USER'S MANUAL

PC-420

**486/5x86
Embedded Card**

PC-420-M2

PC-420 EMBEDDED CPU CARD

OPERATION MANUAL

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This operation manual is meant to assist both Embedded Computer manufacturers and end users in installing and setting up the system. The information contained in this document is subject to change without any notice.

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TABLE OF CONTENTS

INTRODUCTION

This chapter gives you the information for PC-420. It also outlines the System specification.

Sections include:

● About This Manual

● System Specifications

● Safety precautions

Experienced users can skip to chapter 2 on page 2-1 for Quick Start.

1-1. ABOUT THIS MANUAL

Thank you for purchasing our PC-420 Embedded CPU Card, PC / AT compatible. The PC-420 provides faster processing speed, greater expandibility and can handle more task than before. This manual is designed to assist you how to install and set up the system. It contents five chapters. The user can apply this manual for configuration according to the following chapters :

Chapter 1 Introduction
This chapter introduces you the background of this manual, and the specification for this system. Final in this chapter will indicate you how to avoid the damages for this Embedded CPU Card.

Chapter 2 Hardware Configuration
This chapter outlines the components locations and their functions. In the end of this chapter, you will know how to set jumper and how to configure this card to meet your own needs.

Chapter 3 Watchdog-Timer Configuration
Helpful informations that inform you the proper installation of the Watchdog-timer.

Chapter 4 Green PC Function
This chapter explain the Green PC functions concisely.

Chapter 5 Award BIOS Setup
This chapter indicate you how to set up the BIOS configurations.

Appendix A Expansion Bus
This Appendix introduce you the expansion bus for PC-104 and ISA BUS

Appendix B Technical Summary
This section gives you the information about the Technical maps.

Appendix C Trouble Shooting
This section outlines the errors and offer you the methods to solve the problems.

1-2. SYSTEM SPECIFICATION

● **CPU :**

Intel, AMD, Cyrix, Ti, SGS, UMC
486SX / DX / DX2 / DX4 / OVER DRIVER / 5x86.
168pin PGA socket.
25 / 33 / 40 / 50 / 66 / 80 / 100 / 120 / 133MHz clock generator.
3.3V / 5V voltage regulator.

● **MEMORY :**

Up to 64MB DRAM.
Two 72pin SIMM socket on board.

● **CACHE :**

L1 Cache (depended on CPU type).
L2 Cache 128K / 256K / 512K.

● **REAL-TIME CLOCK / CALENDAR :**

CMOS data back up from BIOS set or BIOS default.
Dallas DS 12887 Real Time Clock.
Guaranty battery 10 years.

● **BIOS :**

Award, Flash BIOS for plug & play function.
Easy update 128KB flash EEPROM.
Support Green Function .
Support S/IO Setup.

● **KEYBOARD CONNECTOR :**

PC/AT type mini DIN connector.
Support PC/AT, PS/2 Keyboard .
5 pin External keyboard connector.

● **BUS SUPPORT :**

External ISA BUS.
Internal PCI Bus, for IDE.
PC-104 BUS.

● **WATCHDOG :**
I / O port 443H to open watchdog.
I / O port 441H to close watchdog.
Time-out timing select 0 / 2 / 4 / 6 / 8 / 10 / 12 / 14 / 16 / 18 / 20 / 22 / 24 / 26 / 28 / 30 sec +/- 25%.

● **IDE INTERFACE :**
One IDE port, Support up to two Enhanced IDE devices.

● **FLOPPY DISK DRIVER INTERFACE :**
Support up to two Floppy Disk Drivers, 3.5" and 5.25" (360K / 720K / 1.2M / 1.44M / 2.88M).

● **SERIAL PORT :**
Two high speed 16550 Compatible UARTs with Send / Receive 16 Byte FIFOs.
MIDI Compatible.
Programmable Band Rate Generator.

● **PARALLEL PORT :**
SPP, ECP, EPP Function.
Bi-direction parallel port.

● **GREEN FUNCTION :**
Software support by BIOS setup.
Hardware support by switch control.

● **LED INDICATOR :**
System power.
Hard Disk access.
Turbo and green function mode.

● **PC-104 BUS EXPANSION & SPEED :**
ISA   8MHz
PC-104   8MHz
PCI Bus   33MHz

● **DMA CONTROLLER :**
82C37 x 2

● **DMA CHANNELS :**
  7

● **INTERRUPT CONTROLLERS :**
  82C59 x 2

● **INTERRUPT LEVELS :**
  15

● **STORAGE TEMPERATURE :**
  -40 to 80°C.

● **OPERATING TEMPERATURE :**
  0 to 60°C.

● **SYSTEM POWER REQUIREMENT :**
  DC Voltage: +5V, minimum +4.75V, maximum 5.25V.
  DC Ampere: 5A.
  DC Voltage: +12V, minimum +11.4V, maximum 12.6V.
  DC Ampere: 500mA.

● **BOARD DIMENSION :**
  7.2"(L) x 4.8"(W) (185mm x 122mm)

● **BOARD WEIGHT :**
  0.24 Kg.

1-3. SAFETY PRECAUTIONS

Follow the messages below to avoid your systems from damage:

1. Avoid your system from static electric on all occasions.

2. Keep away from the electric shock, don't touch any components of this card when the card is on. And always disconnect power from your system when you work off.

3. Disconnect the power when you change any configurations. Because when you connect a jumper or install any cards, the sudden of power may damage the electric components.

HARDWARE CONFIGURATION
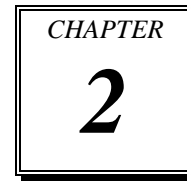
** QUICK START **

Helpful informations detail you the jumper & connector settings, and components locations.

Sections include:

● Jumper & Connector Quick Reference Table

● Components Locations

● Configuration and jumper settings

● Connector Pin Assignments

2-1 JUMPER & CONNECTOR QUICK REFERENCE TABLE

Hard Disk Driver LED Connector JP1
Turbo LED Connector JP2
CPU Clock selection   ....   JP4 / 1-6
RS232/422/485 (COM2) Selection   ....   JP4 / 7-12, JP5
Reset Connector JP6
Power LED and Keylock Connector JP7
CPU Voltage Selection JP8
Green Function Switch Connector JP10
Cache Size Selection JP11
CPU Type Selection JP9
Hard Disk Connector   ....   HDD
Floppy Disk Connector   ....   FDD
Printer Connector   ....   PRT
External Speaker Connector   ....   SPK
COM1 Connector COM1
COM2 Connector COM2
Keyboard Connector   ....   DIN
External Keyboard Connector   ....   EXKB
PC/104 Connector 104AB
PC/104 Connector 104CD
Power Connector   ....   PWR

2-2 COMPONENT LOCATIONS
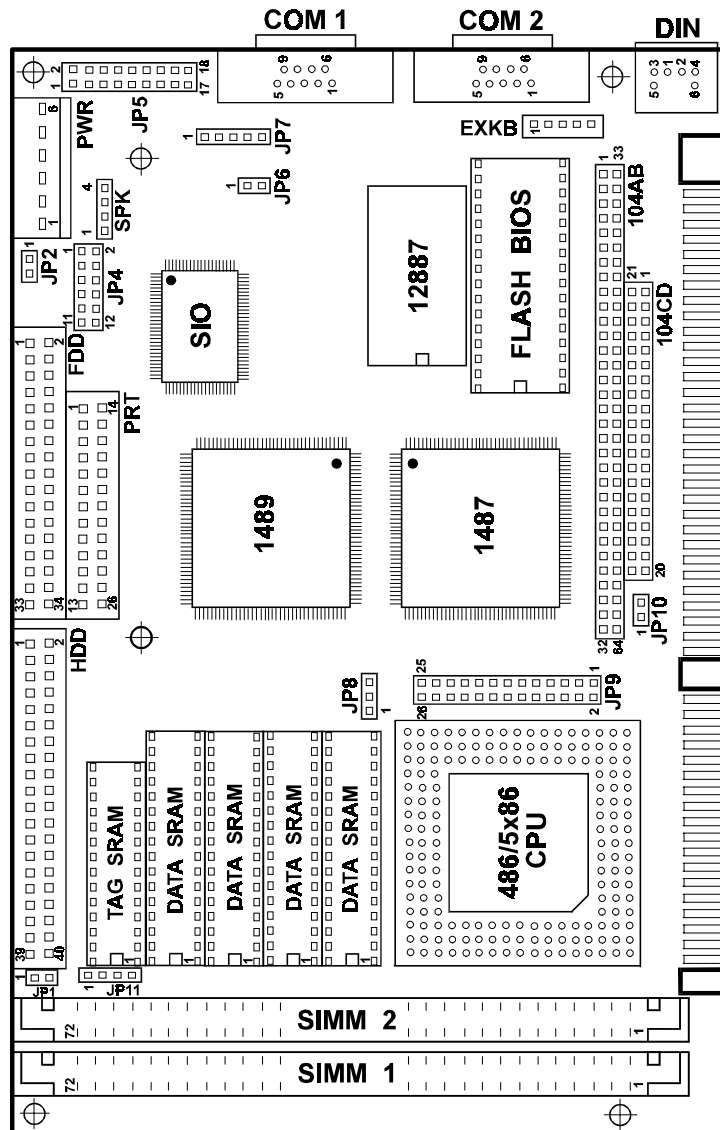
PC-420 Connector ,Jumper and Component locations

2-3 HOW TO SET JUMPERS

You can configure your board by setting jumpers. A jumper consists of two or three metal pins with a plastic base mounted on the card, and a small plastic "cap"(with a metal contact inside) to connect the pins. So you can set up your hardware configuration by "open" or "close" the pins.

The jumper can be combined into sets which called jumper blocks. When the jumpers are all in the block, you have to put them together to set up the hardware configuration. The figure below shows how this looks.

JUMPERS AND CAPS

2 Pin Jumper   3 Pin Jumper   Jumper Block   Jumper Cap
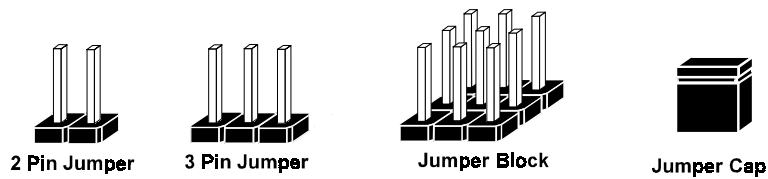
If a jumper has three pins, for examples, labelled PIN1, PIN2, and PIN3. You can connect PIN1 & PIN2 to create one setting and shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams look and what they represent.

JUMPER DIAGRAMS

Jumper Cap like this
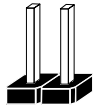
2 pin Jumper like this
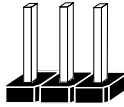
3 pin Jumper like this
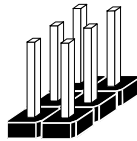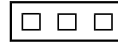
Jumper Block like this
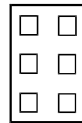
JUMPER SETTINGS

2 pin Jumper close(enabled) like this

1
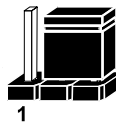
3 pin Jumper
2-3 pin close(enabled) like this

1
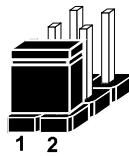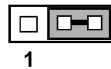
Jumper Block
1-2 pin close(enabled) like this

1   2
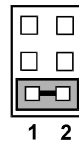
2-4 HARD DISK DRIVE LED

JP1 : Hard Disk Driver LED Connector
The pin assignments are as follow :

PIN	ASSIGNMENT
1	HDD Active Signal
2	Vcc

JP1

2-5 TURBO LED

JP2 : Turbo LED Connector
The pin assignments are as follow :

PIN	ASSIGNMENT
1	Turbo Signal
2	Vcc

JP2
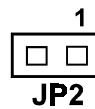
2-6 CPU CLOCK SELECTION

JP4 1-2,3-4,5-6 : CPU Clock Selection
(JP4 / 7-8,9-10,11-12 for COM 1,COM 2 IRQ selection)
The jumper settings are as follow :

CPU CLOCK	JUMPER SETTING			CPU TYPE	JUMPER ILLUSTRATION
	1-2	3-4	5-6		
25 MHz	Open	Open	Open	SX-25, DX/2-50, DX4/-75	
33 MHz	Closed	Closed	Open	SX-33, DX-33, DX/2-66,DX/4-100 AMD5x86-133, Cyrix5x86-100	
40 MHz	Closed	Open	Open	SX-40, DX-40, DX/2-80 Cyrix5x86-120	

*** Manufactory default --- 33MHz
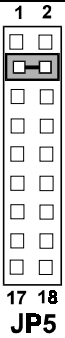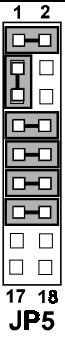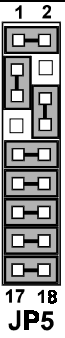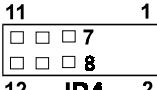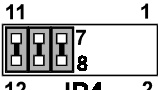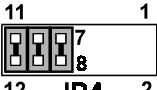
2-7 COM2 FOR RS-232/422/485 SELECTION

JP4/7-8, 9-10, 11-12 & JP5 : RS-232/422/485 Selection
COM1 fixed for RS-232 function only
COM2 selectable for RS-232 or 422, 485 function
The jumper settings are as follow :

COM 2 Function	RS-232	RS-422	RS-485
JP5 Jumper setting (pin closed)	3-4	1-2 3-5 7-8 9-10 11-12 13-14	1-2 3-5 6-8 9-10 11-12 13-14 15-16 17-18
JP5 Jumper illustration			
JP4 Jumper Setting (pin closed)		7-8 9-10 11-12	7-8 9-10 11-12
JP4 Jumper illustration			

*** Manufactory default --- RS-232.

2-8 RESET CONNECTOR

JP6 : Reset Connector
The pin assignments are as follow :

PIN	ASSIGNMENT
1	Reset
2	Ground

2-9 POWER LED & KEYLOCK CONNECTOR

JP7 : Power LED & Keylock Connector
The pin assignments are as follow :

PIN	ASSIGNMENT
1	Power LED
2	NC
3	Ground
4	Keyboard INT
5	Ground

2-10 CPU VOLTAGE SELECTION

JP8 : CPU Voltage Selection
The jumper settings are as follow :

CPU VOLTAGE	JUMPER SETTING 1-2	2-3	JUMPER ILLUSTRATION
3.3V	Open	Closed	
5V	Closed	Open	

*** Manufactory default --- 3.3V

2-11 GREEN FUNCTION SWITCH CONNECTOR

JP10 : Green Function Connector
When you touch the switch first time, it works into green mode, the second time is back to standard mode. The pin assignments are as follow:

PIN	ASSIGNMENT
1	Green Signal
2	Ground
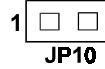
2-12 CACHE SIZE SELECTION

JP11 : Cache Size Selection
The jumper settings are as follow :

Cache Size	Jumper Setting 1-2	3-4	Jumper illustration
128K	Open	Open	
256K	Open	Closed	
512K	Closed	Closed	

*** Manufactory default --- 256K Cache.

2-13 CPU TYPE SELECTION

JP9 : CPU Type Selection
The jumper settings are as follow :

CPU Type	Intel SX	Intel DX\DX2 DX4	AMD DX\DX4	AMD DX2	AMD Write Back
Jumper setting (pin closed)	5-6 11-12 13-15 14-16 19-20 22-24	5-6 11-12 13-15 14-16 19-21 22-24 25-26	4-6 9-11 15-16 19-21 22-24 25-26	4-6 9-11 15-16 17-18 19-21 22-24 25-26	1-3 5-6 8-10 11-12 13-15 14-16 19-21 23-24 25-26
Jumper illustration					

CPU Type	Intel P24D OverDrive	Intel DX2 WriteBack AMD 5x86	Cyrix DX\DX2 DX4	Cyrix 5x86\ 100\120	Cyrix 5x86 133
Jumper setting (pin closed)	1-3 5-6 8-10 11-12 13-15 14-16 19-21 23-24 25-26	1-3 5-6 7-9 8-10 11-12 13-15 14-16 19-21 23-24 25-26	1-2 6-8 9-10 11-13 14-16 15-17 19-21 22-24 25-26	1-3 5-6 8-10 11-12 15-17 14-16 19-21 23-24 25-26	1-3 5-6 7-9 8-10 11-12 15-17 14-16 19-21 23-24 25-26
Jumper illustration	JP9	JP9	JP9	JP9	JP9

*** Manufactory default --- Intel DX\DX2\DX4

2-14 HARD DISK DRIVE CONNECTOR

HDD : Hard Disk Connector
The HDD disk pin assignments are as follow :
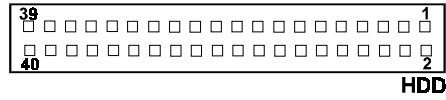
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	REST	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	NC
21	NC	22	GND
23	IOW	24	GND
25	IOR	26	GND
27	IORDY	28	NC
29	NC	30	GND
31	IRQ14	32	IO16
33	A1	34	NC
35	A0	36	A2
37	CS1	38	CS2
39	HDLED	40	GND

2-15 FLOPPY DISK DRIVE CONNECTOR

FDD : Floppy Disk Drive Connector
You can use a 34-pin daisy-chain cable to connect a two-FDDs. On one end of this cable is a 34-pin flat cable to attach the FDD on the board, the other side is to attach two FDDs.
The pin assignments are as follow :
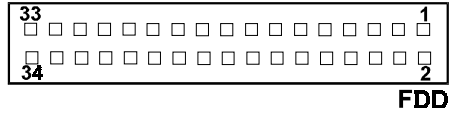
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	2	RPM
3	GND	4	NC
5	GND	6	RATE0
7	GND	8	INDEX
9	GND	10	MTR0
11	GND	12	DRV1
13	GND	14	DRV0
15	GND	16	MTR1
17	GND	18	DIR
19	GND	20	STEP
21	GND	22	WDATA
23	GND	24	WGATE
25	GND	26	TRK0
27	GND	28	WRPTR
29	GND	30	RDATA
31	GND	32	SEL
33	GND	34	DSKCHG

2-16 PRINTER CONNECTOR

PRT : Printer Connector

As to link the Printer to the card, you need a cable to connect both DB25 connector and parallel port. The pin assignments are as follow :

```
13 □ □ □ □ □ □ □ □ □ □ □ □ □ 1
   □ □ □ □ □ □ □ □ □ □ □ □ □
26                          14
           PRT
```
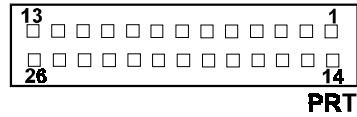
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	STB	14	AUTFE
2	P0	15	ERROR
3	P1	16	INIT
4	P2	17	SLCTIN
5	P3	18	GND
6	P4	19	GND
7	P5	20	GND
8	P6	21	GND
9	P7	22	GND
10	ACK	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	NC

2-17 EXTERNAL SPEAKER CONNECTOR

SPK : external speaker connector
The SPK pin assignment are as follow:
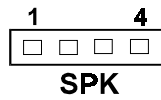
PIN	ASSIGNMENT
1	SPK Signal
2	NC
3	GND
4	+5V

2-18 COM1 CONNECTOR

COM1 : COM1 Connector, DB9 male connector
The COM1 Connector assignments are as follow :
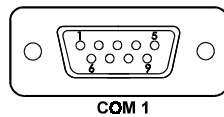
PIN	ASSIGNMENT
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

2-19 COM2 CONNECTOR

COM2 : COM2 Connector
The COM2 Connector assignments are as follow :

COM 2
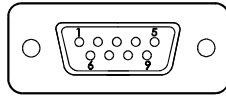
PIN	ASSIGNMENT		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	GND	GND	GND
6	DSR	RTS-	NC
7	RTS	RTS+	NC
8	CTS	CTS+	NC
9	RI	CTS-	NC

2-20 KEYBOARD CONNECTOR

DIN : Keyboard Connector
The DIN connector assignments are as follow :

PIN	ASSIGNMENT
1	KBDATA
2	NC
3	GND
4	VCC
5	KBCLK
6	NC

DIN
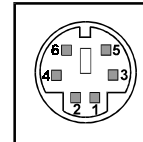
2-21 EXTERNAL KEYBOARD CONNECTOR

EXTB : External Keyboard Connector
The pin assignments are as follow :

PIN	ASSIGNMENT
1	KBCLK
2	KBDATA
3	NC
4	GND
5	VCC

EXKB
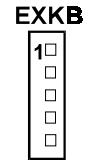
2-22 POWER CONNECTOR

PWR : Power Connector
The pin assignments are as follow :

PWR
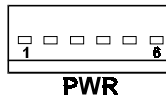
PIN	ASSIGNMENT
1	NC
2	+5V
3	+12V
4	-12V
5	GND
6	GND

2-23 MEMORY INSTALLING

The PC-420 CPU Card can support 4 DRAM banks ,bank 0 and bank 4 in two pcs 72 pin SIMM sockets on board.

Note: SIMM 1,2 for single & double Bank DRAM module
(72pin x 36bit x 2)

DRAM BANK CONFIGURATION

SIMM 1 BANK 0,1	SIMM 2 BANK 2,3	TOTAL MEMORY
1M		1M
1M	1M	2M
2M		2M
1M	2M	3M
2M	2M	4M
4M		4M
1M	4M	5M
2M	4M	6M
4M	4M	8M
8M		8M
2M	8M	10M
4M	8M	12M
8M	8M	16M
4M	16M	20M
8M	16M	24M
16M	16M	32M
32M		32M
4M	32M	36M
8M	32M	40M
16M	32M	48M
32M	32M	64M

WATCHDOG TIMER CONFIGURATION
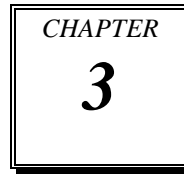
This chapter inform you the watchdog timer concisely.It shows you how to configure the watchdog-timer function.

Sections include:

● Watchdog Timer Configuration

3-1. WATCHDOG TIMER CONFIGURATION

The watchdog timer can reset the system automatically. It is defined at I/O port **443H**. When you want to enable the watchdog timer, please write I/O port **443H**, then the system will reset itself. When you want to disable the function, write I/O port **441H**, the system will run the command to stop the Watchdog function.

The PC-420 watchdog function, You must write your program so when it write I/O port address 443 for enable watchdog and write I/O port address 043 for disable watchdog. The timer's intervals have a tolerance of 25% so you should program an instruction that will refresh the timer about every second.

The following program shows you how to program the watch timer in your program.

Watchdog enable program:

MOV   AX, 000FH   (choose the value you need, start from 0)
MOV   DX, 443H
OUT   DX, AX

Watchdog disable program:

MOV   AX, 000FH   (ignore this value)
MOV   DX, 441H
OUT   DX, AX

The watchdog Timer control table as follow:

Level	Value	Time/sec	Level	Value	Time/sec
1	F	0	9	7	16
2	E	2	10	6	18
3	D	4	11	5	20
4	C	6	12	4	22
5	B	8	13	3	24
6	A	10	14	2	26
7	9	12	15	1	28
8	8	14	16	0	30

GREEN PC FUNCTION
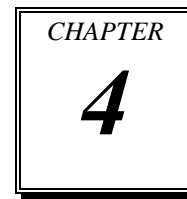
This chapter gives you the concise information for Green PC Function.

Sections include:

- Power Saving Block Diagram

- CPU Doze Mode

- System STANDBY Mode

- System SUSPEND Mode

4-1. POWER SAVING BLOCK DIAGRAM
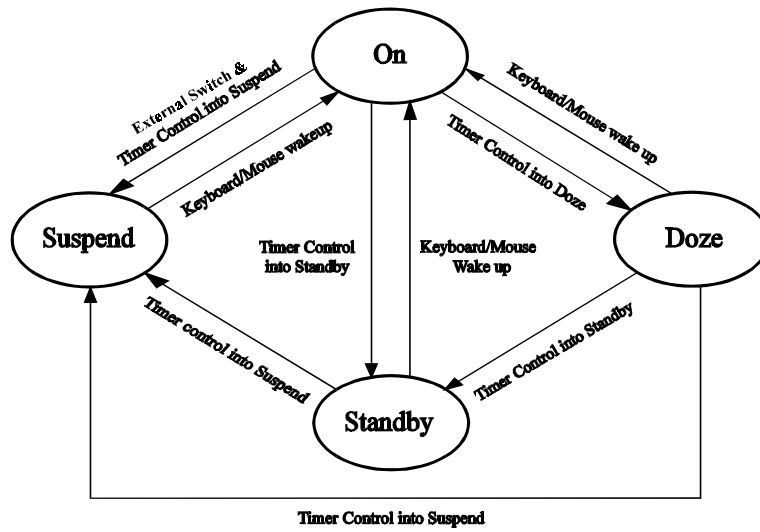
4-2. CPU DOZE MODE

1. After out of the timer, CPU clock is slow down to 8MHz.
2. Sound 1 beep.
3. Flash LED to indicate power saving status.
4. Monitor Activity, according to the setting of Advanced Setup.
5. Any activity occurs, system will exit from Doze mode to On mode.

4-3. SYSTEM STANDBY MODE

1. After out of the timer, CPU clock is slow down to 8MHz.
2. Sound 2 beeps.
3. Flash LED to indicate power saving status.
4. Level 1 cache are disabled.
5. VGA monitor displays blank screen.
6. Fixed disk driver motor will be spin off.
7. Any activity occurs, system will exit from Standby mode to On mode.

4-4. SYSTEM SUSPEND MODE

1. After out of the timer, CPU clock is slow down to 8MHz, if you use Intel S-series or Cyrix (SMI) CPU, then CPU clock will be stopped.
2. Sound 3 beeps.
3. Flash LED to indicate power saving status.
4. Level 2 cache are disabled.
5. VGA monitor displays blank screen.
6. Fixed disk driver motor will be spin off.
7. Monitor activity according to the setting of Advanced Setup.
8. When system in Suspend mode, only Keyboard / Mouse / Alarm resume can wakeup system.

AWARD BIOS SETUP
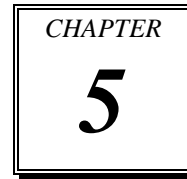
This chapter states out how to set up the Award BIOS.

Sections include:

- Introduction

- Entering Setup

- The Award BIOS Setup

- The Standard CMOS Setup

- The BIOS Features Setup

- The Chipset Features Setup

- Power Management Setup

- Load BIOS defaults

- IDE HDD Auto Detection

- Save Setup

5-1. INTRODUCTION

This chapter will show you the function of a BIOS in managing the features of your system. The PC-420 Embedded Card is equipped with the BIOS for system chipset from Award Software Inc. This page briefly explains the function of a BIOS in managing the special features of your system. The following pages describe how to use the BIOS for system chipset Setup menu.

Your application programs (such as word processing, spreadsheets, and games) rely on an operating system such as DOS or OS/2 to manage such things as keyboard, monitor, disk drives, and memory.

The operating system relies on a BIOS (Basic Input and Output system), a program stored on a ROM (Read-only Memory) chip, to initialize and configure your computer's hardware. As the interface between the hardware and the operating system, the BIOS enables you to make basic changes to your system's hardware without having to write a new operating system.

The following diagram illustrates the interlocking relationships between the system hardware, BIOS, operating system, and application program:
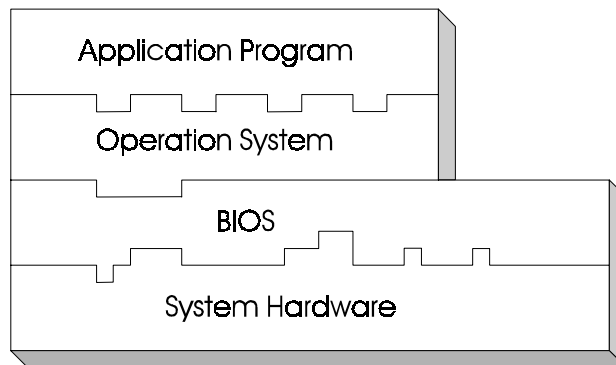
5-2. ENTERING SETUP

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

As long as this message is present on the screen you may press the <Del> key
(the one that shares the decimal point at bottom of the number keypad) to
access the setup program. In a moment, the main menu of the Award SETUP
program will appear on the screen:

```
┌─────────────────────────────────────────────────────────────┐
│              ROM / PCI / ISA BIOS (2A4KDPA)                  │
│                   CMOS SETUP UTILITY                         │
│                 AWARD SOFTWARE, INC                          │
├─────────────────────────────────────────────────────────────┤
│                                                             │
│   STANDARD CMOS SETUP          PASSWORD SETTING             │
│                                                             │
│   BIOS FEATURES SETUP          IDE HDD AUTO DETECTION       │
│                                                             │
│   CHIPSET FEATURES SETUP       SAVE & EXIT SETUP            │
│                                                             │
│   POWER MANAGEMENT SETUP       EXIT WITHOUT SAVING          │
│                                                             │
│   LOAD BIOS DEFAULTS                                        │
│                                                             │
│   LOAD SETUP DEFAULTS                                       │
│                                                             │
├─────────────────────────────────────────────────────────────┤
│   Esc : Quit                ↑↓→←  :SELECT ITEM              │
│   F10 : Save & Exit Setup   (Shift)F2 : Change Color        │
├─────────────────────────────────────────────────────────────┤
│          Time, Date, Hard Disk Type.........                │
└─────────────────────────────────────────────────────────────┘
```

Setup program initial screen

You may use the cursor up/down keys to highlight the individual menu items. As you highlight each item, a brief description of that item's function appears in the lower window. If you have a color monitor you can use the Shift F2 keys to scroll through the various color combinations available.

