing these keys simultaneously will change the system speed to high speed (TURBO, all cache memory enabled).
"CTRL_ALT_[-]"	If J2 open, pressing these keys simultaneously will change the system speed to low speed (Normal, disable cache memory).

5   AT TECHNICAL INFORMATION

5.1 BUS CONNECTOR PIN OUT

5.1.1 ISA BUS 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

5.1.2 PCI BUS SLOT PIN OUT

B		A	
-12V	B01	A01	NC
NC	B02	A02	+12V
GND	B03	A03	NC
NC	B04	A04	NC
VCC	B05	A05	VCC
VCC	B06	A06	INTA#
INTB#	B07	A07	INTC#
INTD#	B08	A08	VCC
PST#1	B09	A09	NC
NC	B10	A10	VCC
PST#2	B11	A11	NC
GND	B12	A12	GND
GND	B13	A13	GND
NC	B14	A14	NC
GND	B15	A15	RST#
CLK	B16	A16	VCC
GND	B17	A17	GNT#
REQ#	B18	A18	GND
VCC	B19	A19	NC
AD_31	B20	A20	AD_30
AD_29	B21	A21	NC
GND	B22	A22	AD_28
AD_27	B23	A23	AD_26
AD_25	B24	A24	GND
NC	B25	A25	AD_24
CBE#3	B26	A26	IDSEL
AD_23	B27	A27	NC
GND	B28	A28	AD_22
AD_21	B29	A29	AD_20
AD_19	B30	A30	GND
NC	B31	A31	AD_18
AD_17	B32	A32	AD_16
CEB#2	B33	A33	NC
GND	B34	A34	FRAME#
IRDY#	B35	A35	GND
NC	B36	A36	TRDY#
DEVSEL#	B37	A37	GND
GND	B38	A38	STOP#
LOCK#	B39	A39	NC
PERR#	B40	A40	SDONE
NC	B41	A41	SBO#
SERR#	B42	A42	GND
NC	B43	A43	PAR
CBE#1	B44	A44	AD_15
AD_14	B45	A45	NC
GND	B46	A46	AD_13
AD_12	B47	A47	AD_11
AD_10	B48	A48	GND
GND	B49	A49	AD_09

B		A	
AD_08	B52	A52	CBE#0
AD_07	B53	A53	NC
NC	B54	A54	AD_06
AD_05	B55	A55	AD_04
AD_03	B56	A56	GND
GND	B57	A57	AD_02
AD_01	B58	A58	AD_00
VCC	B59	A59	VCC
NC	B60	A60	NC
VCC	B61	A61	VCC
VCC	B62	A62	VCC

5.2 I/O & MEMORY MAP

MEMORY MAP: [0000000-009FFFF]   System memory used by DOS and application program.

[00A0000-00BFFFF]   Display buffer memory for VGA/EGA/CGA/MONOCHROME adapter.

[00C0000-00DFFFF]   Reserved   for I/O device BIOS ROM or RAM buffer.

[00E0000-00EFFFF]   Reserved for PCI device ROM.

[00F0000-00FFFFF]   System BIOS ROM.

[0100000-BFFFFFF]   System extension memory.

I/O MAP: [000-01F]   DMA controller.(Master)
INTERRUPT controller.(Master)
CHIPSET control registers I/O ports.

[040-05F]	TIMER control registers.
[060-06F]	KEYBOARD interface controller.(8042)
[070-07F]	RTC ports & CMOS I/O ports.
[080-09F]	DMA register.
[0A0-0BF]	INTERRUPT controller.(Slave)
[0C0-0DF]	DMA controller.(Slave)
[0F0-0FF]	MATH COPROCESSOR
[1F0-1F8]	HARD DISK controller.
[278-27F]	PARALLEL port-2.
[2B0-2DF]	GRAPHICS adapter controller.
[2F8-2FF]	SERIAL port-2.
[360-36F]	NETWORK ports.
[378-37F]	PARALLEL port-1
[3B0-3BF]	MONOCHROME & 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):	System TIMER interrupt from TIMER-0
	KEYBOARD output buffer full
	Cascade for IRQ 8-15
	SERIAL port 2
	SERIAL port 1
	PARALLEL port 2
	FLOPPY DISK adapter
	PARALLEL port 1
	RTC clock
	Available
	Available
	Available
	Available
	MATH coprocessor
	HARD DISK adapter
	Available

5.5 RTC & CMOS RAM MAP

RTC & CMOS:		Seconds
		Second alarm
		Minutes
		Minutes alarm
		Hours
		Hours alarm
		Day of week
		Day of month
		Month
		Year
	0A	Status register A
	0B	Status register B
	0C	Status register C
	0D	Status register D
	0E	Diagnostic status byte
	0F	Shutdown byte
		FLOPPY DISK drive type byte
		Reserve
		HARD DISK type byte
		Reserve
		Equipment byte
		Base memory low byte
		Base memory high byte
		Extension memory low byte
		Extension memory high byte
	19-2d	
	2E-2F	
		Reserved for extension memory low byte
		Reserved for extension memory high byte
		DATE CENTURY byte
		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 been corrupted. This error may have been caused by a weak battery. Check the battery and replace it 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.

⊠ 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 is no floppy drive installed, be sure the Diskette Drive selection in Setup is set to NONE.

⊠ 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 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 ...

Indicate an error verifying a value already written to memory. Use the location along with your system 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 with 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 with 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 will the NMI enabled.

⊠ 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.

APPENDIX B: POST CODES

☞ 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.
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 alternative turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternative 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	
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.
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 protest 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	
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	Write/ Precomp	Land Zone	Sectors
1	10	306	4	128	305	17
2	21	615	4	300	615	17
3	32	615	6	300	615	17
4	65	940	8	512	940	17
5	49	940	6	512	940	17
6	21	615	4	65535	615	17
7	32	462	8	256	511	17
8	31	733	5	65535	733	17
9	117	900	15	65535	901	17
10	21	820	3	65535	820	17
11	37	855	5	65535	855	17
12	52	855	7	65535	855	17
13	21	306	8	128	319	17
14	44	733	7	65535	733	17
16	21	612	4	0	663	17
17	42	977	5	300	977	17
18	59	977	7	65535	977	17
19	62	1024	7	512	1023	17
20	31	733	5	300	732	17
21	44	733	7	300	732	17
22	31	733	5	300	732	17
23	10	306	4	0	336	17
24	42	977	5	65535	976	17
25	80	1024	9	65535	1023	17
26	74	1224	7	65535	1223	17
27	117	1224	11	65535	1223	17
28	159	1224	15	65535	1223	17
29	71	1024	8	65535	1023	17
30	98	1024	11	65535	1023	17
31	87	918	11	65535	1023	17
32	72	925	9	65535	926	17
33	89	1024	10	65535	1023	17
34	106	1024	12	65535	1023	17
35	115	1024	13	65535	1023	17
36	124	1024	14	65535	1023	17
37	17	1024	2	65535	1023	17
38	142	1024	16	65535	1023	17
39	119	918	15	65535	1023	17
40	42	820	6	65535	820	17
41	44	1024	5	65535	1023	17
42	68	1024	5	65535	1023	17
43	42	809	6	65535	852	17
44	64	809	6	65535	852	26
45	104	776	8	65535	775	33
User						

APPENDIX D: PROBLEM SHEET

1. Customer Data

Name   Tel. No.

Address   Fax. No.

                                                  Purchase Date

2. Mainboard Date

Model NO.   GA-   Rev. No.

Serial 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	❑ 1 MB

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: