PCA-6551VE

Single Board Computer

User's Manual

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How to use this manual

This manual is written to help you use the PCA-6551VE. It describes how to make various settings on the Pentium® CPU board to meet your requirements. A brief summary of the manual follows:

Chapter 1 "Introduction" gives an overview of the product's specifications. It also tells you what is included in the product package.

Chapter 2 "Jumpers and Connectors" describes the definitions and positions of jumpers and connectors that you may easily configure and set up according to your particular requirements.

Chapter 3 "System Expansion" describes how to change or expand the CPU board by changing the system memory, cache memory, and/or CPU. These changes will yield more power from the CPU board.

Chapter 4 "Award BIOS Setup" describes how to use the advanced PCI/Green BIOS to control almost every feature of the PCA-6551VE, including the watchdog timer.

Chapter 5 "VGA Driver Installation Procedures" gives instructions for installing and operating the software drivers on the utility disk included in your package.

Chapter 6 "LAN Driver Installation Procedures" provides detailed information on Ethernet configuration, and shows how to change the configuration to match your application requirements.

Appendix A "Watchdog Timer" describes how to set up the watchdog timer (WDT), and gives an example of programming the WDT.

Appendix B "Memory Mapping" describes usage of the 1st MB memory.

Chapter 1

Introduction

Welcome to the PCA-6551VE Socket 370 single board computer. It is a half-size FC-PGA Pentium®-based single board computer with VGA and Ethernet.

The PCA-6551VE boosts embedded applications to new heights, especially where size is a paramount concern. At the same time, it also effectively eliminates the constraints in performance which exist in most traditional embedded architectures.

The PCA-6551VE has the evergreen Intel 440 BX PCI set built-in. The 440 BX can support 66 MHz as well as 100 MHz front side bus. All the original Socket 370 based designs for the Celeron™ CPU running 66 MHz FSB now require major revamping to reliably run with the advanced Pentium III based Coppermine, even though the Coppermine uses the same socket. The **Pentium® III with FC-PGA package** is Intel's first high performance CPU which reverts to the socket approach. This makes high performance in half-size computing possible, and the PCA-6551VE is already the performance leader.

There are two 168-pin DIMMs reserved on the PCA-6551VE. The total memory support is 512 MB, which is the largest in its kind. The VGA has an onboard AGP interface, and the C&T 69000 controller is used. Since the onchip video memory can be 2 or 4 MB, the graphics/video performance is high enough for most industrial applications. The Realtek 10/100Base-T Ethernet controller is also onboard. It operates via a PCI interface, which guarantees high-speed communication. These onboard devices with high-speed interfaces (either via AGP or PCI) are important because they must match the power of the Pentium® III.

The PCA-6551VE also has Advantech's standard SBC features built-in. These include ISAMAX to support numerous ISA cards typically required for CTI applications. This makes the PCA-6551VE one of the best and most powerful engines for a variety of CTI environments. The high-precision RTC with battery is reserved to guarantee precise timing and scheduling. A socket for DOC® is also reserved for a solid state disk up to 144 MB. However, due to height constraints, it only supports up to a 24 MB DOC. Other features such as 2S1P, IDEx1 up to mode 4 performance, and an FDD connector are also included. We are proud of our PCA-6551VE, which underscores our contribution to the IPC market. The PCA-6551VE will play a crucial role in being an IPC master which can react quickly as rapid advances in technologies occur. The Coppermine based CPU is so sophisticated that it is continuing to challenge the skills of SBC designers. In future, Advantech will release more and more products based on this technology.

1.1 Specifications

- **System architecture**
  Intel® Socket 370 Celeron™/Coppermine CPU architecture, CPU up to 700+ MHz
  66/100 MHz bus supported
  CE, FCC Class A certified
  Equipped with VGA, 100Base-TX
  PCI V2.1 compliant
  PICMG 1.0 compliant
  Half-size SBC with ISA gold fingers

- **CPU support**
  Intel® Socket 370 CPU (PGA socket)
  Intel® Celeron™/Coppermine for Socket 370 up to 700 MHz with 66/100 MHz external bus

- **Cache memory**
  128/256 KB Level 2 cache (Pipeline Burst SRAM) on-die

- **Main memory**
  Supports SDRAM only
  Up to 512 MB (max.)
  168-pin DIMM socket x 2
  ECC support (single bit error correction / multiple bit error reporting)

- **BIOS**
  Award System BIOS supported
  2 Mbit Flash ROM
  C&T VGA BIOS

- **Chipset**
  Intel® 82440BX PCI set
  2nd generation PII chipset with MMX support
  PCI V2.1 concurrent PCI
  Optimized SDRAM support

- **VGA**
  C&T 69000 VGA controller (mini VGA package)
  2 MB SDRAM embedded or 4 MB SDRAM
  CRT and flat panel displays supported
  AGP interface

  * C&T 69000 controller

Max. resolution	Color	Refresh rate
800 x 600	True color	85 Hz
1024 x 768	True color	85 Hz
1280 x 1024	True color	85 Hz

  Dual displays supported, MPEG I/II playback supported
  Drivers support: Windows 95/98, Windows NT 4.0

- **LAN**
  RTL-8139B Ethernet controller
  10Base-T / 100Base-TX supported, full Duplex
  Complies with PCI V2.1
  Driver support:
  Dos/Windows, NetWare, Windows 95/98, Windows NT 4.0, SCO Open Server 5.0
  RJ-45 x 1

- **Onboard I/O**
  Winbond 83977-TF Super I/O onboard
  SIO x 2, with 2 x 16C550 UARTs, 10-pin connector x 1
  PIO x 1, bidirectional, EPP/ECP supported, 26-pin x 1
  Floppy disk controller: 5.25" 360 KB / 1.2 MB;
    3.5" 720 KB / 1.2 MB / 1.44 MB / 2.88 MB supported, 34-pin x 1
  One PCI IDE hard disk interface: Supports up to two enhanced IDE devices up to
    PIO mode 4 and DMA Master mode 2. Also supports Ultra DMA 33
  On-chip keyboard, mouse controller
  Onboard 5-pin header for keyboard x 1
  Onboard buzzer x 1
  Onboard USB with 6-pin header x1
  Onboard 2-pin header for reset switch, 4-pin for speaker, 5-pin for keylock power
    daughterboard

- **I/O connectors**
  VGA port
  LAN RJ-45 connector (change to PS/2 mouse port if LAN is not required)
  COM1 DB-9 connector
  PS/2 keyboard connector
    (PS/2 connector is for both mouse and keyboard if LAN connector is required)

- **Onboard RTC**
  High precision clock/calendar with battery backup

- **Onboard solid state disk socket**
  Socket reserved for M-Systems' DiskOnChip® (DOC)
  Memory size up to 144 MB single chip
  Drivers support DOS, Windows, Win 95/98 and NT

- **ISA MAX**
  Built-in ISA MAX to support more ISA add-on cards (up to 20)

- **Watchdog Timer**
  1, 2, 4, 8, 16, 32, 64 second time-out intervals

- **Dimensions (W x D)**
  185 x 122 mm

- **Power requirements**
  +5 V @ 14 A (max)
  +12 V @ 200 mA (max)

- **Environment**
  Operating temperature: 0 ~ 60° C
  Storage temperature: -20 ~ 80° C
  Relative humidity: 10 ~ 90% (non-condensing)

- **Certification**
  CE approved
  FCC Class A

1.2 Packing List

In addition to this manual, the PCA-6551VE package includes:

- PCA-6551VE single board computer x 1
- Printer and SIO cable x 1
- FDC cable x 1
- IDE cable x 1
- C&T 69000 VGA driver utility disk x 1
- RTL 8139B LAN driver utility disk x 3
- Y-cable for keyboard and mouse
- CPU cooler × 1

If any of these items are missing or damaged, please contact your vendor.

Chapter 2

Jumpers and Connectors

This chapter provides definitions of jumpers and connectors, and shows their locations.

2.1 Jumpers

Jumpers on the CPU board are used to select options for certain features. To select any option, follow the instructions. You will either cover over a jumper cap (short) or remove it from the jumper pins (open). See Figures 2-1 and 2-2 for jumper positions.
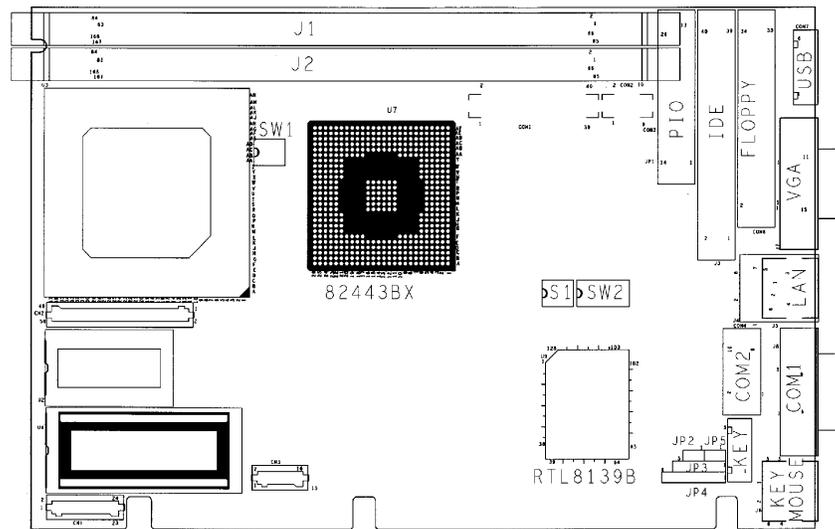
Figure 2-1: Jumper positions

Jumper Settings Tables (*: default setup)

CMOS clear procedure

1. Shut down the computer.
2. Enable jumper SW2.4.
3. Turn on the power button, and then immediately turn it off.
4. Disable jumper SW2.4.

CMOS Clear	Enabled
SW2.4	1 2 3 4 5 6 7 8 [jumper at 4, top] OFF
	*Disabled
	1 2 3 4 5 6 7 8 [jumper at 4, bottom] OFF

Host Frequency	*66 MHz	100 MHz
SW1.4	1 2 3 4 [jumper at 4, top] OFF	1 2 3 4 [jumper at 4, bottom] OFF

Important: The user must change to 100 MHz host frequency via the CMOS/Chipset Features setup. Refer to Section 4.16 in Chapter 4.

DiskOnChip®

M-System Address	C0000	1	2	3	4	5	6	7	8
SW2.1	ON	OFF							
SW2.2	ON								
SW2.3	ON								

M-System Address	C8000	1	2	3	4	5	6	7	8
SW2.1	ON	OFF							
SW2.2	ON								
SW2.3	OFF								

M-System Address	D0000	1	2	3	4	5	6	7	8
SW2.1	ON	OFF							
SW2.2	OFF								
SW2.3	ON								

M-System Address	*D8000	1	2	3	4	5	6	7	8
SW2.1	ON	OFF							
SW2.2	OFF								
SW2.3	OFF								

M-System Address	Disabled	1	2	3	4	5	6	7	8
SW2.1	OFF	OFF							
SW2.2	X								
SW2.3	X								

BIOS Refresh	*Enabled
SW2.5	1 2 3 4 5 6 7 8 ■ at 5 OFF
	Disabled 1 2 3 4 5 6 7 8 ■ at 5 OFF

LAN Chip Function	*Enabled	1 2 3 4 5 6 7 8
SW2.6	ON	■ at 6 (top row)
SW2.7	OFF	■ at 7 (bottom row) OFF

LAN Chip Function	Disabled	1 2 3 4 5 6 7 8
SW2.6	OFF	■ at 7 (top row)
SW2.7	ON	■ at 6 (bottom row) OFF

2.2 Connectors

Connectors on the CPU board provide interfaces to other devices.

Connector	Function	Remark
J1	DIMM1 socket	
J2	DIMM2 socket	
J3	IDE connector	
J4	LAN RJ-45 connector	
J6	PS/2 keyboard/mouse connector	
J7	VGA connector	
J8	COM1 connector	
JP2	H/W reset	
JP3	Keylock	
JP5	IDE LED	
CN1, CN2, CN3	Power module connector	
CON3	Printer connector	
CON4	COM 2 connector	
CON5	Keyboard connector	
CON6	Floppy connector	
CON7	USB connector	

Pin definitions of connectors

- J3: IDE interface connector

Pin	Description	Pin	Description
1	Reset#	2	Ground
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Ground	20	N/C
21	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IOCHRDY	28	Pull Down
29	DMA ACK	30	Ground
31	Interrupt	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

- J4: LAN connector (RJ-45)

Pin	Description
1	TXO+
2	TXO-
3	RXI+
4	TERMPLANE
5	TERMPLANE
6	RXI-
7	TERMPLANE
8	TERMPLANE

- J6: 6-pin mini-DIN keyboard connector (PS/2 type)

Pin	Description
1	Keyboard Data
2	Mouse/Data
3	Ground
4	+5 V
5	Keyboard Clock
6	Mouse/Clock

- J7: VGA connector

Pin	Description
1	RED
2	Green
3	Blue
4	Pull up 1 K to 5 V
5	GND
6	GND
7	GND
8	GND
9	+5V
10	GND
11	Pull up 1 K to 5 V
12	Display data channel data
13	Horizontal Sync
14	Vertical Sync
15	Display Data Channel Clock

- J8: Serial port connector (D-Sub 9-pin)

Pin	Description
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)

• JP2: Reset switch

Pin	Description
1	External Reset
2	Ground

• JP3: Keylock

Pin	Description
1	+5 V
2	N/C
3	Ground
4	Keylock
5	Ground

• CON3: Parallel port connector

Pin	Description	Pin	Description
1	Strobe#	2	Data 0
3	Data 1	4	Data 2
5	Data 3	6	Data 4
7	Data 5	8	Data 6
9	Data 7	10	Acknowledge
11	Busy	12	Paper Empty
13	Printer Select	14	Auto Form Feed#
15	Error#	16	Initialize
17	Printer Select IN#	18	Ground
19	Ground	20	Ground
21	Ground	22	Ground
23	Ground	24	Ground
25	Ground		

- CON4: Serial port connector (D-Sub 9-pin)

Pin	Description
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)
10	GND

- CON5: Keyboard connector

Pin	Description
1	Keyboard Clock
2	Keyboard Data
3	N/C
4	Ground
5	+5 V

- CON6: FDC connector

Pin	Description	Pin	Description
1	Ground	2	Density Select bit 0
3	Ground	4	N/C
5	N/C	6	Density Select bit 1
7	Ground	8	Index#
9	Ground	10	Motor Enable A#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor Enable B#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	N/C	30	Read Data#
31	Ground	32	Head Side Select#
33	Ground	34	Disk Change#

- CON7: USB connector

Pin	Description
1	VCC
2	SBD1-
3	SBD1+
4	SBD0-
5	SBD0+
6	Ground

Chapter 3

System Memory and CPU Installation

This chapter explains how you can expand the capability of your CPU board by changing system memory, cache memory, and/or the CPU.

3.1 System Memory

Your system DRAM is provided by 168-pin DIMMs (Dual Inline Memory Modules) on the CPU board. The CPU board contains two memory banks corresponding to connectors DIMM1 and DIMM2.

The table below shows possible DIMM configurations for the memory banks, and the following figures help you correctly install the DIMM modules. See Figure 3-2 for the location of the memory banks.

DIMM1	DIMM2	Total Memory
16 MB	--	16 MB
16 MB	16 MB	32 MB
32 MB	--	32 MB
32 MB	32 MB	64 MB
64 MB	--	64 MB
64 MB	64 MB	128 MB
128 MB	--	128 MB
128 MB	128 MB	256 MB
256 MB	--	256 MB
256 MB	256 MB	512 MB

The DIMMs use SDRAM memory. Note that if the 100 MHz CPU external clock is turned on, the memory should be SDRAM only and PC/100 compliant.
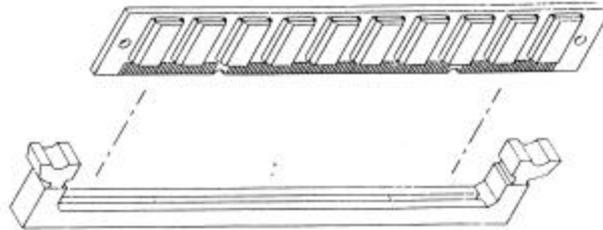
Figure 3-1 Installing DIMM

3.2 Cache Memory

The PCA-6551VE does not support external cache memory.
The CPU has an on-die second level (L2) cache.

3.3 Changing the CPU

The PCA-6551VE uses a 321-pin PGA socket rather than a ZIF socket. Thus
some force is required to push the CPU into the socket or pull the CPU out from
the socket. Normally, some tools are required to pull the CPU out from the socket.
To push in a new CPU, place the CPU on the middle of the socket. Make sure
that the beveled corner of the CPU lines up with the beveled corner of the socket.
Then make sure that the pins of the CPU fit evenly over the socket openings.
Push the CPU in until all the pins fit snugly into the socket. Be sure to re-
configure the DIP switch settings for the correct clock and core/bus ratios. The
PCA-6551VE supports many kinds of CPUs. Refer to the DIP switch setting table
for the correct configuration.

Warning: The FC-PGA Pentium® III CPU is fragile. Install and remove it gently.
Using excessive force may result in breakage.

3.4 Installing a CPU Fan

1.   Loosen the four screws on the fan to make the frame loose. Then peel off the thin plastic coating on the rubber pad.

Figure 3-2: Peeling off the thin plastic coating of the CPU fan

2. Lift the frame to the same height as the rubber pad, and make sure that the bevel of the CPU is positioned at the lower right-hand corner. Push the Coppermine/Celeron™ forward into the frame. Note that rubber pad should not obstruct the die on the Coppermine/Celeron.

Figure 3-3: Pushing the Coppermine/Celeron™ into the frame

3. Once the Coppermine/Celeron™ CPU is correctly attached to the fan, place the assembly on the board, and plug in the fan power cord.
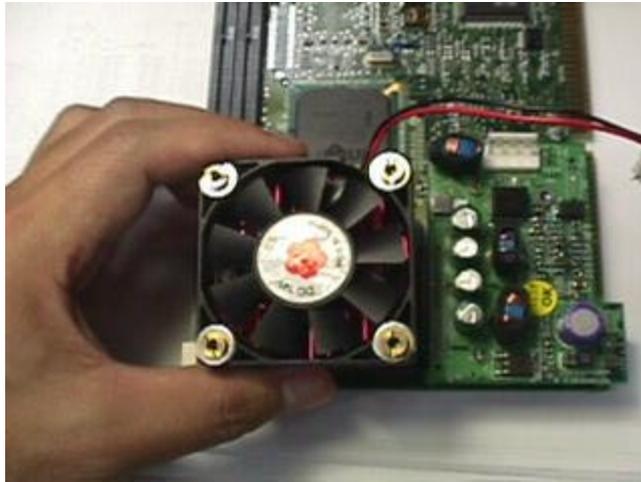
Figure 3-4: Placing the CPU/fan assembly on the board

4.   To affix the assembly to the board, screw the four screws back firmly. Do not use excessive force, which may distort or break the frame. Note that a Celeron™ CPU is thicker than a Coppermine, so a Celeron will require less screwing back.

Figure 3-5: Affixing the CPU/fan assembly to the board

Chapter 4
Award BIOS Setup

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 RAM (CMOS RAM), 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. This will allow you to enter Setup.

Alternatively, power on the computer. When the message shown below appears briefly at the bottom of the screen during t he POST (Power On Self Test), press the <Del> key or simultaneously press the <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. Turn the system OFF and then ON, or alternatively press the "RESET" button on the system case. You may also restart by simultaneously pressing the <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed. 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 on the left
Right arrow	Move to the item on the right
Esc key	Main Menu -- Quit and do 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
(Shift) F2 key	Change color from total 16 colors. F2 to select color forward, (Shift) F2 to select color backward
F3 key	Reserved
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 Setup default, only for Option Page Setup Menu
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

4.3 Getting Help

Main Menu

The online description of the highlighted setup function is displayed at the bottom of the screen.

Status Page Setup Menu / Option Page Setup Menu

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

4.4 The Main Menu

Once you enter Award BIOS CMOS Setup Utility, t he Main Menu (Figure 1) will appear on the screen. The Main Menu allows you to select from ten 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 4-1: Main Menu

```
                    ROM PCI/ISA BIOS (P600-000)
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.
    ┌──────────────────────────────┬──────────────────────────────┐
    │ STANDARD CMOS SETUP          │ INTEGRATED PERIPHERALS        │
    │ BIOS FEATURES SETUP          │ SUPERVISOR PASSWORD           │
    │ CHIPSET FEATURES SETUP       │ USER PASSWORD                 │
    │ POWER MANAGEMENT SETUP       │ IDE HDD AUTO DETECTION        │
    │ PNP/PCI CONFIGURATION        │ HDD LOW LEVEL FORMAT          │
    │ LOAD BIOS DEFAULTS           │ SAVE & EXIT SETUP             │
    │ LOAD SETUP DEFAULTS          │ EXIT WITHOUT SAVING           │
    ├──────────────────────────────┴──────────────────────────────┤
    │ Esc : Quit                      ↑ ↓ → ←   : Select Item      │
    │ F10 : Save & Exit Setup         (Shift)F2 : Change Color     │
    └──────────────────────────────────────────────────────────────┘
```

Standard CMOS setup

This setup page includes all the items in a standard compatible BIOS. See pages 4-7 through 4-10 for details.

BIOS features setup

This setup page includes all the items of Award's special enhanced features. See pages 4-11 through 4-15 for details.

Chipset features setup

This setup page includes all the items of chipset special features. See pages 4-16 through 4-20 for details.

Power management setup

This category determines the amount of power consumption for the system, after one of the listed items is selected. The default value is Disabled. See page 4-21 through 4-25 for details.

PNP/PCI configuration

This category specifies the assignments of all the IRQs and DMAs. See pages 4-26 through 4-27 for details.

Load BIOS defaults

BIOS defaults indicates the most appropriate values of the system parameters which the system needs for minimum performance. The OEM manufacturer may change the defaults via MODBIN before the binary image is burned into the ROM.

Load setup defaults

Chipset defaults indicates the values required by the system for maximum performance. The OEM manufacturer may change the defaults via MODBIN before the binary image is burned into the ROM.

Integrated peripherals system environment

This item allows you to set up all the onboard I/O controllers such as IDE, SCSI, FDC, and so on. See pages 4-28 through 4-30 for details.

Password setting

Change, set, or disable the password of the supervisor or user. This item allows you to limit access to the system and Setup, or just to Setup. See page 4-31 for details.

IDE HDD auto detection

This item automatically configures hard disk parameters. See pages 4-32 through 4-34 for details.

Save & Exit Setup

Saves CMOS value changes to CMOS, and exit setup.

Exit without saving

Abandon all CMOS value changes, and exit setup.

4.5 Standard CMOS Setup Menu

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes one or more setup items, or sometimes none. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

Figure 4-2: Standard CMOS setup menu (Support Enhanced IDE)

```
                 ROM PCI / ISA BIOS (PCA-6551VE)
                      STANDARD CMOS SETUP
                      AWARD SOFTWARE, INC.
```

Date (mm:dd:yy) : Mon, Dec 13 1999							
Time (hh:mm:ss) : 16: 48: 33							
Daylight Saving : Disabled							
HARD DISKS		CYLS.	HEADS	PRECOMP	LANDZONE		SECTORS
MODE							
Drive C : Auto (0Mb)	0	0	0	0		0	Auto
Drive D : Auto (0Mb)	0	0	0	0		0	Auto

Drive A : 1.44M, 3.5in.
Drive B : None
Floppy 3 Mode Support : Disabled

640K

LCD&CRT : Both

Halt On   : All , But keyboard

262144K

Base Memory:

Extended Memory: 261120K

Other Memory: 384K

Total   Memory:

```
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 of the week, from Sun to Sat, determined by the BIOS, is read only
date	The date, from 1 to 31 (or the maximum allowed in the month), you can key in details using the numerical/function keys
month	The month, Jan through Dec
year	The year, depend on the year of BIOS

Time

The time format is <hour>, <minute>, <second>. It accepts both function key or numerical key input. The time is calculated using the 24-hour military time clock. For example, 1 p.m. is 13:00:00.

Primary master/primary slave

This item identifies the types of drives that have been installed in the computer. There are 45 predefined types. Also, two user-definable types are for Enhanced IDE BIOS. Types 1 through 45 are predefined. 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 those in 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, you will be asked to enter related information shown beneath. Enter the information directly from the keyboard and press <Enter>. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

If the controller of the HDD interface is ESDI, the selection will be "Type 1".
If the controller of the HDD interface is SCSI, the selection will be "None".
If the controller of the HDD interface is CD-ROM, the selection will be "None".

CYLS.	number of cylinders
HEADS	number of heads
PRECOMP	write precom
LANDZONE	landing zone
SECTORS	number of sectors
MODE	HDD access mode

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

Drive A type/drive B type

This item identifies the types of floppy disk drive A: or drive B: that have been installed in the computer.

None	No floppy drive installed
360 K, 5.25 in	5.25 inch PC-type standard drive; 360 kilobyte capacity
1.2 M, 5.25 in	5.25 inch AT-type high-density drive; 1.2 megabyte capacity
720 K, 3.5 in	3.5 inch double-sided drive; 720 kilobyte capacity
1.44 M, 3.5 in	3.5 inch double-sided drive; 1.44 megabyte capacity
2.88 M, 3.5 in	3.5 inch double-sided drive; 2.88 megabyte capacity

Video

This item selects 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 secondary monitor type in Setup.

There are two ways to boot up the system:

1. When VGA is primary and monochrome is secondary, the selection of the video type is "VGA Mode".
2. When monochrome is primary and VGA is secondary, the selection of the video type is "Monochrome Mode".

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SEGA, 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

Error halt

This item determines whether the computer will stop if an error is detected during power up.

No errors	Whenever the BIOS detects a non-fatal error, the system will be stopped and you will be prompted
All errors	The system boot will not be stopped for any error that may be detected.
All, But Keyboard	The system boot will not stop for a keyboard error, but it will stop for all other errors
All, But Diskette	The system boot will not stop for a disk error, but it will stop f or all other errors
All, But Disk/Key	The system boot will not stop for a keyboard or disk error, but it will stop for all other errors

Memory

This item refers to display-only memory, which is determined by POST (Power On Self Test) of the BIOS.

Base Memory

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512 K for systems with 512 K memory installed on the motherboard, or 640 K for systems with 640 K or more memory installed on the motherboard.

Extended Memory

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1 MB in the CPU's memory address map.

Other Memory

This refers to the memory located in the 640 K to 1024 K address space. This is, memory which can be used for different applications. DOS uses this area to load device drivers, in order to keep as much base memory free for application programs. The most common use for this area is Shadow RAM.

Total Memory

System total memory is the sum of basic memory, extended memory, and other memory.

4.6 BIOS Features Setup Menu

ROM PCI/ISA BIOS (PCA-6551VE)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CBFFF Shadow	: Disabled
External Cache	: Enabled	CC000-CFFFF Shadow	: Disabled
CPUL 2 Cache ECC Checking	: Enabled	D0000-D3FFF Shadow	: Disabled
		D4000-D7FFF Shadow	: Disabled
Quick Power on self test	: Disabled	D8000-DBFFF Shadow	: Disabled
Boot Sequence	: A,C,SCSI	DC000-DFFFF Shadow	: Disabled
Swap Floppy Drive	: Disabled		
Boot up Floppy Seek	: Dis abled		
Boot up Numlock Status	: OFF		
Gate A20 Option	: Fast		
Typematic Rate Setting	: Enabled		
Typematic Rate (Chars/Sec)	: 30		
Typematic Delay (Msec)	: 250		
Security Option	: Setup	ESC : Quit	↑↓←→: Select Item
PCI/VGA Palette Snoop	: Disabled	F1 : Help	PU/PD/+/-: Modify
OS Select For DRAM 64MB	: Non-OS2	F5 : Old Values	(Shift) F2: Color
HDD S.M.A.R.T. capability	: Disabled	F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

Virus Warning

This category flashes on the screen. During and after system boot-up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system. The following error message will appear. In the meantime, you can run an anti-virus progra m to locate the problem.

! WARNING !
Disk boot sector is to be modified
Type "Y" to accept write or "N" to abort write
Award Software, Inc.

Enabled	Automatically causes a warning message to appear when anything attempts to access the boot sector or hard disk partition table during system boot-up
Disabled	No warning message appears when anything attempts to access the boot sector or hard disk partition table during system boot-up

Note: This function is available only for DOS and other OSs that do not trap INT13.

CPU Internal Cache/External Cache

These two items speed up memory access. However, the setting depends on the design of the CPU/chipset. The default value is Enabled. If your CPU has no internal cache, then the item "CPU Internal Cache" will not appear.

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 set to Enabled, BIOS will shorten or skip some check items during POST.

Enabled	Enable quick POST
Disabled	Normal POST

Boot Sequence

This category determines which drive the computer searches first to find the disk operating system (i.e. DOS). The default value is A,C.

C,A	System will first search for hard disk drive, then floppy disk drive
A,C	System will first search for floppy disk drive, then hard disk drive

Note: This function is only available for IDE type systems.
For SCSI type systems, the computer always boots from drive A:.

Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360 K type floppy disks are 40 tracks, whereas 760 K, 1.2 M and 1.44 M disks are all 80 tracks.

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

Boot Up NumLock Status

The default value is On.

On	Keypad is number keys
Off	Keypad is arrow keys

Typematic Rate Setting

This determines the typematic rate.

Enabled	Enable typematic rate and typematic delay programming
Disabled	Disable typematic rate and typematic delay programming. The system BIOS will use default values for these 2 items. The default values are controlled by the keyboard

Typematic Rate (Chars/Sec)

6	6 characters per second
8	8 characters per second
10	10 characters per second
12	12 characters per second
15	15 characters per second
20	20 characters per second
24	24 characters per second
30	30 characters per second

Typematic Delay (Msec)

When holding down a key, the time between display of successive characters.

250	250 msec
500	500 msec
750	750 msec
1000	1000 msec

Security Option

This item allows you to limit access to the system and Setup, or just to Setup.

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

Note: To disable security, select PASSWORD SETTING in the Main Menu. You will then be asked to enter a password. Do not type anything, and instead just press <Enter>. This will disable security. Once the security has been disabled, the system will boot and you will be able to enter Setup freely.

PCI/VGA Palette Snoop

This determines whether theMPEG ISA/VESA VGA cards can work with PCI/VGA or not.

Enabled	PCI/VGA can work with MPEG ISA/VESA VGA cards
Disabled	PCI/VGA cannot work with MPEG ISA/VESA VGA cards

OS Select for DRAM > 64MB

This segment is specifically created for OS/2 when DRAM is larger than 64 MB. If your operating system is OS/2 and DRAM used is larger the 64 MB, you must select "OS2". Otherwise, select "non-OS2". The default selection is "non-OS2".

Video BIOS Shadow

This determines whether video BIOS will be copied to RAM. This function is optional, and depends on the chipset design. Video Shadow will increase video speed.

Enabled	Video shadow is enabled
Disabled	Video shadow is disabled

C8000 - CFFFF Shadow / D8000 - DFFFF Shadow

These items determine whether optional ROM will be copied to RAM at the rate of 16 or 32 KB per unit. The rate depends on the chipset used.

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disabled

Notes:

1. For the C8000-DFFFF ROM on PCI BIOS option, BIOS will automatically enable the shadow RAM. The user does not have to select this item.

2. Secondary IDE channel control:
    a) Enabled: Enable secondary IDE port, and BIOS will assign IRQ15 for this port.
    b) Disabled: Disable secondary IDE port, and IRQ15 is available for other devices.
    c) The item is optional only for PCI BIOS.

3. Some sound cards have an onboard CD-ROM controller which use the secondary IDE port. In order to avoid PCI IDE conflict, you must select "disable" for the secondary IDE channel control. The CD-ROM can then operate normally.

4.7 Chipset Features Setup Menu

The features in this menu are related to the chipset on the CPU board, and are all already optimized. Therefore, it is recommended that the default settings in the setup table not be changed, unless the user is completely familiar with the relevant details of the chipset's features.

ROM PCI/ISA BIOS (PCA-6551VE)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	Auto Detect DIMM/PCI Clk	: Enabled
EDO DRAM Speed Selection	: 60ns	Spread Spectrum	: Disabled
EDO CASx# MA Wait State	: 2	CPU Host Clock (CPU/PCI)	: Default
EDO RASx# Wait State	: 2		
SDRAM Control by	: Manual		
SDRAM RAS-to-CAS Delay	: 3		
SDRAM RAS Precharge Time	: 3		
SDRAM CAS latency Time	: 3		
SDRAM Precharge Control	: Disabled		
DRAM Data Integrity Mode	: Non-ECC		
System BIOS Cacheable	: Enabled		
Video BIOS Cacheable	: Enabled		
8 Bit I/O Recovery Time	: 1		
16 Bit I/O Recovery Time	: 1		
Memory Hole At 15M-16M	: Disabled	ESC : Quit	↑↓→←: Select Item
Passive Release	: Disabled	F1 : Help	PU/PD/+/- : Modify
Delayed Transaction	: Disabled	F5 : Old Values	(Shift) F2 : Color
AGP Aperture Size (MB)	: 64	F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

This section describes features of the Intel® 440BX PCIset. If your system contains a different chipset, the information in this section will bear little resemblance to what you actually see on your screen.

ADVANCED OPTIONS. The parameters in this screen are for system designers, service personnel, and technically expert users only. Do not reset these values unless you understand the consequences of your changes.

NOTE: This chapter describes all fields offered by Award Software in this screen. Your system board designer may omit or modify some fields.

Auto Configuration

Auto Configuration selects predetermined optimal values of chipset parameters. When disabled, chipset parameters revert to setup information stored in CMOS. Many fields in this screen are not available when Auto Configuration is Enabled.

The options are: Enabled, Disabled.

EDO DRAM Speed Selection

DRAM timing is controlled by the DRAM Timing Registers. The timings programmed into this register are dependent on the system design. Slower rates may be required in certain system designs to support loose layouts or slower memory.

50 ns	DRAM timing type
60 ns	DRAM timing type

EDO CASx# MA Wait State

You can select the timing control type of EDO DRAM CAS MA (memory address bus).

The options are: 1, 2

EDO RASx# MA Wait State

You can select the timing control type of EDO DRAM RAS MA (memory address bus).

The options are: 1, 2

SDRAM RAS-to-CAS Delay

You can select RAS-to-CAS delay time in HCLKs of 2/2 or 3/3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you also change specifications of the installed DRAM or the installed CPU.

The options are: 2, 3

SDRAM RAS Precharge Time

This defines the length of time Row Address Strobe is allowed to precharge.

The options are: 2, 3

SDRAM CAS latency Time

You can select CAS latency time in HCLKs of 2/2 or 3/3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you also change specifications of the installed DRAM or the installed CPU.

The options are: 2, 3

DRAM Data Integrity Mode

Select Parity or ECC (error-correcting code), according to the type of installed DRAM.

The options are: Non-ECC, ECC

System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F000h -FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

Enabled	BIOS access cached
Disabled	BIOS access not cached

Video BIOS Cacheable

Selecting Enabled allows caching of the video BIOS ROM at C0000h-F7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

Enabled	Video BIOS access cached
Disabled	Video BIOS access not cached

Video RAM Cacheable

Selecting Enabled allows caching of the video RAM, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

8 Bit I/O Recovery Time

The recovery time is the length of time, measured in CPU clocks, which the system will delay after completion of an input/output request. This delay takes place because the CPU is operating so much faster than the input/output bus that the CPU must be delayed to allow for the completion of the I/O. This item allows you to determine the recovery time allowed for 8 bit I/O.

The options are: NA; 1, 2, 3, 4, 5, 6, 7, or 8 CPU clocks

16 Bit I/O Recovery Time

This item allows you to determine the recovery time allowed for 16 bit I/O.

The options are: NA; 1, 2, 3, or 4 CPU clocks

Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB.

Enabled	Memory hole supported
Disabled	Memory hole not supported

Passive Release

When Enabled, CPU to PCI bus accesses are allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM.

The options are: Enabled, Disabled

Delayed Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transaction cycles. Select Enabled to support compliance with PCI specification version 2.1.

The options are: Enabled, Disabled

AGP Aperture Size (MB)

Select the size of the Accelerated Graphics Port (AGP) aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. See www.agpforum.org for AGP information.

The options are: 4, 8, 16, 32, 64, 128, 256

Auto Detect DIMM/PCI Clk

This item auto detects the clock generator. The unused pins of DIMM/PCI Clk are disabled. The amplitudes of the radiated electromagnetic emissions are reduced.
The options are: Enabled, Disabled

Spread Spectrum Modulated

The clock generator generates a clock that is frequency modulated in order to increase the bandwidth that is occupies. By increasing the bandwidth of the fundamental and its harmonics, the amplitudes of the radiated electromagnetic emissions are reduced.
The options are: Enabled, Disabled

CPU Host Clock (CPU/PCI)

Depending on the CPU's FSB, the options are: Default, 66/33 MHz, 75/37 MHz, 83/41 MHz, 100/50 MHz
The Default value is in fact 66 MHz.

4.8 Power Management Setup

Power management setup will appear on your screen like this:

ROM PCI/ISA BIOS (PCA-6551VE)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

ACPI function	: Disabled	** Reload Global Timer Events **	
Power Management	: User Defined	IRQ[3-7, 9-15], NMI	: Disabled
PM Control by APM	: Yes	Primary IDE 0	: Disabled
Video Off Method	: Blank Screen	Primary IDE 1	: Disabled
Video Off After	: Standby		
Doze Mode	: Disabled		
Standby Mode	: Disabled	Floppy Disk	: Disabled
Suspend Mode	: Disabled	Serial Port	: Enabled
HDD Power Down	: Disabled	Parallel Port	: Disabled
Throttle Duty Cycle	: 62.5%		
PCI/VGA Act-Monitor	: Disabled		
IRQ 8 Break Suspend	: Disabled		

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

Power Management

This category determines how much power consumption is appropriate for the system, after the following items have been selected. The default value is Disabled. Explanations of each of the following items and their options are detailed below.

Item	Options	Descriptions
A. Power Management	1. Disabled 2. User Defined	Global Power Management will be disabled Users can configure their own power management
	3. Min Saving	Pre-defined timer values are used such that all timers are at their MAX values
	4. Max Saving	Pre-defined timer values are used such that all timers are at their MIN values
B. Video Off Option	1. Always On	System BIOS will never turn off the screen
	2. Suspend->Off	Screen turns off when system is in SUSPEND mode
	3. Susp, stby->Off	Screen turns off when system is in STANDBY or SUSPEND modes
	4. All Modes ->Off	Screen turns off when system is in DOZE, STANDBY or SUSPEND modes
C. Video Off Method	1. Blank Screen	The system BIOS only blanks off the screen when disabling video
	2. V/H SYN C+Blank	In addition to (1), BIOS also turns off the V-SYNC & H-SYNC signals from VGA cards to monitor
	3. DPMS Supported	This function is enabled only for the VGA cards supporting DPMS
		Note: Green monitors detect the V/H SYNC signals to turn off its electron gun

D. Switch Function	1. Break	The External Suspend Switch is "Break"
	2. Wake	The External Suspend Switch is "Wake"

	3. 1 Min
	    2 Min
	    4 Min
	    6 Min
	    8 Min
	   10 Min
	   20 Min
	   30 Min
	   40 Min
	    1 Hour
		Defines the continuous idle time before the system enters DOZE mode
		
		If any item defined in (J) is enabled and active, the DOZE timer will be reloaded

		Note: Normally, STANDBY mode puts the system into low speed or 8 MHz, and the screen may turn off, depending on item (E)
E. Doze Speed (div by) Stdby speed (div by)	1/8 2/8 3/8 4/8 5/8 6/8 7/8 8/8	System full speed can be divided by the optional integers. The bigger the number the slower the speed under Doze or standby mode
F. Modem Use IRQ	3, 4, 5, 7, 9, 4, 10, 11, NA	For external modems, 3 or 4 will be used for card type modems. It depends on the card's definition. The default is 3
G. Standby Mode (*) Remark 1	1. Disabled	System will never enter STANDBY mode

	2. 10 Sec
	    1 Min
	   10 Min
	   30 Min
	    1 Hour
	    2 Hour
	   20 Min
		Defines the continuous idle time before the system enters STANDBY mode.
		
		If any item defined in (J) is enabled and active, the STANDBY timer will be reloaded

		Note: Normally, STANDBY mode puts the system into low speed or 8 MHz. The screen may be off, depending on item (E)

H. Doze (*) Remark 1	1. Disabled	System will never enter STANDBY mode
	2. 1 Min 2 Min 4 Min 6 Min 8 Min 10 Min 20 Min 30 Min 40 Min 1 Hour	Defines the continuous idle time before the system enters STANDBY mode. If any item defined in (J) is enabled and active, the STANDBY timer will be reloaded
		Note: Normally,STANDBY mode puts the system into low speed or 8 MHz. The screen may be off, depending on item (E)
I. Suspend Mode (*) Remark 1	1. Disabled	System will never enter SUSPEND mode
	2. 1 Min 2 Min 4 Min 6 Min 8 Min 10 Min 20 Min 30 Min 40 Min 1 Hour	Defines the continuous idle time before the system enters SUSPEND mode. If any item defined in (J) is enabled and active, the SUSPEND timer will be reloaded
		Note: Normally, SUSPEND mode puts the system into low speed or 8 MHz. The clock is stopped, and the screen may be off, depending on item (E)
J. HDD Off After:	1. Disabled	The HDD's motor will not turn off
	2. 10 Sec 1 Min 10 Min 30 Min 1 Hour 2 Hour 4 Hour	Defines the continuous HDD idle time before the HDD enters power saving mode (motor off)

K. VGA Activity	1. Disabled	
IRQ3 (COM2) IRQ4 (COM1) IRQ5 (LPT 2) IRQ6 (Floppy Disk) IRQ7 (LPT 1) IRQ8 (RTC Alarm) IRQ9 (IRQ2 Redir) IRQ10 (Reserved) IRQ11 (Reserved) IRQ12 (PS/2 Mouse) IRQ13 (Coprocessor) IRQ14 (Hard Disk) IRQ15 (Reserved)	2. Enabled	
L. Power Bottom Over Ride	1. Delay 4 Sec 2. Instant off	

Remarks

1. * 'System Doze', 'System Standby', and 'System Suspend'
    These items are marked with (*) in this manual. They will be loaded with predefined values, provided that the item 'Power Management' is not configured to 'User Defined'

2. # Although the item 'HDD Power Down' is not controlled by the item 'Power Management' in terms of timer value, the HDD(s) will not power down if global power management is disabled!

4.9 PnP/PCI Configuration

This section describes configuring the PCI bus system. PCI, or Peripheral Component Interconnection, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

```
                    ROM PCI/ISA BIOS (P600-000)
                      PNP/PCI CONFIGURATION
                      AWARD SOFTWARE, INC.

 PNP OS Installed          : No       Assign IRQ For VGA  : Enabled
 Resources Controlled By   : Manual   Slot 1 Use IRQ No.  : Auto
 Reset Configuration Data  : Disabled Slot 2 Use IRQ No.  : Auto
                                      Onboard LAN use IRQ : Auto
 IRQ-3   assigned to : PCI/ISA PnP    Onboard VGA use IRQ : Auto
 IRQ-4   assigned to : PCI/ISA PnP
 IRQ-5   assigned to : PCI/ISA PnP    Used MEM base addr  : N/A
 IRQ-7   assigned to : PCI/ISA PnP
 IRQ-9   assigned to : PCI/ISA PnP    Assign IRQ For USB  : Disabled
 IRQ-10  assigned to : PCI/ISA PnP
 IRQ-11  assigned to : PCI/ISA PnP
 IRQ-12  assigned to : PCI/ISA PnP
 IRQ-14  assigned to : PCI/ISA PnP
 IRQ-15  assigned to : PCI/ISA PnP
 DMA-0   assigned to : PCI/ISA PnP
 DMA-1   assigned to : PCI/ISA PnP    ESC : Quit          ↑↓→← : Select Item
 DMA-3   assigned to : PCI/ISA PnP    F1  : Help          PU/PD/+/- : Modify
 DMA-5   assigned to : PCI/ISA PnP    F5  : Old Values    (Shift)F2 : Color
 DMA-6   assigned to : PCI/ISA PnP    F6  : Load BIOS  Defaults
 DMA-7   assigned to : PCI/ISA PnP    F7  : Load Setup Defaults
```

PNP OS Installed

This item allows you to determine install PnP OS or not.

The options are: Yes, No

Resource Controlled by

Award Plug and Play BIOS has the capacity to automatically configure all the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows ® 95.

The options are: Auto, Manual (Default)

Reset Configuration Data

The system will attempt to update ESCD (Extend System Configuration Data). Thus BIOS will store information for both PnP devices and non-PnP devices to CMOS.

The options are: Enabled, Disabled (Default)

IRQ/DMA Assigned To

This item allows you to determine the IRQ/DMA assigned to the ISA bus. It is not available for any PCI slot (Legacy ISA), nor for PnP for both ISA a nd PCI.

The options are: Legacy ISA, PCI/ISA PnP

PCI IRQ Activated by

During boot-up, this sets the method by which the PCI bus recognizes that an IRQ service is being requested by a device. Under all circumstances, you should retain the default configuration unless advised otherwise by your system's manufacturer.

The options are: Level (Default), Edge

4.10 Integrated Peripherals

ROM PCI / ISA BIOS (PCA-6551VE)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.

IDE HDD Block Mode	: Enabled		
IDE Primary Master PIO	: Auto		
IDE Primary Slave PIO	: Auto		
IDE Secondary Master PIO	: Auto		
IDE Secondary Slave UDMA	: Auto		
On-Chip Primary PCI IDE	: Enabled		
USB Keyboard Support	: Enabled		
KBC input clock	: 8 MHz		
Onboard FDC Controller	: Enabled		
Onboard Serial Port 1	: 3F8/IRQ4		
Onboard Serial Port 2	: 2F8/IRQ3		
Onboard Parallel Port	: 378/IRQ7		
Parallel Port Mode	: SPP		
		ESC : Quit	↑ ↓ → ←: Select Item
		F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(Shift) F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

IDE HDD Block Mode

This allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

Enabled	IDE controller uses block mode
Disabled (Default)	IDE controller uses standard mode

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

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it, and if the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support.

The options are: Auto (Default), Disabled

On-Chip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled (Default) to activate each channel separately.

Onboard PCI SCSI Chip

This item allows you to determine whether the onboard PCI SCSI chip is enabled (Default) or not.

USB Keyboard Support

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.

The options are: Enabled, Disabled (Default)

Onboard FDC Controller

Select Enabled if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install and-in FDC or the system has no floppy drive, select Disabled.

The options are: Enabled (Default), Disabled

Onboard Serial Port 1/Port 2

This item allows you to determine access of the onboard serial port 1 / port 2 controller with which I/O address.

The options are: 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto (Default)

UART 2 Mode

This item allows you to determine the Infra Red (IR) function of the onboard I/O chip.

The options are: Standard (Default), IrDA1.0, ASK-IR, IrDA1.1

Duplex Select

This item allows you to select the IR function when your selected UART 2 Mode is IrDA1.0, ASK-IR, or IrDA1.1.

The options are: Half, Full

TxD, RxD Active

This item allows you to determine the activity of RxD and TxD.

The options are: "Hi, Hi", "Lo, Lo", "Lo, Hi", "Hi, Lo"

Onboard Parallel Port

Select a logical LPT port name and matching address for the physical parallel (printer) port.

The options are: 378H/IRQ7 (Default), 278H/IRQ5, 3BCH/IRQ7, Disabled

Parallel Port Mode

This item selects an operating mode for the onboard parallel port. Select Compatible or Extended, unless you are certain both your hardware and software support EPP or ECP modes.

The options are: SPP, ECP+EPP1.7, EPP1.7+SPP, EPP1.9+SPP, ECP, ECP+EPP1.9 (Default), Normal

ECP Mode Use DMA

This item selects a DMA channel for the port.

The options are: 3 (Default), 1

4.11 Supervisor/User Password Setting

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

- supervisor password: Can enter, and change the options of the setup menus
- user password: Can only enter, but do not have the right to change the options of the setup menus

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

ENTER PASSWORD:

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

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

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 4). If the Security option is set to "System", the password will be required both at boot-up and at entry to Setup. If the Security option is set to "Setup", prompting only occurs when trying to enter Setup.

4.12 IDE HDD Auto Detection

Enhanced IDE features are included in all Award BIOSs. A brief description of this feature follows:

1. Setup Changes

<I> Auto-detection

The BIOS setup will display all possible modes that may be supported by the HDD, including NORMAL, LBA & LARGE.

If HDD does not support LBA modes, no 'LBA' option will be shown.
Users can select a mode which is appropriate for them.

ROM/PCI/ISA BOPS (2XXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

```
HARD DISKS     TYPE   SIZE   CYLS   HEAD   PRECOMP   LANDZ   SECTOR
MODE
         Select Primary Master Option ( N = Skip ) : N

  OPTION   SIZE   CYLS   HEADS   PRECOMP   LANDZONE   SECTORS
  MODE
  1(Y)516  1120    16     65535               1119       59
  NORMAL

   2  516   524     32      0        1119       63        LBA
```

<II> Standard CMOS Setup

		Cyls	Heads	Precomp	Landzone	Sectors	Mode
Primary Master:	User (516 MB)	1120	16	65535	1119	59	Normal
Primary Slave:	None (203 MB)	684	16	65535	685	38	------
Secondary Master:	None	0	0	0	0	0	0
Secondary Slave:	None	0	0	0	0	0	0

When the HDD type is shown as 'user', the "MODE" option will be open for the user to select his own HDD mode.

(2) HDD Modes

Award BIOS supports 3 HDD modes: NORMAL, LBA, LARGE

NORMAL mode

This is a generic access mode in which neither the BIOS nor the IDE controller will make any transformations during accessing.

The maximum number of cylinders, head and sectors for NORMAL mode are 1024, 16 and 63 respectively

no. Cyclinders	(1024)
x no. Heads	(16)
x no. Sectors	(63)
x no. per sector	(512)
	528 Megabytes

If the user sets his HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes, even though its physical size may be greater than that!

LBA (Logical Block Addressing) mode

This is a new HDD accessing method to overcome the 528 Megabyte bottleneck. The number of cylinders, heads and sectors shown in setup may not be the number physically contained in the HDD.

During HDD accessing, the IDE controller will transform the logical address described by the sector, head and cylinder numbers into its own physical address inside the HDD.

The maximum HDD size supported by LBA mode is 8.4 Gigabytes. This is obtained according to the following formula:

no. Cyclinders	(1024)
x no. Heads	(255)
x no. Sectors	(63)
x bytes per sector	(512)
	8.4 Gigabytes

LARGE mode

This is an extended HDD access mode supported by Award Software.

Some IDE HDDs contain more than 1024 cylinders without LBA support (in some cases, users do not want LBA). Award BIOS provides another alternative to support these kinds of HDDs!

Example of LARGE mode:

CYLS.	HEADS	SECTOR	MODE
1120	16	59	NORMAL
560	32	59	LARGE

BIOS "tricks" DOS (or other OSs) into thinking that the number of cylinders is less than 1024, by dividing that number by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT13h in order to access the right HDD address!

Maximum HDD size:

no. Cyclinders	(1024)
x no. Heads	(32)
x no. Sectors	(63)
x bytes per sector	(512)
1 Gigabyte	

(3) Remarks

To support LBA or LARGE modes of HDDs, there must be some softwareinvolved. All such software is located in the Award HDD Service Routine (INT 13h). The computer may fail to access an HDD with LBA (LARGE) mode selected if you are running under a Operating System which has replaced the whole of INT 13h.

4.13 Power-On Boot

After you have made all the changes to CMOS values, and the system cannot boot with the CMOS values selected in Setup, restart the system by turning it OFF then ON. Alternatively, you can press the "RESET" button on the system case. You may also restart by simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. Upon restarting the system, immediately press <Insert> to load the BIOS default CMOS values for boot-up.

4.14 BIOS Reference - POST Messages

During the Power On Self Test (POST), if the BIOS detects an error requiring you to fix something, it will either sound a beep code or display a message.

If a message is displayed, it will be accompanied by:

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

POST Beep

Currently there is only one beep code in BIOS. This code indicates that a video error has occurred and that 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 Messages

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

CMOS BATTERY HAS FAILED

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

CMOS CHECKSUM ERROR

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

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. 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 make sure that the disk is formatted as a boot device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

The type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY

This pertains to the display switch on the motherboard, which can be set to either monochrome or color. The error message indicates the switch is set to a different setting than that indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

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

EISA Configuration Checksum Error
PLEASE RUN EISA CONFIGURATION UTILITY

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

EISA Configuration Is Not Complete
PLEASE RUN EISA CONFIGURATION UTILITY

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

Note: When either of the above errors appears, the system will boot in ISA mode. This allows you to run the EISA Configuration Utility.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

The hard drive cannot be initialized. Make sure that the adapter is installed correctly, and that all cables are correctly and firmly attached. Also make sure that the correct hard drive type is selected in Setup.

ERROR INITIALIZING HARD DISK CONTROLLER

Cannot initialize controller. Make sure that 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 on the hard drive.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

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

Invalid EISA Configuration
PLEASE RUN EISA CONFIGURATION UTILITY

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

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

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure that the keyboard is attached correctly, and that no keys are being pres sed during boot-up. 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 allow the BIOS to ignore the missing keyboard and continue the boot-up.

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 chip(s).

Memory parity Error at ...

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

MEMORY SIZE HAS CHANGED SINCE LAST BOOT

Memory has been added or removed since the last boot. In EISA mode, use Configuration Utility to reconfigure the memory configuration. In ISA mode, enter Setup and enter the new memory size in the memory fields.

Memory Verify Error at ...

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

OFFENDING ADDRESS NOT FOUND

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

OFFENDING SEGMENT

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

PRESS A KEY TO REBOOT

This will be displayed at the bottom of the 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-up, this will allow you to disable the NMI and continue to boot. Alternatively, you can reboot the system with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

Should Be Empty But EISA Board Found
PLEASE RUN EISA CONFIGURATION UTILITY

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

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

Should Have EISA Board But Not Found
PLEASE RUN EISA CONFIGURATION UTILITY

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

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

Slot Not Empty

Indicates that a slot designated as empty by the EISA Configuration Utility actually contains a board.

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

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted, and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Wrong Board In Slot
PLEASE RUN EISA CONFIGURATION UTILITY

The board ID does not match the ID stored in the EISA non-volatile memory.

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

4.15 BIOS Reference - POST Codes

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

POST (hex)	Description

C 0	1. Turn off OEM specific cache, shadow...
	 2. Initialize all the standard devices with default values. Standard devices include:
	     DMA controller (8237)
	     Programmable Interrupt Controller (8259)
	     Programmable Interval Timer (8254)
	     RTC chip

C 1	Auto-detection of onboard DRAM & cache
C 3	1. Test system BIOS checksum 2. Test the first 256 K DRAM 3. Expand the compressed codes into temporary DRAM area, including the compressed System BIOS & Option ROMs
C 5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM, so that POST will go faster
01-02	Reserved
03	Initialize EISA registers (EISA BIOS only)
04	Reserved
05	1. Keyboard controller self-test 2. Enable keyboard interface
06	Reserved
07	Verifies CMOS's basic R/W functionality
BE	Program defaults values into chipset, according to the MODBINable Chipset Default Table
09	1. Program the configuration register of NS CPU according to the MODBINable NS Register Table 2. OEM specific cache initialization (if needed)
0A	1. Initialize the first 32 interrupt vectors with corresponding interrupt handlers Initialize INT no from 33-120 with dummy(spurious) interrupt handler 2. Issue CPU ID instruction to identify CPU type 3. Early power management initialization (OEM specific)

❁ **This POST code is for boot block**

POST (hex)	Description

C0	1. Turn off OEM specific cache, shadow...
	 2. Initialize all the standard devices with default values. Standard devices include:
	     DMA controller (8237)
	     Programmable Interrupt Controller (8259)
	     Programmable Interval Timer (8254)
	     RTC chip

C1	Auto-detection of onboard DRAM & cache
C3	Checking checksum of compressed code
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM, so that POST will go faster
01	Clear base memory 0 ~ 640 K
0C	Initial interrupt vector 00-1FH
0D	Initial ISA VGA
41H	Enable FDD and detect media type
FFH	Boot from FDD

❀ **This table is for non-compressed versions only**

01-02	Reserved
C 0	Turn off OEM specific cache, shadow...
03	1. Initialize EISA registers (EISA BIOS only) 2. Initialize all the standard devices with default values. Standard devices include: DMA controller (8237) Programmable Interrupt Controller (8259) Programmable Interval Timer (8254) RTC chip
04	Reserved
05	1. Keyboard controller self-test 2. Enable keyboard interface
06	Reserved
07	Verifies CMOS's basic R/W functionality
BE	Program defaults values into chipset according to the MODBINable Chipset Default Table
C 1	Auto-detection of onboard DRAM & cache
C 5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM, so that POST will go faster
08	Test the first 256 K DRAM
09	1. Program the configuration register of Cyrix CPU according to the MODBINable NS Register Table 2. OEM specific cache initialization (if needed)
0A	1. Initialize the first 32 interrupt vectors with corresponding Interrupt handlers. Initialize INT numbers 33 ~ 120 with dummy(spurious) interrupt handler 2. Issue CPU ID instruction to identify CPU type 3. Early power management initialization (OEM specific)

❊ **The following POST codes are for all compressed versions and all non-compressed versions**

POST (hex)	Description
0B	1. Verify whether RTC time is valid or not 2. Detect bad battery 3. Read CMOS data into BIOS stack area 4. PnP initializations, including (PnP BIOS only): 　　Assign CSN to PnP ISA card 　　Create resource map from ESCD 5. Assign IO and memory for PCI devices (PCI BIOS only)
0C	Initialization of the BIOS data area (40:00 – 40:FF)
0D	1. Program some of the chipset's value according to Setup (Early Setup Value Program) 2. Measure CPU speed for display, and determine system clock speed 3. Video initialization including monochrome, CGA, EGA/VGA. If no display device found, the speaker will sound one single long beep followed by two short beeps
0E	1. Initialize the APIC (multi-processor BIOS only) 2. Test video RAM (if monochrome display device found) 3. Show messages including: 　　Award logo, copyright string, BIOS date code & part no. 　　OEM specific sign on messages 　　Energy Star logo (green BIOS only) 　　CPU brand, type and speed 　　Test system BIOS checksum (non-compressed version only)
0F	DMA channel 0 test
10	DMA channel 1 test
11	DMA page registers test
12-13	Reserved
14	Test 8254 Timer 0 Counter 2
15	Test 8259 interrupt mask bits for channel 1
16	Test 8259 interrupt mask bits for channel 2
17	Reserved
19	Test 8259 functionality
1A-1D	Reserved
1E	If EISA NVM checksum is good, execute EISA initialization (EISA BIOS only)
1F-29	Reserved
30	Detect base memory and extended memory size
31	1. Test base memory from 256 K to 640 K 2. Test extended memory from 1 M to the top of memory

32	1. Display Award Plug & Play BIOS Extension message (PnP BIOS only)
	2. Program all onboard super I/O chips (if any), including COM ports, LPT ports, and FDD port, all according to setup values
33-3B	Reserved
3C	Set flag to allow users to enter CMOS Setup Utility
3D	1. Initialize keyboard
	2. Install PS/2 mouse

POST (hex)	Description
3E	Try to turn on Level 2 cache Note: Some chipsets may need to turn on the L2 cache in this stage. But usually, the cache is turned on later in POST 61h
3E	Try to turn on Level 2 cache Note: Some chipsets may need to turn on the L2 cache in this stage. But usually, the cache is turned on later in POST 61h
BF	1. Program the rest of the chipset's value according to Setup. (Later Setup Value Program) 2. If auto-configuration is enabled, program the chipset with pre-defined values in the MODBINable Auto-Table
41	Initialize floppy disk drive controller
42	Initialize hard drive controller
43	If it is a PnP BIOS, initialize serial and parallel ports
44	Reserved
45	Initialize math coprocessor
46-4D	Reserved
4E	If there is any error detected (such as video, kb, etc.), show all the error messages on the screen and wait for user to press the <F1> key
4F	1. If password is needed, ask for password 2. Clear the Energy Star logo (green BIOS only)
50	Write all CMOS values currently in the BIOS stack area back into the CMOS
51	Reserved

52	1. Initialize all ISA ROMs
	2. Later PCI initializations (PCI BIOS only)
	    - assign IRQ to PCI devices
	    - initialize all PCI ROMs
	3. PnP Initializations (PnP BIOS only)
	    - assign IO, memory, IRQ and DMA to PnP ISA devices
	    - initialize all PnP ISA ROMs
	4. Program shadow RAM according to setup settings
	5. Program parity according to setup setting
	6. Power management Initialization
	    - Enable/disable global PM
	    - APM interface initialization

53	1. If it is NOT a PnP BIOS, initialize serial and parallel ports 2. Initialize time value in BIOS data area by translating the RTC time value into a timer tick value
60	Set up virus protection (boot sector protection) functionality according to setup settings

4.16 BIOS Default Drive Table

This is an up-to-date drive type table, as contained in Setup.

Type	Size (MB)	Cylinders	Heads	Sectors	Write Precomp	Land Zone	Example Model
1	10	306	4	17	128	305	TEAC SD510, MMI 112, 5412
2	20	615	4	17	300	615	Seagate ST225, ST4026
3	30	615	6	17	300	615	
4	62	940	8	17	512	940	
5	46	940	6	17	512	940	
6	20	615	4	17	None	615	Seagate ST125, Tandon TM262
7	30	462	8	17	256	511	
8	30	733	5	17	None	733	Tandon TM 703
9	112	900	15	17	None	901	
10	20	820	3	17	None	820	
11	35	855	5	17	None	855	