5-3. THE STANDARD CMOS SETUP MENU

Highlight STANDARD CMOS SETUP and press < ENTER > and the screen shown as below :

```
ROM PCI / ISA BIOS (2A4XDP6A)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date   (mm:dd:yy)   :  Wed,  Jan,  12,  1994
Time   (hh:mm:ss)   :  18  : 24  :  14

                    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 : 1.2M , 5.25 in.
Drive B : 1.4M , 3.5  in.            Base Memory:       640K
                                   Extended Memory:   15360K
Video   : EGA/VGA                    Other Memory:      384K
                                  ----------------------------------
Halt On: All Errors                  Total Memory:    16384K

 Esc : Quit          ↑↓→← :Select Item        Pu/Pd/+/- : Modify
 F1   : Help         (Shift) F2 : Change Color
```

CMOS setup screen

In the above table the base memory size and the extended memory size are displayed. This is automatically read from your systems, and you do not need to set these parameters. The screen shows a calendar. The week display will depend on the date set in your system clock and the flashing indicating the current date. Since you have not yet set the time and date, the date displayed is probably incorrect. Information on each item is

Date:

< Month >, < Date > and <Year >. Ranges for each value are in the CMOS Setup Screen, and the week-day will skip automatically.

Time:

< Hour >, < Minute >, and < Second >. Uses 24 hour clock format, i.e., for PM numbers, add 12 to the hour. For examples, 4: 30P.M. You should enter the time as 16:30:00.

Drive C type / Drive D type:

The categories identify the types of hard disk drive C or drive D that have been installed in the computer. There are 45 predefined types and 2 user definable types are for Normal BIOS. Type 1 or Type 45 are predefined. Type User is user-definable.

Primary Master/Primary Slave/Secondary Master/Secondary Slave :

The categories identify the types of 2 channels that have been installed in the computer. There are 45 predefined types and 4 user definable types are for Enhanced IDE BIOS. Type 1 to Type 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 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 >. This information should be provided in the docu-mentation from your hard disk vendor or the system manufacturer.

If the controller of HDD interface is ESDI, the selection shall be "Type 1".

If the controller of HDD interface is SCSI, the selection shall be "None"
If the controller of HDD interface is CD-ROM, the selection shall be "None"

TYPE:
This is the number designation for a drive with certain identification parameters.

CYLS.:
This is the number of cylinders found in the specified drive type.

HEADS:
This is the number of heads found in the specified drive type.

WPCOM:
WPcom is the read delay circuitry which takes into account the timing differences between the inner and outer edges of the surface of the disk platter. The number designates the starting cylinder of the signal.

LZONE:
Lzone is the landing zone of the heads. This number determines the cylinder location where the heads will normally park when the system is shut down.

SIZE (CAPACITY):
This is the formatted capacity of the drive based on the following formula:
(# of heads) X (# of cylinders) X (# of sets) X (512bytes/sects)

DRIVE A AND DRIVE B:
The option are 360KB 5.25in, 1.2KB 5.25in, 720KB 3.5in, 1.44MB 3.5in, 2.88MB 3.5in and None. Not Installed could be used as an option for diskless workstations.

VIDEO:
Options are Monochrome, Color 40, VGA/EGA, Color 80.

HARD DISK ATTRIBUTES:

Type	Cylinders	Heads	V-P comp	LZone	Sect	Capacity
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	30
4	940	8	512	940	17	62
5	940	6	512	940	17	46
6	615	4	65535	615	17	20
7	642	8	256	511	17	30
8	733	5	65535	733	17	30
9	900	15	65535	901	17	112
10	820	3	65535	820	17	20
11	855	5	65535	855	17	35
12	855	7	65535	855	17	49
13	306	8	128	319	17	20
14	733	7	65535	733	17	42
15	000	0	0000	000	00	00
16	612	4	0000	663	17	20
17	977	5	300	977	17	40
18	977	7	65535	977	17	56
19	1024	7	512	1023	17	59
20	733	5	300	732	17	30
21	733	7	300	732	17	42
22	733	5	300	733	17	30
23	306	4	0000	336	17	10
24	977	5	65535	976	17	40
25	1024	9	65535	1023	17	76
26	1224	7	65535	1223	17	71
27	1224	11	65535	1223	17	111
28	1224	15	65535	1223	17	152
29	1024	8	65535	1023	17	68
30	1024	11	65535	1023	17	93
31	918	11	65535	1023	17	83
32	925	9	65535	926	17	69
33	1024	10	65535	1023	17	85
34	1024	12	65535	1023	17	102
35	1024	13	65535	1023	17	110
36	1024	14	65535	1023	17	119
37	1024	2	65535	1023	17	17
38	1024	16	65535	1023	17	136
39	918	15	65535	1023	17	114
40	820	6	65535	820	17	40
41	1024	5	65535	1023	17	42
42	1024	5	65535	1023	26	65
43	809	6	65535	852	17	40
44	809	6	65535	852	26	61
45	776	8	65335	775	33	100
47			User Defined			

Award Hard Disk Type Table

5-4. The BIOS FEATURES SETUP MENU

Choose the "BIOS FEATURES SETUP" in the main menu, the screen shown as below.

```
            ROM PCI/ISA BIOS (2A4KDP6A)
               BIOS FEATURES SETUP
               AWARD SOFTWARE, INC.

 CPU Internal Cache       : Enabled    Video    BIOS Shadow      : Enabled
 External Cache           : Enabled    C8000 -CFFFF Shadow       : Disabled
 Quick Power On Self Test : Disabled   D0000- D7FFF Shadow       : Disabled
 Boot Sequence            : A,C        D8000- DFFFF Shadow       : Disabled
 Swap Floppy Drive        : Disabled
 Boot Up Floppy Seek      : Enabled
 Boot Up Numlock Status   : ON
 Boot Up System Speed     : High
 Gate A20 Option          : Fast
 Memory Parity Check      : Disabled
 Typematic Rate Setting   : Disabled
 Typematic Rate (Chars/Sec) : 6
 Typematic Delay (Msec)   : 250        Esc : Quit    ↑↓→←  :  Select Item
 Security Option          : Setup      F1 : Help      Pu/Pd/+/- :  Modify
                                       F5 : Old Values  (Shift)F2 :  Color
                                       F6 : Load BIOS Defaults
                                       F7 : Load Setup Defaults
```

BIOS Features Setup

The BIOS FEATURES SETUP allows you find true certain features supported by the chipset and Award BIOS. It also includes support for shadow RAM under which the contents of the ROM BIOS can be copied into memory at boot up, enhancing performance. When you change any of the setting, you may recall the default settings at any time from the main menu.

This is detailed later. To get help on each item, highlight the relevant item and press the F1 key. A Windows will appear on your screen detailing the various options available for each item. A brief introduction of each setting in the BIOS FEATURES SETUP program is given below.

CPU INTERNAL CACHE:

This item should always be Enable, if your system is 486CPU. Even if you have installed the external cache. If you have no external cache installed this item should be enabled to allow use of the internal 8K cache in the 486 CPU.

