GA - 486IM

USER'S MANUAL

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

Rev. 2A Second Edition A

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�֎All of the items or discription regarding VL-BUS in this manual don't support those motherboards without VL-BUS slots.

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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1INTRODUCTION

1.1 PREFACE

Welcome to use the GA-486IM motherboard. The motherboard is a 128 KB - 512 KB CACHE 486DX PC/AT compatible system with ISA bus, PCI (Peripheral Component Interconnect) bus and VL (VESA Local) bus and it 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, PCI and VL-Bus.

➢ 4 Master PCI bus slots and 2 Master VL bus slots.

➢ Supports 486DX / DX2 / SX / S-Series / OverDrive / P24T /P24D / 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 2nd cache memory operated in BURST mode.

➢ Write-Back cache operation.

➢ Supports 2 - 128 MB DRAM memory on board.

➢ 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, 4 PCI slots and 2 VL slots.

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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 by 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.)

CPU   486DX4-100, DX4-75, DX2-80/66/50, DX-40/33.
DRAM   32 MB - 70 ns.
CACHE   256 KB
DISPLAY   S3 86C864 PCI bus VGA.
IDE   GA-107
O. S.   MS-DOS 6.2

Software	Ver	Item	Unit	DX4-100x3	DX4-75x3	DX2-80
LandMark	1.14	CPU	MHz	200+	200+	200+
LandMark	2.0	CPU	MHz	363.20	272.38	267.64
		FPU	MHz	854.43	640.04	682.23
SI	7.0	CPU		198.0	148.5	158.4
Benchmark	8.0	Processor		57.79	43.10	45.20
PM	1.7	Mips	Mips	39.0	29.1	31.9
		Dhrystone	K-Dstone/s	50.0	37.3	41.0
		Whetstone	K-Wstone/s	10094.1	7570.6	7994.5
Byte	2.1	CPU	AT Class	16.99	10.32	12.21
			Class	6.19	3.60	4.43
		FPU	AT Class	103.87	76.91	79.13
			Class	14.53	10.76	11.07

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Software	Ver	Item	Unit	DX2-66	DX2-50	DX-40	DX-33
LandMark	1.14	CPU	MHz	200+	200+	183.0	152.5
LandMark	2.0	CPU	MHz	222.96	167.21	133.81	111.47
		FPU	MHz	568.92	426.23	341.09	284.15
SI	7.0	CPU		144.0	108.0	86.4	72.0
Benchmark	8.0	Processor		43.48	32.42	28.41	24.79
PM	1.7	Mips	Mips	28.4	21.3	17.8	14.8
		Dhrystone	K-Dstone/s	36.5	27.3	22.8	19.0
		Whetstone	K-Wstone/s	6662.1	4996.6	3981.3	3320.0
Byte	2.1	CPU	AT Class	10.96	8.18	8.74	7.54
			Class	4.04	3.02	3.41	2.98
		FPU	AT Class	68.12	49.44	39.56	32.96
			Class	9.53	6.92	5.54	4.61

1.4 BLOCK DIAGRAM

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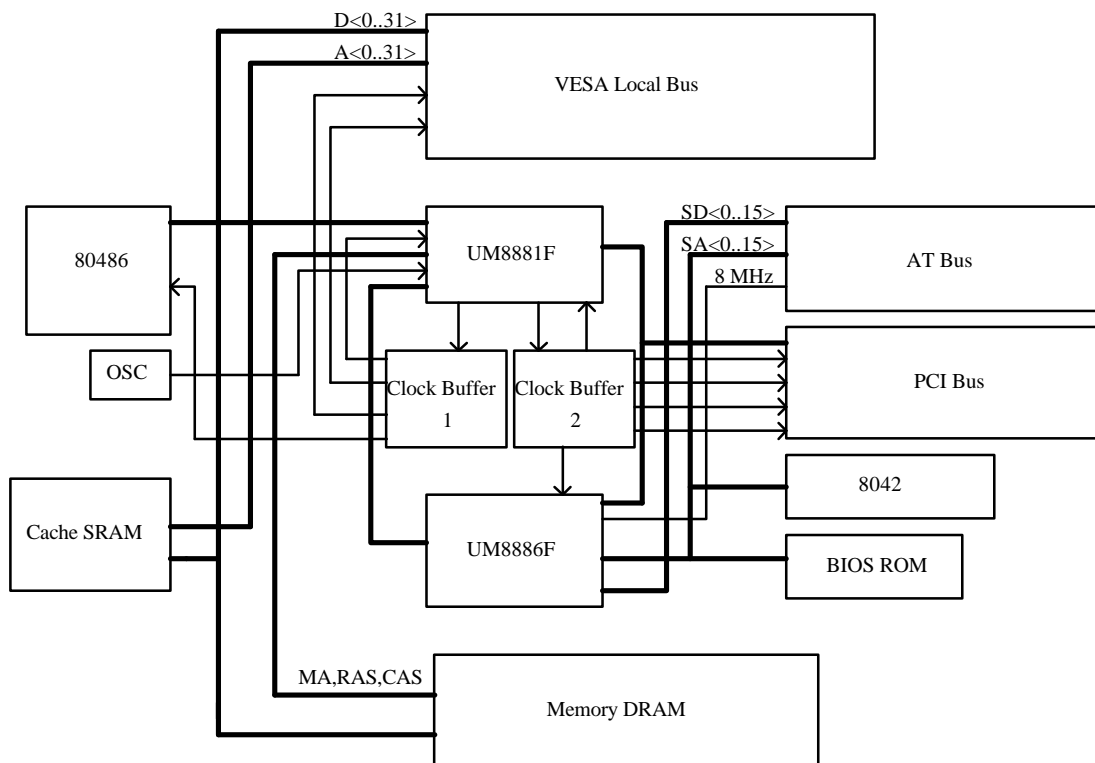
1.5 INTRODUCE THE PCI-BUS and VL-BUS

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 VESA (Video Electronics Standards Association) local bus and PCI (Peripheral Component Interconnect) bus specification were 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.

The VL-bus standard, under development since November 1991, is designed to bring workstation-level performance to a standard PC platform. The VL-bus removes many of the bottlenecks that have happened PCs for several years. On the VL-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 and VL-buses 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 togeter.

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2 SPECIFICATION

2.1 HARDWARE

■ CPU	–	80486SX/DX/DX2/S-Series, 80487SX, OverDrive, P24T, P24D, DX4.
	–	237 pins (Socket 3) ZIF white socket / LIF socket on board.
■ COPROCESSOR	–	Coprocssor included in 80486DX.
■ SPEED	–	25 / 33 / 40 / 50 MHz system and VL-bus speed.
	–	20-33 MHz PCI- bus speed.
	–	8 MHz (programmable) AT Bus speed.
	–	Hardware and Software speed switchable function.
■ GREEN FUNCTION	–	Power Down Timer from 15 sec. to 512 mins.
	–	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 and DMA, Local Bus Master and Device Cannel.
	–	Support Green LED Indicator and Green Switch.
■ DRAM MEMORY	–	4 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.
	–	16 KB cache memory included in DX4.
	–	128 / 256 / 512 KB 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.

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■ I/O BUS SLOTS   − 4 AT-bus.

                    − 4 PCI-bus.

                    − 2 VL-bus.

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

2.2 SOFTWARE

■ BIOS   − Licensed AWARD BIOS.

                    − AT CMOS Setup, Advanced / Chipset Setup,
                      Power Management and Hard Disk Utility
                      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.

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3 HARDWARE INSTALLATION

3.1 UNPACKING

The ainboard ackage hould ontain he dlowing:

- The A-486IM ainboard
- User's manual

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 maniboard. 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.

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3.2 MAINBOARD LAYOUT

≺GA-486IM≻
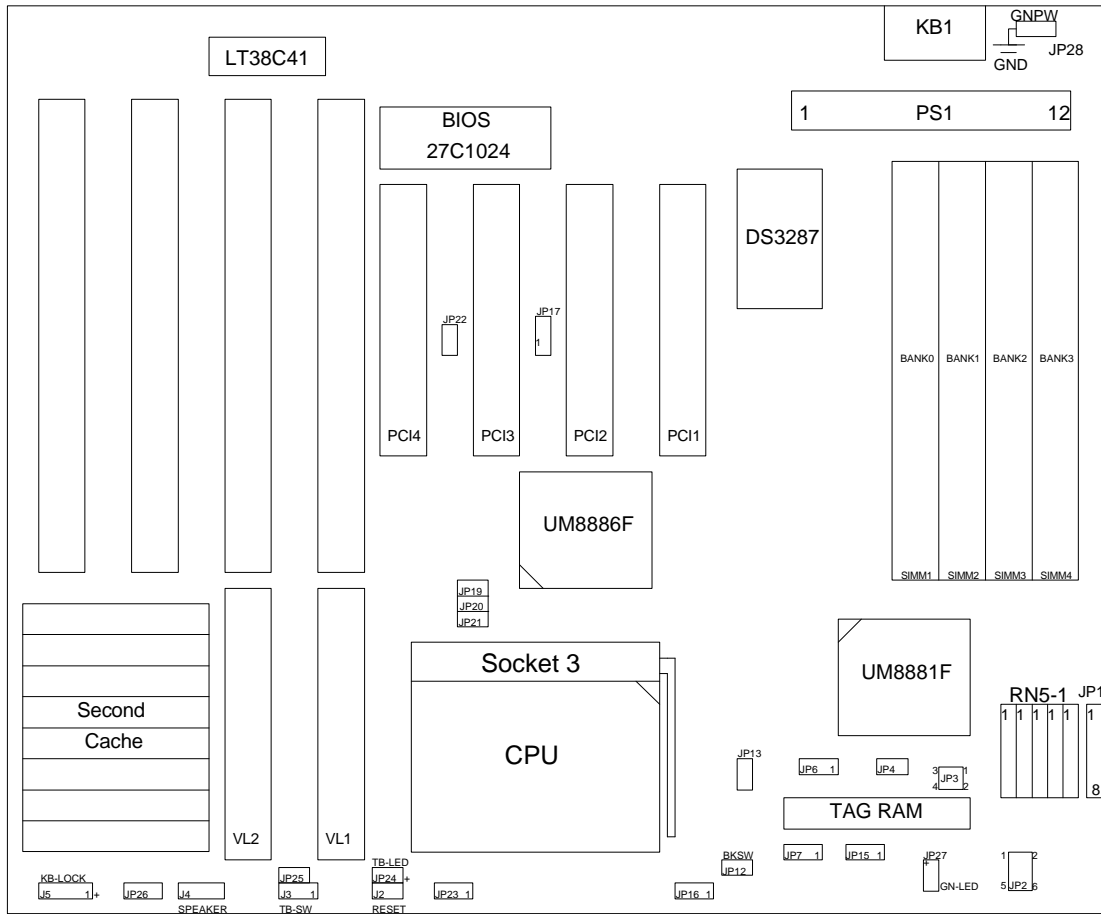
3.3 JUMPERS AND CONNECTORS SETTING

CONNECTOR SETTING

J2: Reset Connector	
Open	Normal operation.
Close	Hardware reset system.

J3: Turbo Switch Connector	
1-2	Low speed.
2-3	High speed. (Default)

J4: Speaker Connector	
1	Data.
2	GND.
3	GND.
4	VCC (+5V).

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J5: Power LED & Key-Lock Connector	
1	LED anode (+).
2	NC.
3	LED cathode (-).
4	Key-lock.
5	GND.

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.

VL-BUS JUMPER SETTING

JP25: VL-Bus Clock Setting	
Open	VL clock $\leq$ 33 MHz. (Default)
Close	VL clock $>$ 33 MHz.

JP7,15: Delay Local Bus Clock	
Pin No.	Function
1-2	For normal operation.
2-3	For some VL-Bus interface card that needs more address setup time.

GREEN FUNCTION JUMPER SETTING

JP12: Brake Switch	
	Shorting this jumper and then releasing it immediately will force system into Green mode right away.

JP24: Turbo LED and Flash Green LED	
	Normally the JP24 is a Turbo LED. But when system gets into Green mode, the LED on JP24 will light on once per second.

JP27: Green LED	
	When system gets into Green, the LED on JP27 will be light.

JP28: Green Power Connector	

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	If your power supply has signal to control the A.C. output, and then the signal can be connected to JP28; 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.

JP6: AMD CPU Selection Jumper	
1-2	AMD DXL CPU X 3
2-3	AMD DXL CPU X 2

This option is supported from PCB REV.2A.

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 or 32Kx8-15ns , and the DATA SRAM type is 8Kx8-15ns, 32Kx8-15ns 64Kx8-20ns or 128Kx8-20ns.

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

CACHE MEMORY SIZE SETTING

JUMPER	JP19	JP20	JP21	JP26
128 KB	OFF	OFF	ON	2-3
256 KB	OFF	ON	ON	1-2
∗256 KB	OFF	ON	ON	2-3
512 KB	ON	ON	ON	2-3

☞ 128 KB cache: Put 32 K X 8 in U25 ~ U28.
☞ 512 KB cache: Put 128 K X 8 in U25 ~ U28.
∗ 256 KB cache: Put 64 K X 8 in U25 ~ U28.

3.5 CPU INSTALLATION AND JUMPERS SETUP

The system speed depends on the frequency of CLOCK GENERATOR. The user can change the JP2 selection to set up the system speed at 25 MHz, 33 MHz ,40 MHz and 50 MHz for different CPU speeds.

The mainboard can use 80486DX, DX2, SX, 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.

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Refer to the following table to correctly install the CPU and jumpers setup:

CPU CLOCK SETTING

Clock	JP2		
	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 TYPE SELECTION

DX CPU : JP16 pin 1-2 short , SX CPU   JP16 pin 2-3 short .
Intel-S CPU JP3 PIN3-4 short, others JP3 PIN1-2 short. (Including Intel-Non-S, AMD, Cyrix & UMC CPU.)

- Intel CPU :   JP1 3-4, 5-6 closed.
                        RN2, RN5, 8P4R 0 ohm installed.
                        JP13 closed.
  DX4 CPU   3.3V, 5V Auto switch. No Jumper needed to
                        switch CPU voltage.
                        JP4 open, JP23 2-3 open DX4 Running X3
                        CPUCLK, JP23 2-3 close DX4 Running X2
                        CPUCLK.
  P24D CPU   For internal Cache write-Through function, pls
                        set JP6 2-3 closed.
                        For internal Cache write-Back function, pls set
                        JP6 1-2 closed.

- AMD/UMC CPU: JP1 5-6, 7-8 closed.
                        RN3 8P4R 0 ohm installed.
                        JP13 open.

- Cyrix CPU: JP1 1-2, 3-4 closed.
                        RN1, RN4, 8P4R 0 ohm installed.
                        JP13 open.

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.

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3.6 DRAM INSTALLATION

GA-486IM 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 GA-486IM 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 2MB ~ 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 J4 is used to connect speaker. The speaker can work well in both direction of connector when it is installed to the connector J4 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 J5 of mainboard in correct direction.

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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 J3 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 JP24 in correct direction. Normally, the JP24 is a TURBO LED connector. But when system gets into Green mode, the LED on JP24 will light on once perosecond.

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 ance. The Reset switch is a 2 PIN connector and should be installed to J2 on mainboard.

3.12 GREEN FUNCTION INSTALLATION

For the purpose of power saving, there are two jumpers, JP27 and JP12, to make sure the power saving function doing well. The JP27 is a indicator (Green LED) for Green function. If the green LED is ON, the system is operating in green mode. The JP12 is a switch to force the system into Green mode immediately.

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3.13 PERIPHERAL DEVICE INSTALLATION

If the PCI-bus (VL-bus) device is to   be installed in the system, any the   of four PCI-bus (VL-bus) slots can be used no matter Slave or Master PCI-bus (VL-bus) device being installed,

After installing the peripheral device, the user should check everything again, and prepare to power-on the system.

After the device installation and jumpers setup finished, the mainboard can be mounted into the case and fixed with screws To complete the mainboard installation, the peripheral device could be installed now. The basic system needs a display interface card and a disk control interface card.

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

After installing the peripheral device, the user should check everything again, and prepare to poweron the system.

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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

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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 highlight item. To exit the Help Window press <Esc>.

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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 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 ( 2A4X5G01 )
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.
┌────────────────────────────────┬──────────────────────────────┐
│                                │                              │
│   STANDARD CMOS SETUP          │   PASSWORD SETTING           │
│                                │                              │
│   BIOS FEATURES SETUP          │   IDE HDD AUTO DETECTION      │
│                                │                              │
│   CHIPSET FEATURES SETUP       │   HDD LOW LEVEL FORMAT        │
│                                │                              │
│   POWER MANAGEMENT SETUP       │   SAVE & EXIT SETUP          │
│                                │                              │
│   PCI/GREEN FUNCTION  SETUP    │   EXIT WITHOUT SAVING         │
│                                │                              │
│   LOAD SETUP 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.

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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 9 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: Standard CMOS Setup Menu

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```
                    ROM PCI/ ISA BIOS ( 2A4X5G01 )
                       STANDARD CMOS SETUP
                       AWARD SOFTWARE, INC.
```

```
   Date (mm:dd:yy)  : Wed, Aug  31 1994
   Time (hh:mm:ss)  :  16  :  12  :  00

                     CYLS.  HEADS  PRECOMP  LANDZONE  SECTORS   MODE

   Drive C : User  (504Mb)  1024    16       65535      1023       17     NORMAL
   Drive D : None  (0 Mb)     0      0         0          0         0    ------------


   Drive A : 1.44 M, 3.5 in.
   Drive B : 1.2 M, 5.25 in.                  Base Memory:      640 K
                                          Extended Memory:   31744 K
                                          Expanded Memory:       0 K
   Video   : EGA/VGA                          Other Memory:     384 K

   Halt On : All Errors                       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.
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.

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Drive C type / Drive D type

The category identify the types of hard disk drive C or drive D 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.	inch PC-type standard drive; 360 kilobyte capacity
1.2M, 5.25 in.	inch AT-type high-density drive; 1.2 megabyte capacity
720K, 3.5 in.	inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in.	inch double-sided drive; 1.44 megabyte capacity
2.88M, 3.5	inch double-sided drive; 2.88 megabyte capacity

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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.

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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

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4.6 BIOS FEATURES SETUP

ROM PCI/ISA BIOS (2A4X5G01)
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		
Turbo SW Function Enable	: Yes		

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

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. 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

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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). 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

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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 drive installed is 360

Boot Up NumLock Status

The default value is On

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

Turbo SW Function Enable

The default value is Yes

Yes	Change system speed by Turbo SW immediately when system boot up.
No	Change system speed by keyboard immediately when system boot up.

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.

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Enabled	Video shadow is enabled
Disabled	Video shadow is disabled

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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 (2A4X5G01)
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           : 0 WS
Internal Cache WB/WT       : Write Thru
External Cache WB/WT       : Write Back
System BIOS Cacheable      : Enabled
Video BIOS Cacheable       : Enabled
Memory Hole Size           : None
I/O Recover Time           : 1 WS


                                             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

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

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PCICLK/3	For 50 MHz system

DRAM Read Wait States

2W	For 40 MHz , 50 MHz system
1W	For 33MHz system
0W	For 25 MHz system

DRAM Write Wait States

2W	For 40 MHz , 50 MHz system
1W	For 33MHz system
0W	For 25 MHz system

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.

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 Shadow

The default value is Cacheable.

Cacheable	Cache and Shadow system BIOS.

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Non-cacheable	Shadow system BIOS only.

Video BIOS Shadow

The default value is Cacheable.

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

Memory Hole Size

None	System doesn't assign any memory 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.

I/O Recover Time

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

CPU-to-PCI Post Write

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

CPU-to-PCI Burst Write

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

Enhance PCI performance

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

CPU Clock / PCI Clock

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

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4.8 POWER MANAGEMENT SETUP

ROM PCI/ISA BIOS (2A4X5G01)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Green Function	: Enable	*Monitor Even 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
Netwerk Card Instlalled	: No	Monitor PCI4 Master Card	: Enabled
Non-S CPU PMI IRQ	: IRQ10	Monitor VL-Bus Card	: Enabled
		Monitor Video Action	: Enabled

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

Enable	Enable Green function.
Disable	Disable Green function.

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

Green Timer

Disable	Disable System's Green Timer function.
15 secs -512 mins	Enable System's Green Timer function between 15 seconds to 512 mins.

VGA Adaptor Type

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

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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

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

Netwerk Card Installed

YES	Netwerk Card Installed.
NO	Netwerk Card not Installed.

Non-S CPU PMI IRQ

IRQ10	use IRQ10 to close monitor in DOS system only.
IRQ15	use IRQ15 to close monitor in DOS system only.

Monitor PCI1-4 Master Card, VL-Bus Card,Video Action

The system gets into green mode or not depending on the status of PCI1-4 Master Card, VL-Bus Card,Video Action

Enable	System will not get into green mode when PCI1-4 Master Card, VL-Bus Card,Video Action is active.
Disable	System will get into green mode no matter what PCI1-4 Master Card, VL-Bus Card,Video Action is active or not.

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4.9 PCI /GREEN FUNCTION SETUP

ROM PCI/ISA BIOS (2A4X5G01)
PCI / GREEN FUNCTION SETUP
AWARD SOFTWARE, INC.

Slot 1 Using INT#	: A-PIRQ1	*WeakUp Even In Inactive Mode:	
Slot 2 Using INT#	: A-PIRQ2	Monitor IRQ3	: Enabled
Slot 3 Using INT#	: A-PIRQ3	Monitor IRQ5	: Enabled
Slot 4 Using INT#	: A-PIRQ4	Monitor IRQ7	: Enabled
Ga410 Using INTA IN	: Slot1	Monitor IRQ9	: Enabled
PIRQ1# Connect IRQ	: 14 By Single	Monitor IRQ10	: Enabled
PIRQ2# Connect IRQ	: NA By Single	Monitor IRQ12	: Enabled
PIRQ3# Connect IRQ	: NA By Single		
PIRQ4# Connect IRQ	: NA By Single		

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

Monitor IRQ3,5,7,9,10,12

Enable	System will wake up when IRQ3,5,7,9,10,12 acting.
Disable	System will not wake up no matter what IRQ3,5,7,9,10,12 acting.

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PCI CARD SETTING PROCEDDRES

A: Please set all your PCI card using INTA# as possible.

B: Select "PCI/Green Function setup" in CMOS SETUP.

C: According to which PCI slot installed with the PCI card, you can select your referencial settings.
   For example: PCI CARD in slot1 using INTA.
   Then you have to set item 1:
   SLOT1 using INT#: "A-PIRQ1" and set item 6:
   PIRQ1# connected IRQ: "5, 7, 9, 10, 11, 12, 14, 15"
   PCI IDE has to be set to 14
   PCI SCSI can be set to 9, 10, 11, 12

D: GA-107 / 108 only can be installed in PCI SLOT2, so please set item 2 SLOT2 using INT#:"D-PIRQ1" and set item 6 PIRQ1# connected IRQ14 by single.

E: Please always set ITEM 6~9 by single. If you don't have two or more PCI cards using the same PIRQ1, PIRQ2 , PIRQ3 or PIRQ4.
   PIRQ1# connected IRQ:"   " by single
   PIRQ2# connected IRQ:"   " by single
   PIRQ3# connected IRQ:"   " by single
   PIRQ4# connected IRQ:"   " by single

F: Some PCI display cards (For example: WD90C33, Trident 9420) can't accept CPU to PCI Burst-write,so please   disable CPU to PCI Burst-write for those PCI display card in Chipset Features Setup.

G: Some PCI display cards would conflict with some PCI Matser card.
   For example:
   Intel S3928 with NCR 810
   Intel S3928 with Adaptec 2940
   WD90C33 with Adaptec 2940
   Intel S3928 with BusLogic BT 946
   In these cases,please install Master Card (Adaptec 2940 or BusLogic BT946) in PCI slot1 and install display card (Intel S3928 or WD90C33) in PCI slot3, then short pin 2-3 of JP17 and open JP22.

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4.10 LOAD SETUP DEFAULTS

ROM PCI/ISA BIOS (2A4X5G01)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

```
┌─────────────────────────────────────────────────────────────────┐
│                                                                   │
│   STANDARD CMOS SETUP            PASSWORD SETTING                 │
│                                                                   │
│   BIOS FEATURES SETUP            IDE HDD AUTO DETECTION           │
│                                                                   │
│   CHIPSET FEATURES SETUP         HDD LOWLEVEL FORMAT              │
│                                                                   │
│   POWER MANAGEMEN ┌───────────────────────────┐ T SETUP          │
│                   │  Load SETUP Defaults (Y/N)? N │               │
│   PCI / GREEN FUNCTIO └───────────────────────┘ UT SAVING        │
│                                                                   │
│   LOAD SETUP 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".

4.11PASSWORD 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 ( 2A4X5G01 )
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
```

STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	HDD LOWLEVEL FORMAT
POWER MANAGEMEN	Enter Password:
PCI / GREEN FUNCTIO	
LOAD SETUP 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

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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.

4.12IDE HDD AUTO DETECTION

ROM PCI/ ISA BIOS (2A4X5G01)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

			CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE

Drive C ：   (0 Mb)

Select Driver C Option (N:Skip): N

OPTIONS	SIZE	CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
1(Y)	515	1048	16	65535	1047	63	NORMAL
2	515	524	32	0	1047	63	LAB
3	515	524	32	65535	1047	63	LARGE

ESC: Quit

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4.13HDD LOW LEVEL FORMAT

ROM PCI/ ISA BIOS (2A4X5G01)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

```
┌──────────────────────────────────────────────────────┐
│                                                        │
│                                                        │
│            ┌─────────────────────────────┐             │
│            │                             │             │
│            │   HARD DISK INSTALL FAILURE │             │
│            │                             │             │
│            │   PRESS ANY KEY TO CONTINUE │             │
│            │                             │             │
│            └─────────────────────────────┘             │
│                                                        │
│                                                        │
│          CYLS.  HEADS  PRECOMP  LANDZONE SECTORS  MODE │
│  Drive C :  (   504 Mb)  1024    16     65535      1023       63   NORMAL │
│  Drive D :  (     0 Mb)     0     0         0         0        0   NORMAL │
│                                                        │
└──────────────────────────────────────────────────────┘
```

Type "Y" will accept the H.D.D. parameter reported by BIOS. Type "N" will keep the old H.D.D. parameter setup.