12	49	855	7	17	None	855	
13	20	306	8	17	128	319	Disctron 526, MMI M125
14	42	733	7	17	None	733	
15		Reserved					
16	20	612	4	17	0	663	Microscience HH725, Syquest 3250, 3425
17	40	977	5	17	300	977	
18	56	977	7	17	None	977	
19	59	1024	7	17	512	1023	
20	30	733	5	17	300	732	
21	42	733	7	17	300	732	
22	30	306	5	17	300	733	Seagate ST4038
23	10	977	4	17	0	336	

24	40	1024	5	17	None	976	Seagate ST4051
25	76	1224	9	17	None	1023	Seagate ST4096
26	71	1224	7	17	None	1223	Maxtor 2085
27	111	1224	11	17	None	1223	Maxtor 2140, Priam S14
28	152	1024	15	17	None	1223	Maxtor 2190, Priam S19
29	68	1024	8	17	None	1023	Maxtor 1085, Micropolis 1325
30	93	918	11	17	None	1023	Maxtor 1105 1120, 4780
31	83	925	11	17	None	1023	Maxtor 1170
32	69	1024	9	17	None	926	CDC 9415
33	85	1024	10	17	None	1023	
34	102	1024	12	17	None	1023	
35	110	1024	13	17	N one	1023	
36	119	1024	14	17	None	1023	
37	17	1024	2	17	None	1023	
38	136	1024	16	17	None	1023	
39	114	918	15	17	None	1023	Maxtor 1140, 4380
40	40	820	6	17	None	820	Seagate ST251
41	42	1024	5	17	None	1023	Seagate 4053 Miniscribe 3053/6053
42	65	1024	5	26	None	1023	Miniscribe 3053/6053 RLL
43	40	809	6	17	None	852	Miniscribe 3650
44	61	809	6	26	None	852	Miniscribe 3675 RLL
45	100	776	8	33	None	775	Conner CP3104
46	203	684	16	38	None	685	Conner CP3204
User							

Chapter 5

VGA Driver Installation Procedures

5.1 Windows 95/98 Drivers Setup Procedure

1.   In the Windows 95/98 screen, click ″Start″. Select ″Settings″, and then click on the ″Control Panel″ icon.

Figure 5-1: Opening the Windows Control Panel

2. When installing Windows 95, an″Add New Hardware Wizard″ window will appear. Click on″Next″.

Figure 5-2: Starting the Add New Hardware wizard

3. Windows will search for any new Plug and Play device on your system. Your screen may go blank during this process. Click on ″Next ″.

Figure 5-3: Searching for new Plug and Play devices

4. If you choose ″Yes [Recommended]″ and press ″Next″, the Hardware Wizard will help you find the new hardware. If the Hardware Wizard cannot find the new hardware, or if you want to set up the VGA driver by yourself, then select ″No, I want to select the hardware from a list″ and press ″Next″.

Figure 5-4: Finding new hardware

5. In the ″Hardware types:″ list, select ″Display adapters″ and press ″Next″.

Figure 5-5: Choosing Display adapters from the Hardware types list

6. Select ″Have Disk…″ and press ″Next″.

Figure 5-6: Selecting Have Disk

7. Click on ″Browse…″.
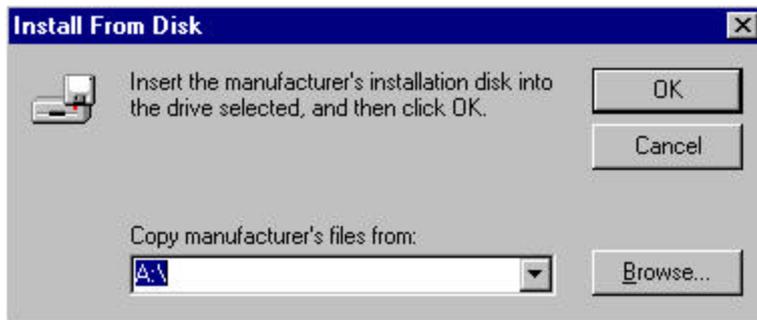
Figure 5-7: Clicking on the Browse button

8. Select ″chips98.inf″ in the "Open" window, and click on "OK".
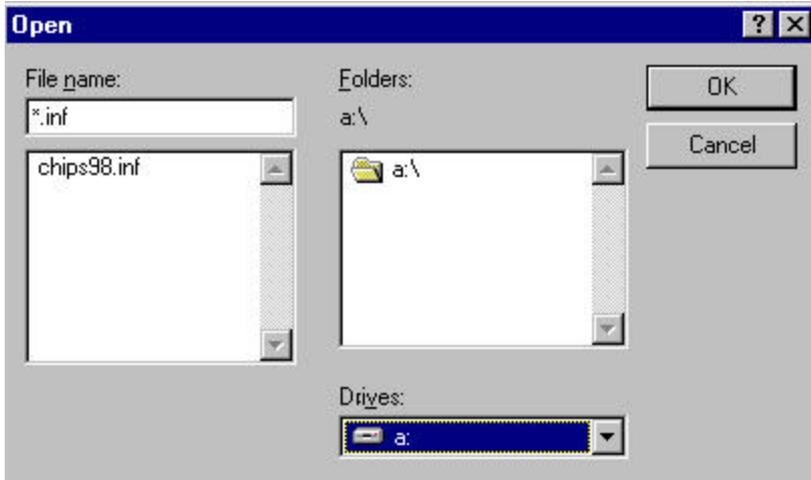
Figure 5-8: Selecting ″chips98.inf″

9. Select ″Chips and Tech. 69000 PCI″ and click on ″OK″.
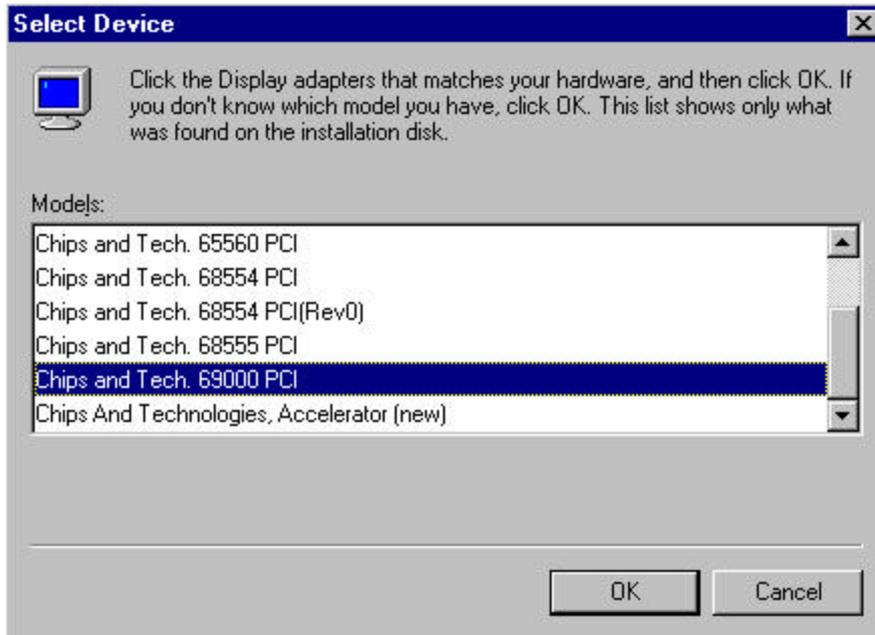
Figure 5-9: Selecting Chips and Tech. 69000 PCI

10. Click on "Next" to start copying the driver.

Figure 5-10: Clicking on the Next button

11. Click on ″Finish″ to complete the setup procedure.

Figure 5-11: Clicking on Finish

5.2 Windows NT Drivers Setup Procedure

1. In the ″Control Panel″ screen, select the ″Display″ icon. In the "Display Properties" window, select the "Settings" tab and click on ″Display Type″.
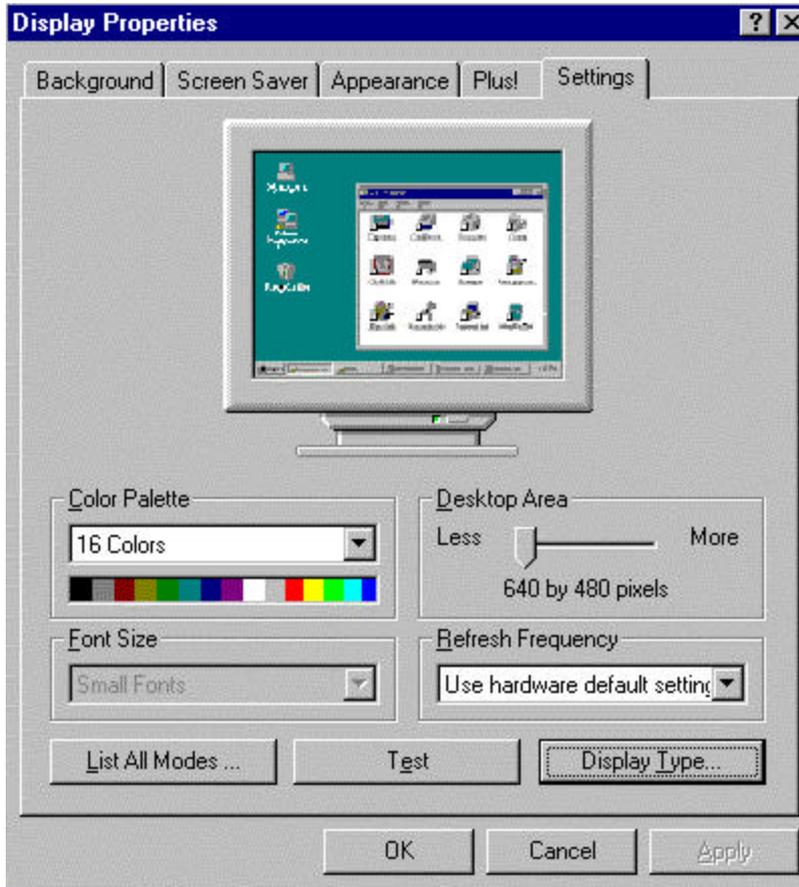
Figure 5-12: Clicking on Display Type in the Settings tab

2. Click on "Change…" in the Display Type window.
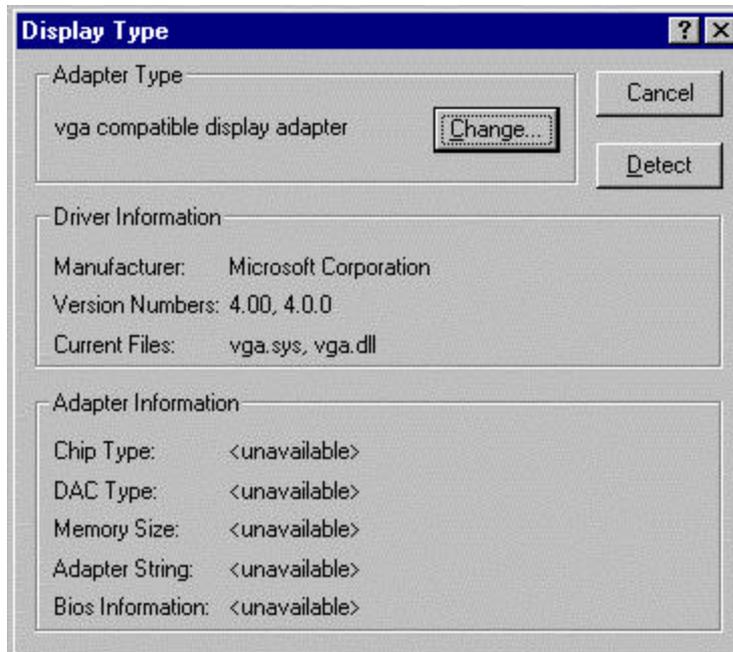
Figure 5-13: Clicking on the Change button

3. Click on ″Have Disk…″ in the Change Display window.
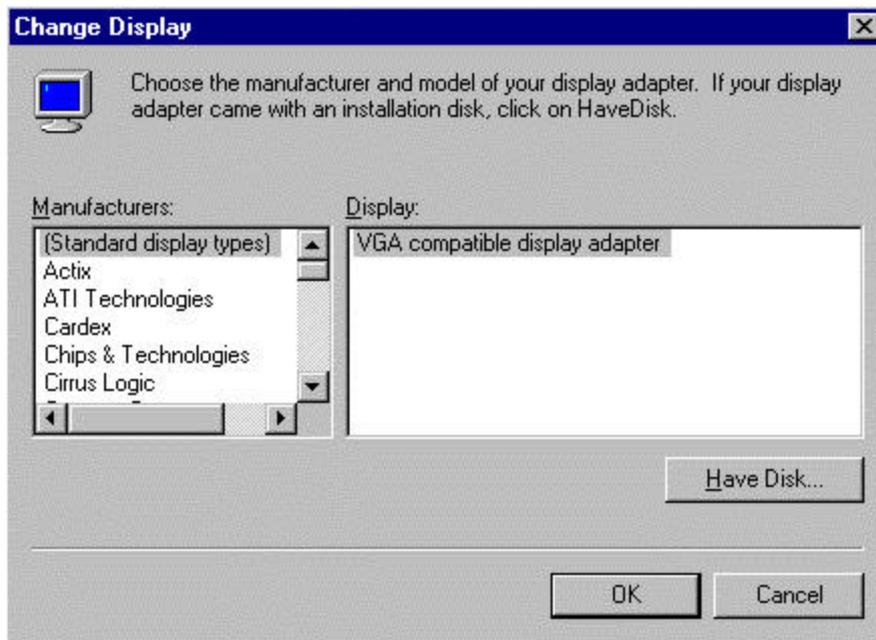
Figure 5-14: Clicking on the Have Disk button

4. Click on ″Browse…″ to look for the driver program.
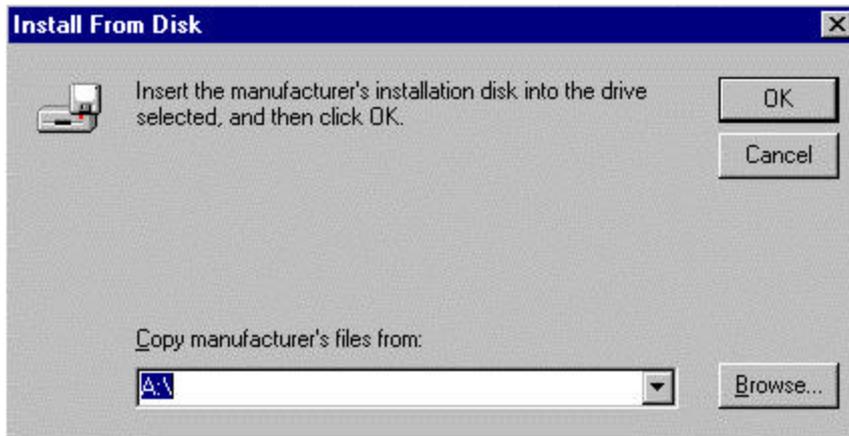
Figure 5-15: Clicking on the Browse button

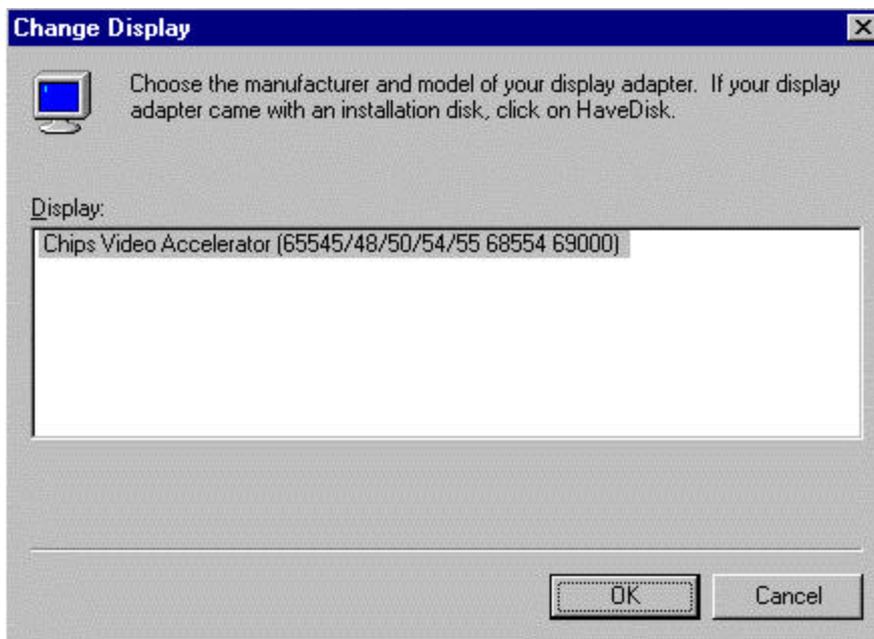5. Select ″Chip Video Accelerator [65545/48/50/54/55 68554 69000]″, and click on ″OK″.

Figure 5-16: Selecting the Chip Video Accelerator item

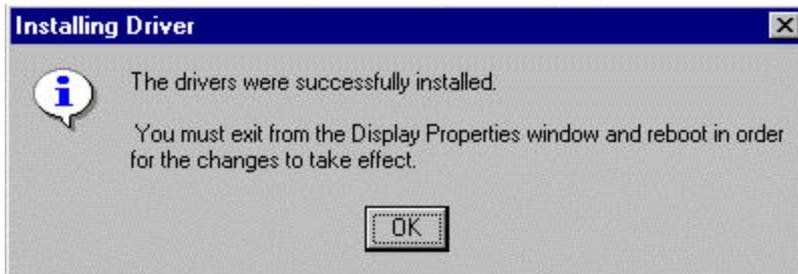6. When the driver has been successfully installed, click on ″OK″.

Figure 5-17: Clicking on the OK button

Chapter 6

LAN Driver Installation Procedures

6.1 Windows 95/98 Drivers Setup Procedure

1. In the Windows 95/98 screen, click on ″Start″. Select ″Settings″, and then click on the ″Control Panel″ icon.

Figure 6-1: Opening the Windows Control Panel

2.   Select ″Next″ to start the Add New Hardware Wizard.

Figure 6-2: Clicking on the Next button

3.   Click on ″Next″.

Figure 6-3: Clicking on the Next button

4. If the device is in the list, select ″PCI Ethernet Controller″ and press ″Next″.

Figure 6-4: Selecting the device from the list

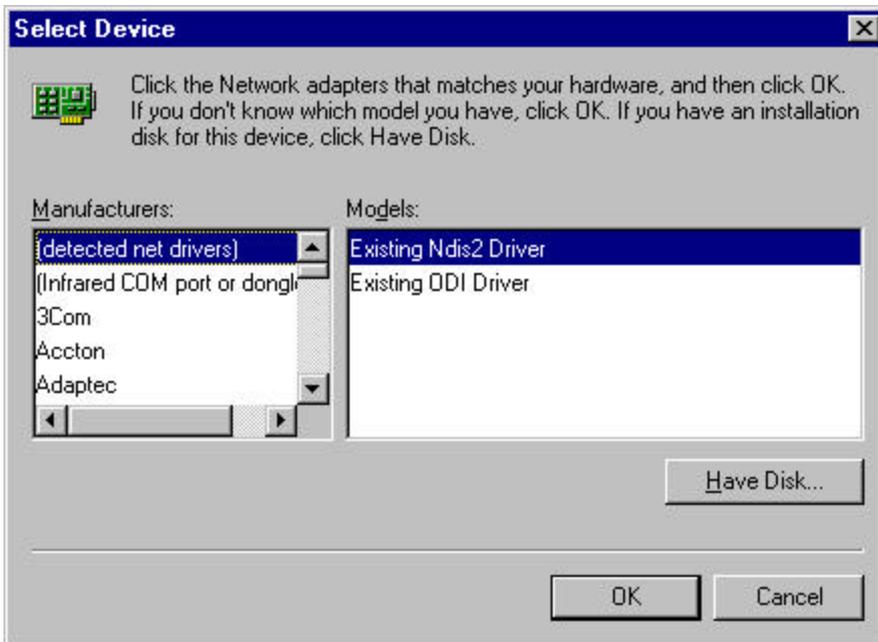4.   Follow the instructions on the screen, and click on ″Have Disk…″.

Figure 6-5: Clicking on Have Disk

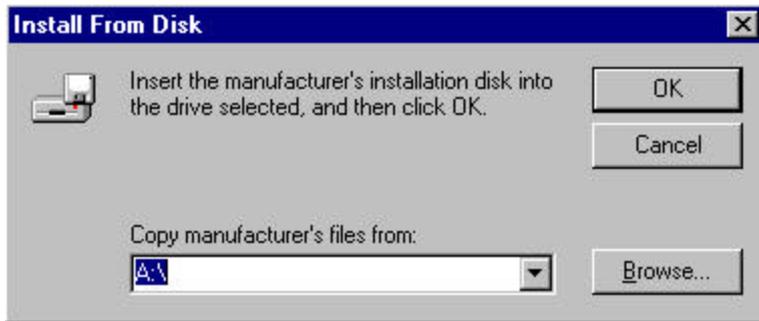6. Click on ″Browse…″.

Figure 6-6: Clicking on the Browse button

7. Select the device driver ″netrts 5.inf″, and click on ″OK″.
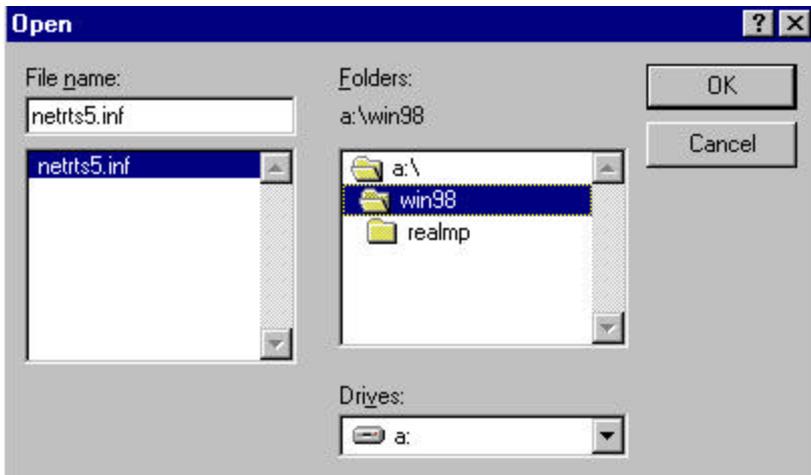

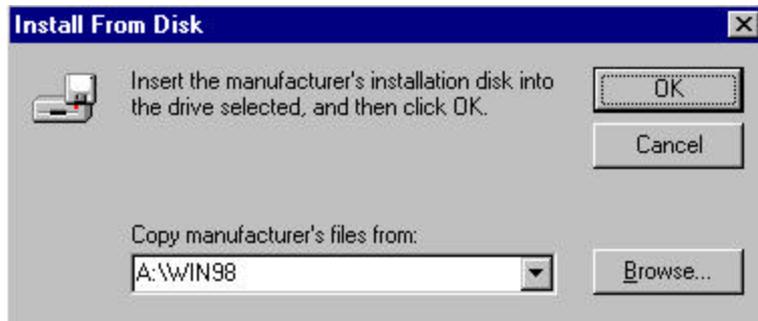Figure 6-7: Selecting "netrts5.inf"

8. Click on ″OK″.

Figure 6-8: Clicking on the OK button

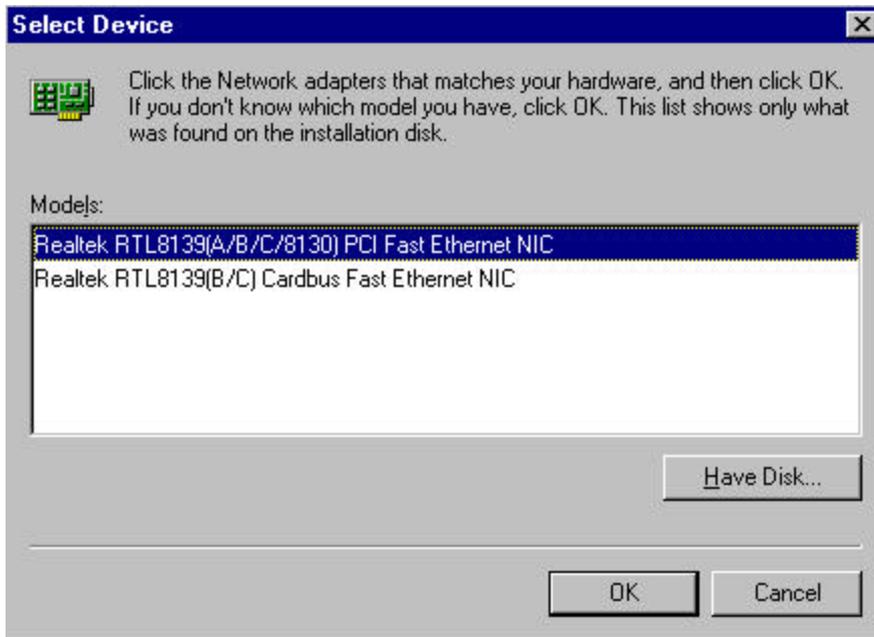9. Select ″Realtek RTL8139[A/B/C/8130] PCI Fast Ethernet NIC″ and press ″OK″.

Figure 6-9: Selecting the network adapter model

10. Click on "Next".

Figure 6-10: Clicking on the Next button

11. Click on ″Finish″ to complete the setup procedure.

Figure 6-11: Clicking on Finish

6.2 Windows NT Drivers Setup Procedure

1. In the ″Windows NT″ screen, click ″Start″ and select ″Settings″. Then click on the
    ″Control Panel″ icon to select ″Network″.
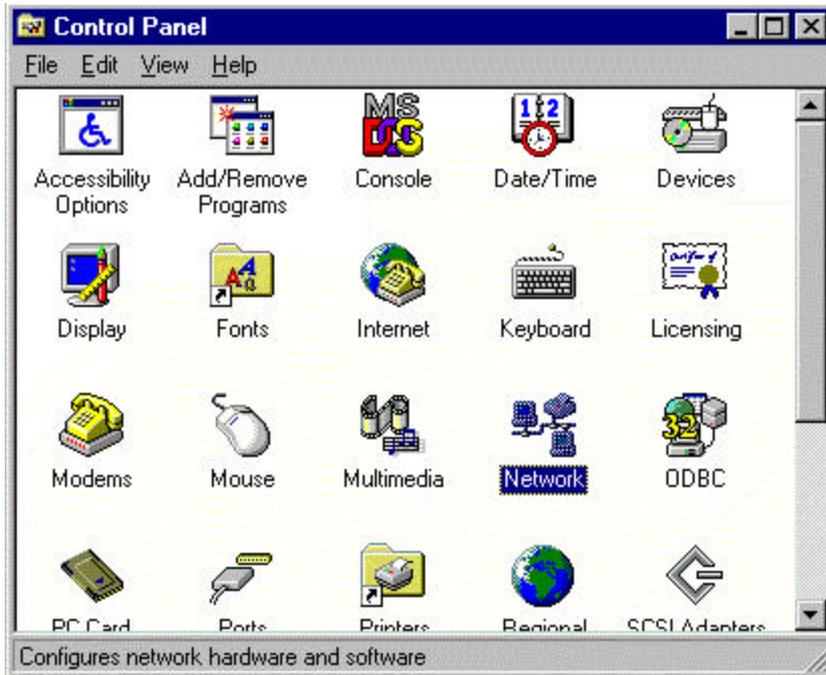
Figure 6-12: Double-clicking on the Network icon in the Control Panel

2. In the "Network" window, select the "Adapters" tab. Click on "Add…" to add your new driver.

Figure 6-13: Clicking on the Add button

3.   Select ″Have Disk…″ to find the Network Adapters Driver program.

Figure 6-14: Clicking on Have Disk

4. Click on ″OK″.

Figure 6-15: Clicking on the OK button

5. Click on ″OK″.
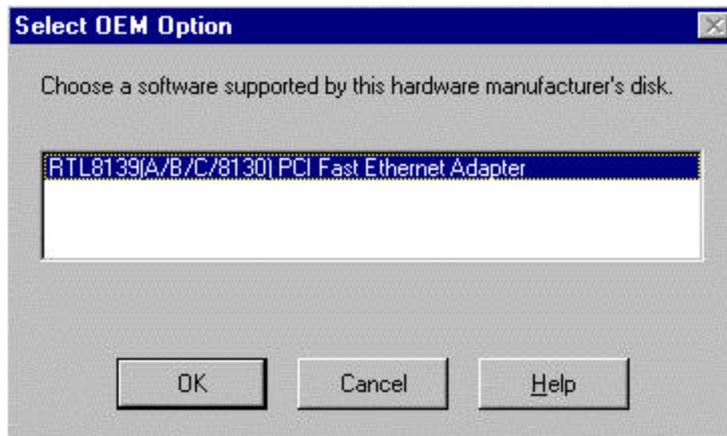
Figure 6-16: Clicking on the OK button

6.   Click on ″OK″.
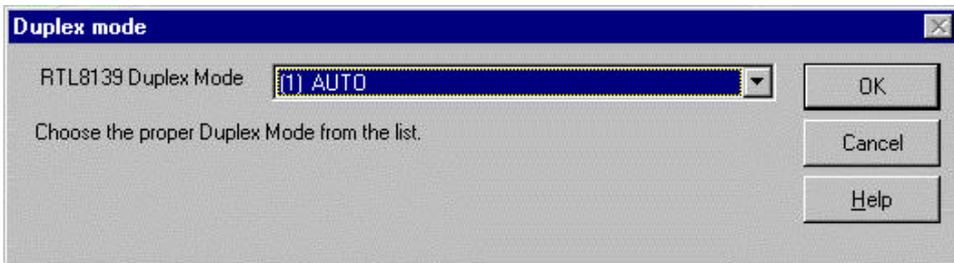
Figure 6-17: Clicking on the OK button

Appendix A
Watchdog Timer

Watchdog Timer Operating Procedure

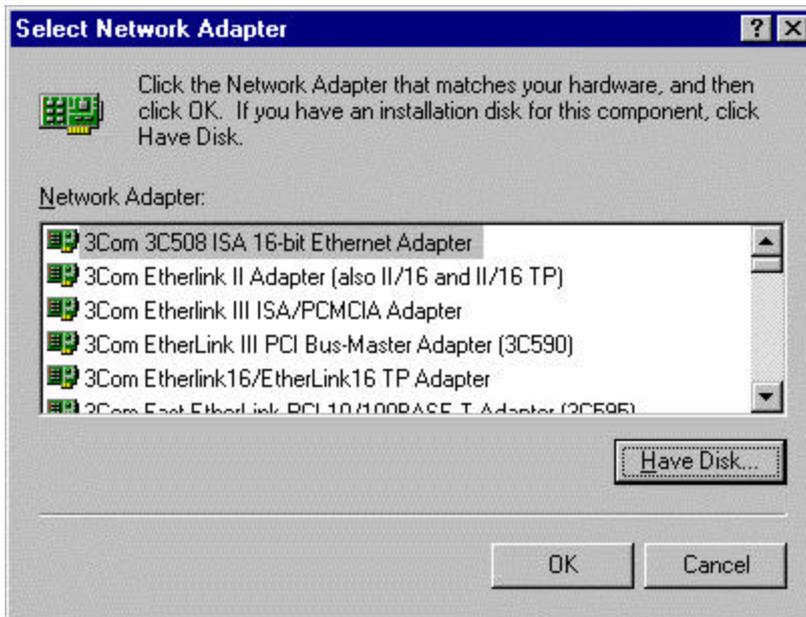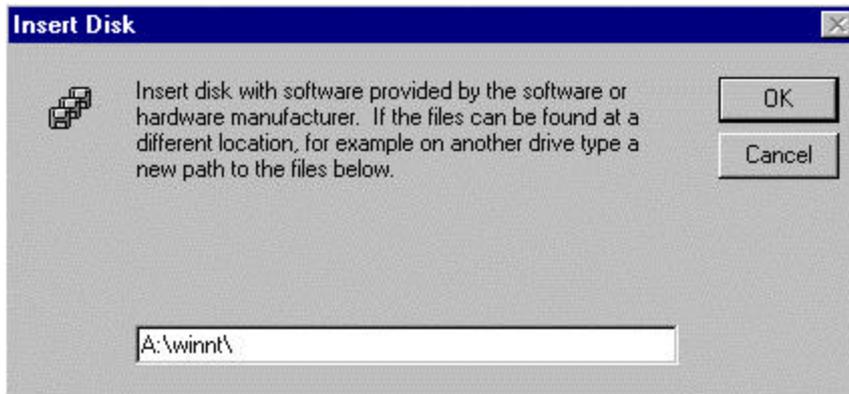The watchdog timer (WDT) is a special hardware device. It monitors the computer system to ensure that it is operating normally. If the system is not operating normally, the WDT will automatically initiate certain remedial procedures.

The WDT contains a receivable SQW signal from the RTC. It can set time and clear the counter function. When time is up, the WDT can send a Reset or NMI signal.

The computer's operator has to write a value into the WDT Configuration Register (i.e. write the control value to the configuration port), and clear the WDT counter (i.e. read the configuration port).

Watchdog Timer Functions

WDT configuration port	F2	Default at F2
Watchdog timer	Disabled Enabled	1. Default at disabled 2. Enabled for user's programming
WDT time-out active for	Reset NMI	Default at Reset
WDT active time	1 sec 2 sec 4 sec 8 sec 16 sec 32 sec 64 sec	Default at 64 sec

Watchdog Timer Control Register

The watchdog timer control register controls the WDT's operation. You can write the value to the WDT configuration port.

The following shows the control register's bit definitions:

```
 7    6    5    4    3    2    1    0

 X    X    X    □    □    □    □    □
```

111 : N/A

110 : Select 1 second

101 : Select   2 seconds

100 : Select 4 seconds

011 : Select   8 seconds

010 : Select 16 seconds

001 : Select 32 seconds

000 : Select 64 seconds

1 : Enable watchdog timer

0 : Disable watchdog timer

1 : Select NMI

0 : Select Reset

No setting
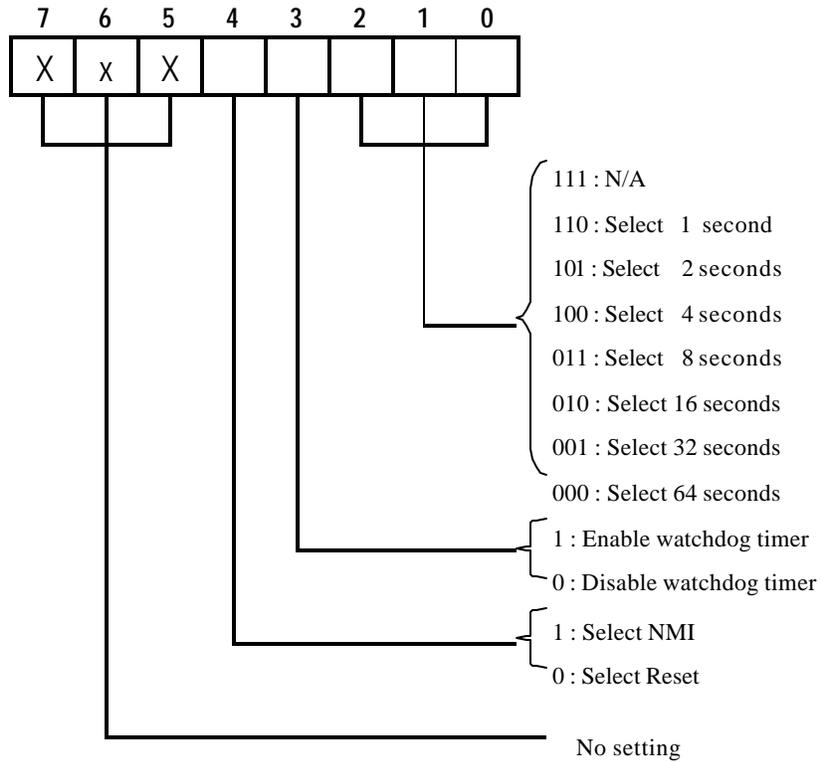
Watchdog Timer Programming Procedure

• **Power on or reset the system**

The initial value of the WDT control register (D4~D0) is zero, when power is on or when the system has been reset the. The following shows the initial value of the WDT (00000000b):

Bit	Value	Function
4	0	Select Reset
3	0	Disable watchdog timer
2, 1, 0	0 0 0	Select 64 seconds

• **Initializing the SQW of the RTC (setting the SQW output period at 0.5 sec)**

To initialize the SQW of the RTC processor, set the SQW signal with an output period of 0.5 seconds. This is the basic frequency of the WDT counter. The following is an example of **initializing the SQW signal program** in Intel® 8086 assembly language:

```
; (Generate SQW = 0.5 sec.)
Mov  dx, 70h
Mov  ax, 0Ah
Out  dx, al        ; Out port 70h = 0Ah
Mov  dx, 71h
Mov  ax, 2Fh
Out  dx, al        ; Out port 71h = 2Fh
; (enable the SQW output)
Mov  dx, 70h
Mov  ax, 0Bh
Out  dx, al        ; Out port 70h = 0Bh
Mov  dx, 71h
Mov  ax, 0Ah
Out  dx, al        ; Out port 71h = 0Ah
```

• **Clearing the WDT**

Repeatedly read the WDT configuration port, and the interval cannot be longer than the preset time. Otherwise, the WDT will generate an NMI or Reset signal for the system. The following is an example of **clearing the WDT program** in Intel[®] 8086 assembly language:

```
; ( Clear the WDT)
Mov    dx, F2h    ;Setting the WDT configuration port
In      al,  dx
```

Note: Before running the WDT, you must clear it. Therefore, before enabling the WDT, make sure that the initial value is zero.

• **WDT control register (write to WDT configuration port)**

You can set the WDT control register to control the WDT's operation.

The initial value of the WDT control register is as follows:

```
; (Setting the WDT Control Register as AL)
Mov      al, 0h  ; Setting initial value = 0 for the WDT Control Register
```

You must choose one of the following options:

1. Select NMI or Reset: decide D4 value in F2.

i.e. Setting D4 = 0, then it selects Reset

```
AND     al, 11101111b   ; Select Reset
```

i.e. Setting D4 = 1, then it selects NMI

```
OR al, 00010000b   ; Select NMI
```

2. Select the time-out intervals of the WDT (i.e. decide the values of D2, D1, D0 in F2)

   Example: D2~D0 = 0, the time-out interval will be 64 sec.

```
AND      al, 11111000b   ; Setting the time-out interval as 64 sec.
```

3. Enable or Disable the WDT (i.e. decide D3 value in F2)

   i.e. D3 = 0, disable the WDT

```
AND      al, 11110111b  ; Disable the WDT
```

   i.e. D3=1, Enable the WDT

```
OR       al, 00001000b  ; Enable the WDT
```

After finishing the above settings, you must output the control register's value to the WDT configuration port. The WDT will then start according to the above settings.

```
MOV    dx, F2h     ; Setting WDT configuration port
OUT    dx, al         ; Output the control register value
```

You should build a mechanism into the program so that it continues to read the WDT configuration port and clears the WDT before a time-out.

Appendix B
Memory Mapping

```
                        ┌──────────────────┐
                   ⇕    │  ON BOARD DRAM   │
    (1MB) 100000 ───────┼──────────────────┤
         FFFFF          │                  │
                   ⇕    │                  │
         F0000          │   SYSTEM BIOS    │ ⎫
         EFFFF          │                  │ ⎬  Memory address E0000~EFFFF
                   ⇕    │(may reserve for  │ ⎪  will be free after BIOS completing boot
         E0000          │   free space)    │ ⎭
         DFFFF ─────────┼──────────────────┤
                   ⇕    │       FREE       │
         CC00          │                  │
         CBFFF ─────────┼──────────────────┤
                   ⇕    │ Addon Card VGA   │
                        │      BIOS        │
         C0000 ─────────┼──────────────────┤
         BFFFF          │                  │
                   ⇕    │    VIDEO RAM     │
         A0000 ─────────┼──────────────────┤
         9FFFF          │      640K        │
                   ⇕    │       |          │
             0          │       0          │
                        └──────────────────┘
```