EXTERNAL CACHE:

Enable or disable this function according to whether you want external cache enabled or disabled.

QUICK POWER ON SELF TEST:

You can enable or disable this item to speed 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.

BOOT SEQUENCE:

You may define whether the system will look first at drive A: and then at drive C: when booting up, or vice versa.

BOOT UP FLOPPY SEEK:

You may enable / disable this item to define whether the system will look for a floppy disk drive to boot at power-on, or directly to the hard disk drive.

BOOT UP NUMLOCK STATUS:

Use this item to enable / disable the NumLock on your keyboard automatically at power-on.

BOOT UP SYSTEM SPEED:

Select High to configure your system in the turbo speed mode at boot up, select Low to configure your system in normal speed mode. Whichever setting you choose you will still be able to use the turbo switch to toggle between the tow modes during use.

MEMORY PARITY CHECK:

Enable or Disable this item according to whether you wish the system to check the memory parity during boot up or not. If you disable this item even if the BIOS encounters a parity error it will be ignored. We re-commend that you always enable the item in order to ensure that the memory is good each time you turn your PC on.

GATE 20A OPTION:

When you set this category as Fast. The A20 signal is controlled by chipset specific method.

TYPEMATIC RATE SETTING:

Enable this item if you wish to be able to configure the characteristics of your keyboard. Typematic refers to the way in which characters are entered repeatedly if a key is held down. For example, if you press and hold down the "A" key, the letter "a" will repeatedly appear on your screen on your screen until you release the key. This item is disable by default.

TYPEMATIC RATE (CHARS-SEC):

You can use this item to define the typematic rate delay of your keyboard, i.e. the rate at which characters will be repeated when a key held down.

TYPEMATIC DELAY (MSEC):

You can use this item to define the period after which the typematic function become active i.e. how long after you press a key the characters will be repeated.

SECURITY OPTION:

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

5-5. CHIPSET FEATURE SETUP

Choose the "CHIPSET FEATURES SETUP" from the main menu, the screen shown as below.

```
            ROM PCI/ISA BIOS (2A4KDP6A)
             CHIPSET FEATURES SETUP
              AWARD SOFTWARE, INC.

Auto Configuration    : Enable    Onboard FDC Controller    : Enabled
                                  Onboard Serial Port 1     : 3F8/IRQ4
AT-BUS Clock          : CLK/4     Onboard Serial Port 2     : 2F8/IRQ3
DRAM Read Timing      : Normal    Onboard Parallel Port     : 378/IRQ7
DRAM Write Timing     : Normal    Parallel Port Mode        : Normal
SRAM Read Timing      : 3-1-1-1
SRAM Write Timing     : 0 Wait

On Chip Local Bus IDE : Enabled
IDE Primary Master PIO : Auto
IDE Primary Slave PIO  : Auto
                                  Esc : Quit      ↑↓→←  :  Select Item
                                  F1 : Help       Pu/Pd/+/- :  Modify
                                  F5 : Old Values  (Shift)F2 :  Color
                                  F6 : Load BIOS Defaults
                                  F7 : Load Setup Defaults
```

Chipset Features Setup

By moving cursor to the desired selection and pressing < F1 > key, the all options for the desired selection will be displayed for choice. User has to use select the desired option.

AUTO CONFIGURATION FUNCTION:

When this option is Enabled, the BIOS automatically configures cache and clock settings based on detection of the CPU clock speed, you cannot change the other parameters. Set this option to Disabled to manually set DRAM, cache and I/O bus clock operating parameters.

DRAM TIMING OPTION:

The number of wait states added on reads to DRAM. Fewer wait states improve performance.

SRAM TIMING OPTION:

The number of wait states added on reads to SRAM. Fewer wait states improve performance.

AT BUS CLOCK:

Defines the clock value for AT bus. Usually, AT bus clock should be programmed to 8Mhz, e.g. when system clock is 33Mhz, choose 4/1 CLKIN. All values derived from CLKIN is called synchronous mode. The 7.159Mhz option is called asyc. mode.

5-6. POWER MANAGEMENT SETUP

Choose "POWER MANAGEMENT SETUP" option on the main menu, a display will be shown on screen as below :

```
┌─────────────────────────────────────────────────────────────────────┐
│                  ROM PCI/ISA BIOS (2A4KDP6A)                          │
│                  POWER MANAGEMENT SETUP                                │
│                     AWARD SOFTWARE, INC.                              │
│                                                                       │
│  Power Management     :Disable   IRQ6    (Floppy Disk)    : ON        │
│  PM Control by APM    :Yes       IRQ7    (LPT 1)          : ON        │
│  Video Off Option     Susp,Stby->off  IRQ8  (RTC Alarm)  : OFF       │
│  Video Off Method     :V/H Sync+Blank  IRQ9  (IRQ Redir) : ON        │
│                                  IRQ10   (Reserved)       : OFF       │
│       ** PM Timer **             IRQ11   (Reserved)       : OFF       │
│  HDD Standby Timer    :Disabled  IRQ12   (PS/2 Mouse)     : ON        │
│  Doze Timer Select    :Disabled  IRQ13   (Coprocessor)    : OFF       │
│  Standby Timer Select :Disabled  IRQ14   (Hard Disk)      : ON        │
│  Inactive Timer Select :Disabled IRQ15   (Reserved)       : OFF       │
│                                                                       │
│       ** PM Events **                                                 │
│  VGA                  :OFF                                            │
│  FDD(3FXh)            :ON                                             │
│  LPT & (1FXh)         :LPT/COM                                        │
│  HDD (1FXh)           :ON        Esc : Quit    ↑↓→← :  Select Item    │
│  NMI                  :OFF       F1 : Help    Pu/Pd/+/- :  Modify     │
│  IRQ3 (COM 2)         :ON        F5 : Old Values  (Shift)F2 :  Color  │
│  IRQ4 (COM 1)         :ON        F6 : Load BIOS Defaults             │
│  IRQ 5 (LPT 2)        :ON        F7 : Load Setup Defaults            │
└─────────────────────────────────────────────────────────────────────┘
```

Power Management Setup

This category determines how much power consumption for system after selecting below items. Default value is Disable. Having made all the settings above, press < Esc > to return to the main menu.

POWER MANAGEMENT:

This item determines how much power consumption for system. When you define it as Max Saving are used all timers MIN value.

PM CONTROL BY APM:

When this item is set to be YES, the system BIOS will wait for APM's prompt before it enter any PM mode e.g. DOZE, STANDBY or SUSPEND. If APM is installed, & if there is a task running, even the timer is time out, the APM will not prompt the BIOS to put the system into any power saving mode.

DOZE MODE TIMEOUT:

Sets the time interval after inactivity when the system enters Doze mode. This options as following, from 10 Sec to 2 Hours or Disabled.

STANDBY MODE TIMEOUT:

Sets the time interval after system inactivity when the system enters STANDBY mode. This options as following: From 30 Sec to 2 Hours or Disabled.

SUSPEND MODE TIMER:

Sets the time interval after system inactivity when the system enters SUSPEND mode. This options as following: From 30 Sec to 2 Hours or Disabled.