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4.14 SAVE & EXIT SETUP

ROM PCI/ISA BIOS (2A4X5G01)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

```
┌─────────────────────────────────────────────────────────────┐
│                                                             │
│   STANDARD CMOS SETUP            PASSWORD SETTING           │
│                                                             │
│   BIOS FEATURES SETUP            IDE HDD AUTO DETECTION     │
│                                                             │
│   CHIPSET FEATURES SETUP         HDD LOWLEVEL FORMAT        │
│                                                             │
│   POWER MANAGEMEN  ┌─────────────────────────┐ T SETUP     │
│                    │ SAVE to CMOS and EXIT (Y/N)? N │       │
│   PCI / GREEN FUNCTIO └─────────────────────────┘ UT SAVING│
│                                                             │
│   LOAD SETUP 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.

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4.15 EXIT WITHOUT SAVING

ROM PCI/ISA BIOS (2A4X5G01)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	HDD LOWLEVEL FORMAT
POWER MANAGEMEN Quit Without Saving (Y/N) N T SETUP	
PCI / GREEN FUNCTIO DUT SAVING	
LOAD SETUP 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.

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_[+]"	Pressing these keys simultaneously will change the system speed to high speed (TURBO, all cache memory enabled).
"CTRL_ALT_[-]"	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	-MEMCS16	D01	C01	SBHE
RESET	B02	A02	SD07	-I/OCS16	D02	C02	LA23
+5V	B03	A03	SD06	IRQ10	D03	C03	LA22
IRQ9	B04	A04	SD05	IRQ11	D04	C04	LA21
-5V	B05	A05	SD04	IRQ12	D05	C05	LA20
DRQ2	B06	A06	SD03	IRQ15	D06	C06	LA19
-12V	B07	A07	SD02	IRQ14	D07	C07	LA18
0WS	B08	A08	SD01	-DACK0	D08	C08	LA17
+12V	B09	A09	SD00	DRQ0	D09	C09	-MEMR
GND	B10	A10	-I/O CH RDY	-DACK5	D10	C10	-MEMW
-SMEMW	B11	A11	AEN	DRQ5	D11	C11	SD08
-SMEMR	B12	A12	SA19	-DACK6	D12	C12	SD09
-IOW	B13	A13	SA18	DRQ6	D13	C13	SD10
-IOR	B14	A14	SA17	-DACK7	D14	C14	SD11
-DACK3	B15	A15	SA16	DRQ7	D15	C15	SD12
-DRQ3	B16	A16	SA15	+5V	D16	C16	SD13
-DACK1	B17	A17	SA14	-MASTER	D17	C17	SD14
-DRQ1	B18	A18	SA13	GND	D18	C18	SD15
-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				

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5.1.2PCI BUS SLOT PIN OUT

-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
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

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5.1.3VL-BUS SLOT PIN OUT

DAT00	B01 A01	DAT01
DAT02	B02 A02	DAT03
DAT04	B03 A03	GND
DAT06	B04 A04	DAT05
DAT08	B05 A05	DAT07
GND	B06 A06	DAT09
DAT10	B07 A07	DAT11
DAT12	B08 A08	DAT13
VCC	B09 A09	DAT15
DAT14	B10 A10	GND
DAT16	B11 A11	DAT17
DAT18	B12 A12	VCC
DAT20	B13 A13	DAT19
GND	B14 A14	DAT21
DAT22	B15 A15	DAT23
DAT24	B16 A16	DAT25
DAT26	B17 A17	GND
DAT28	B18 A18	DAT27
DAT30	B19 A19	DAT29
VCC	B20 A20	DAT31
ADR31	B21 A21	ADR30
GND	B22 A22	ADR28
ADR29	B23 A23	ADR26
ADR27	B24 A24	GND
ADR25	B25 A25	ADR24
ADR23	B26 A26	ADR22
ADR21	B27 A27	VCC
ADR19	B28 A28	ADR20
VCC	B29 A29	ADR18
ADR17	B30 A30	ADR16
ADR15	B31 A31	ADR14
VCC	B32 A32	ADR12
ADR13	B33 A33	ADR10
ADR11	B34 A34	ADR08
ADR09	B35 A35	GND
ADR07	B36 A36	ADR06
ADR05	B37 A37	ADR04
VCC	B38 A38	WBACK#
ADR03	B39 A39	BE0#
ADR02	B40 A40	VCC
N/C	B41 A41	BE1#
RESET#	B42 A42	BE2#
D/C#	B43 A43	GND
M/IO#	B44 A44	BE3#
W/R#	B45 A45	ADS#
RDYRTN#	B48 A48	LRDY#
GND	B49 A49	LDEV#
IRQ9	B50 A50	LREQ#
BRDY#	B51 A51	GND
BLAST#	B52 A52	LGNT#
ID0	B53 A53	VCC
ID1	B54 A54	ID2
GND	B55 A55	ID3
LCLK	B56 A56	ID4
VCC	B57 A57	LKEN#
BS16#	B58 A58	LEADS#

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5.2 I/O & MEMORY MAP

MEMORY MAP: [0000000-   System memory used by DOS and application
             009FFFF]   program.
             [00A0000-   Display   buffer   memory   for   VGA/
             00BFFFF]   EGA/CGA/MONOCHROME adapter.
             [00C0000-   Reserved   for I/O device BIOS ROM or RAM
             00DFFFF]   buffer.
             [00E0000-   Reserved for PCI device ROM.
             00EFFFF]
             [00F0000-   System BIOS ROM.
             00FFFFF]
             [0100000-   System extension memory.
             BFFFFFF]

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.

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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

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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

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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.

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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.

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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.

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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.

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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	

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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.

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FF	Boot	

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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	732	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
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							

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APPENDIX D: PROBLEM SHEET

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

Mainboard Data
Model No.   GA-   Rev. No.
Serial No.
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: 64 KB   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   ESDI   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:
          DOS   OS/2   NETWARE   UNIX / XENIX vER.:
AUTOEXEC.BAT & CONFIG.SYS File:

Problem Description:

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