5-7. LOAD BIOS DEFAULTS

AUTO CONFIGURATION WITH BIOS DEFAULTS

"LOAD BIOS DEFAULTS" loads the default BIOS values. When the diagnostic aid of your system becomes unusable, choose this option and the following message appears :

<div style="border:1px solid black; text-align:center">
Load BIOS Default (Y / N) ? Y
</div>

To use the BIOS defaults, change the prompt to "Y" and press < Enter >, the CMOS is load automatically when you power on the PC-410.

5-8 LOAD SETUP DEFAULTS

AUTO CONFIGURATION WITH SETUP DEFAULTS

This Main Menu item uses the default SETUP values. Use this option as a diagnostic aid of your system behaves erratically. Choose this item and the following message appears:

<div style="border:1px solid black; text-align:center">
Load SETUP Default (Y/N)?Y
</div>

To use the SETUP defaults, change the prompt to "Y" and press <Enter> The CMOS is load automatically form SETUP default values:

5-9 PASSWORD SETTING

If you want to enable this item you should choose the "PASSWORD SETTING" option from the main menu, the following message will appear at the center of the screen to assist you in creating a password.

<div style="border:1px solid">

Enter Password:

</div>

Type the password, up to eight characters, and press < Enter >. The password typed now will 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 password, just press < Enter > when you are prompted to enter password. A message will confirm the password being disable. Once the password is disabled, the system will boot and you can enter Setup freely.

<div style="border:1px solid">

Password Disabled

</div>

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

5-10. IDE HDD AUTO DETECTION

Choose the "IDE HDD AUTO DETECTION" option . The screen will be shown as below.

```
┌─────────────────────────────────────────────────────────────┐
│            ROM PCI / ISA BIOS (2A4XDP6A)                     │
│                STANDARD CMOS SETUP                           │
│                AWARD SOFTWARE, INC.                          │
│                                                             │
│          CYLS.  HEADS  PRECOMP  LANDZONE  SECTORS  MODE      │
│ Drive C :   ( Mb)  0      0       0         0        0   ------- │
│                                                             │
│  ┌───────────────────────────────────────────────────────┐ │
│  │        Select Driver C Option (N=Skip) : N            │ │
│  │                                                       │ │
│  │  Option  Size  Cyls  Heads  Precomp  Landzone  Sectors  Mode │ │
│  │  ────────────────────────────────────────────────────── │ │
│  │  2(Y)   1277  619    64       0     2476    63     LBA  │ │
│  │  1      1278  2477   16    65535    2476    63   Normal │ │
│  │  3      1277  1238   32    65536    2476    63    Large │ │
│  └───────────────────────────────────────────────────────┘ │
│ Note: Some Oses (like SCO-UNIX) must use "Normal" for installation │
└─────────────────────────────────────────────────────────────┘
```

IDE HDD AUTO DETECTION Screen

AUTO DETECTION

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

If HDD does not support LBA mode, 'LBA' option will be shown.

If no of cylinders is less then or equal to 1024, no 'LARGE' option will be shown.

User can select a mode which is appropriate for then.

HDD MODE

The Award BIOS supports 3 HDD mode: NORMAL, LBA, & LARGE

NORMAL mode:
Generic access mode in which neither the BIOS nor the IDE controller will
make any transformations during accessing.

The maximum number of cylinders, heads & sectors for NORMAL mode are
1024, 16, &63.

```
        no. Cylinder      (1024)
      x no. Head          (  16)
      x no. Sector        (  63)
      x no. Per sector    ( 512)
    ---------------------------------------
        Total:       528 Mega byte
```

If user set 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:
A new HDD accessing method to overcome the 528 Megabyte bottleneck. The
number of cylinders. head & 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 sector, head & cylinder number into its own physical address
inside the HDD.

The maximum HDD size supported by LBA mode is 8.4 Gigabyte which is
obtained by the following formula:

```
        no. Cylinder      (1024)
      x no. Head          ( 255)
      x no. Sector        (  63)
      x no. Per sector    ( 512)
    ---------------------------------------
        Total:       8.4 Giga byte
```

LARGE mode:

Some IDE HDDs contain more than 1024 cylinder without LBA support (in some cases, user do not want LBA). The BIOS provides another alternative to support these kinds of HDD.

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

BIOS tricks DOS (or other OS) that the number of cylinder is less than 1024 by dividing it by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT 13h in order to access the right HDD address the right HDD address.

Maximum HDD size:

```
      no. Cylinder     (1024)
   x  no. Head         (  32)
   x  no. Sector       (  63)
   x  no. Per sector   ( 512)
   --------------------------------------
      Total:   1   Giga byte
```

REMARKS:

To support LBA or LARGE mode of HDDs, there must be some softwares involved. All these softwares are located in the Award HDD Service Routine (INT 13h). It may be failed to access a HDD with LBA(LARGE) mode selected if you are running under a Operating System which replaces the whole INT 13h.

5-11 SAVE SETUP

When you have completed adjusting all the settings as required, you must have these setting into the CMOS RAM. Select SAVE & EXIT and press<Enter> , when you confirm that you wish to save the settings your machine will be automatically rebooted and the changes you have made will be implemented. You may call up the setup program at any time to adjust any of the individual items by pressing the <Del> key during boot up. If wish to cancel any changes you have made, select EXIT WITHOUT SAVING and the original setting stored in the CMOS will be retained.
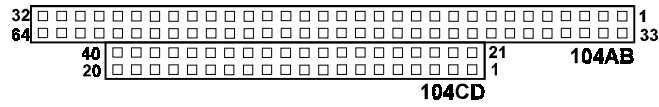
EXPANSION BUS
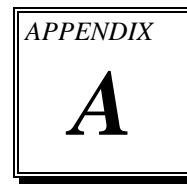
This appendix indicates you the pin assignments.

Sections include:

● PC-104 Connector Pin Assignment

● ISA BUS Pin Assignment

PC-104 CONNECTOR PIN ASSIGNMENT

104AB, 104CD : PC-104 Connector

The PC-104 can support multi-pieces of PC-104 modules. This card has two
connectors : one (104AB) consists of 64 pin, dual-in-line header, the other one
(104CD) consists of 40 pin, dual-in-line header
The pin assignment for connector 104AB & 104CD are as follow:

| 104AB				104CD			
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	33	IOCHK	1	GND	21	GND
2	REST	34	D7	2	MEMCS16	22	SBHE
3	VCC	35	D6	3	IOCS16	23	LA23
4	IRQ9	36	D5	4	IRQ10	24	LA22
5	-5V	37	D4	5	IRQ11	25	LA21
6	DRQ2	38	D3	6	IRQ12	26	LA20
7	-12V	39	D2	7	IRQ15	27	LA19
8	ZWS	40	D1	8	IRQ14	28	LA18
9	+12V	41	D0	9	DACK0	29	LA17
10	KEY PIN	42	IOCHRDY	10	DRQ0	30	MEMR
11	SIOW	43	AEN	11	DACK5	31	MEMW
12	SIOR	44	A19	12	DRQ5	32	D8
13	IOW	45	A18	13	DACK6	33	D9
14	IOR	46	A17	14	DRQ6	34	D10
15	DACK3	47	A16	15	DACK7	35	D11
16	DRQ3	48	A15	16	DRQ7	36	D12
17	DACK1	49	A14	17	VCC	37	D13
18	DRQ1	50	A13	18	MASTER	38	D14
19	REFSH	51	A12	19	GND	39	D15
20	CLK	52	A11	20	GND	40	KEY PIN
21	IRQ7	53	A10				
22	IRQ6	54	A9				
23	IRQ5	55	A8				
24	IRQ4	56	A7				
25	IRQ3	57	A6				
26	DACK2	58	A5				
27	TC	59	A4				
28	BALE	60	A3				
29	VCC	61	A2				
30	OSC	62	A1				
31	GND	63	A0				
32	GND	64	KEY PIN				

ISA BUS PIN ASSIGNMENT

The ISA BUS for this card is called "Gold Fingers". It is devided into two sets : one consists of 62 pins, the other consists of 36 pins.
The pin assignments are as follow :
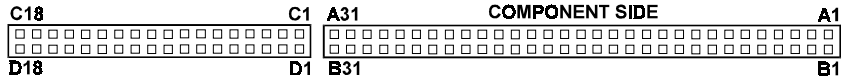
	B		A		D		C
PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT	PIN	ASSIGNMENT
B1	GND	A1	-I/O CH CHK	D1	-MEMCS16	C1	SBHE
B2	RESET	A2	SD07	D2	-I/OCS16	C2	LA23
B3	+5V	A3	SD06	D3	IRQ10	C3	LA22
B4	IRQ9	A4	SD05	D4	IRQ11	C4	LA21
B5	-5V	A5	SD04	D5	IRQ12	C5	LA20
B6	DRQ2	A6	SD03	D6	IRQ15	C6	LA19
B7	-12V	A7	SD02	D7	IRQ14	C7	LA18
B8	OWS	A8	SD01	D8	-DACK0	C8	LA17
B9	+12V	A9	SD00	D9	DRQ0	C9	-MEMR
B10	GND	A10	-I/O CH RDY	D10	-DACK5	C10	-MEMW
B11	-SMEMW	A11	AEN	D11	DRQ5	C11	SD08
B12	-SMEMR	A12	SA19	D12	-DACK6	C12	SD09
B13	-IOW	A13	SA18	D13	DRQ6	C13	SD10
B14	-IOR	A14	SA17	D14	-DACK7	C14	SD11
B15	-DACK3	A15	SA16	D15	DRQ7	C15	SD12
B16	-DRQ3	A16	SA15	D16	+5V	C16	SD13
B17	-DACK1	A17	SA14	D17	-MASTER	C17	SD14
B18	-DRQ1	A18	SA13	D18	GND	C18	SD15
B19	-REFRESH	A19	SA12				
B20	BCLK	A20	SA11				
B21	IRQ7	A21	SA10				
B22	IRQ6	A22	SA09				
B23	IRQ5	A23	SA08				
B24	IRQ4	A24	SA07				
B25	IRQ3	A25	SA06				
B26	-DACK2	A26	SA05				
B27	T/C	A27	SA04				
B28	BALE	A28	SA03				
B29	+5V	A29	SA02				
B30	OSC	A30	SA01				
B31	GND	A31	SA00				

TECHNICAL SUMMARY
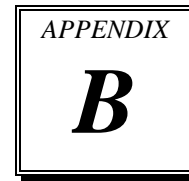
This section introduce you the maps concisely.

Sections include:

● Interrupt Map

● RTC & CMOS RAM Map

● Timer & DMA Channels Map

● I / O & Memory Map

INTERRUPT MAP

IRQ	ASSIGNMENT
0	System TIMER interrupt from TIMER-0
1	Keyboard output buffer full
2	Cascade for IRQ 8-15
3	Serial port 2
4	Serial port 1
5	Parallel port 2
6	Floppy Disk adapter
7	Parallel port 1
8	RTC clock
9	Available
10	Available
11	Available
12	Available
13	Math coprocessor
14	Hard Disk adapter
15	Available

RTC & CMOS RAM MAP

CODE	ASSIGNMENT
00	Seconds
01	Second alarm
02	Minutes
03	Minutes alarm
04	Hours
05	Hours alarm
06	Day of week
07	Day of month
08	Month
09	Year
0A	Status register A
0B	Status register B
0C	Status register C
0D	Status register D
0E	Diagnostic status byte
0F	Shutdown byte
10	Floppy Disk drive type byte
11	Reserve
12	Hard Disk type byte
13	Reserve
14	Equipment byte
15	Base memory low byte
16	Base memory high byte
17	Extension memory low byte
18	Extension memory high byte
19-2d	
2E-2F	
30	Reserved for extension memory low byte
31	Reserved for extension memory high byte
32	Date Century byte
33	Information Flag
34-3F	Reserve
40-7f	Reserved for Chipset Setting Data

TIMER & DMA CHANNELS MAP

<u>**Timer Channel Map**</u> :

Timer Channel	Assignment
0	System timer interrupt
1	DRAM Refresh request
2	Speaker tone generator

<u>**DMA Channel Map**</u> :

DMA Channel	Assignment
0	Available
1	IBM SDLC
2	Floppy Disk adapter
3	Channel-3 Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

I/O & MEMORY MAP

<u>**Memory Map**</u> :

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

<u>**I/O Map**</u> :

I/O MAP	ASSIGNMENT
000-01F	DMA controller (Master)
020-021	Interrupt controller (Master)
022-023	Chipset controller registers I/O ports.
040-05F	Timer control regsiters.
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	Net work 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

TROUBLE SHOOTING
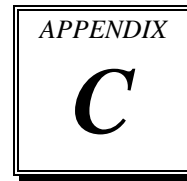
This section outlines the errors may occur when you operate the system, also gives you the suggestions on solving the problems.

Sections include:

● Trouble Shooting for Error Messages

● Trouble Shooting for POST Code

C-1 TROUBLE SHOOTING FOR ERROR MESSAGE

The following information inform you the error messages and the trouble shooting. Please adjust your systems according to the messages below. And make sure all the components and connectors are in proper position and firmly attached. If the errors still encountered, please contact with your distributor for maintenance.

POST BEEP :

Currently there are two kind of beep codes in BIOS. The one code in-dicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code con-sists of a single long beep followed by three short beeps. The other one code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

CMOS BATTERY FAILURE :

When the CMOS battery is out of work or has run out, the user has to replace the whole unit.

CMOS CHECKSUM ERROR :

This error inform you that the CMOS is corrupted. When the battery runs weak, this situation might happen. Please check the battery and change a new one when necessary.

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.

DISK BOOT FAILURE:

When you can't find the boot device, insert a system disk into Drive A and press < Enter >. Make sure both the controller and cables are all in proper positions, also make sure the disk is formatted correct device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR :

When the diskette drive type is different from CMOS, please run setup or configure the drive again.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE :

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

ERROR INITIALIZING HARD DISK CONTROLLER :

When this error occurs. Be sure the cord is exactly installed in the bus. Make sure the correct hard drive type is selected in Setup. Also check whether all of the jumpers are set correctly in the hard drive.

FLOPPY DISK CONTROLLER ERROR OR
NO CONTROLLER PRESENT :

When you cannot find or initialize the floppy drive controller, please check the controller whether in proper Setup. If there are no floppy drive installed, Ensure the Diskette Drive selection in Setup is set to NONE.

KEYBOARD ERROR OR NO KEYBOARD PRESENT :

When this situation happens, please check keyboard attachment and no keys 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 :

When the memory address indicates error. 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 :

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

MEMORY VERIFYING ERROR :

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

OFFENDING ADDRESS MISSING :

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

REBOOT ERROR :

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.

SYSTEM HALTED :

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.

C-2 TROUBLE SHOOTING FOR POST CODES

When you power on your PC, and the screen display nothing. You have to insert the POST Card for test. The address for ISA POST port is 80h. Make sure the card is in correct slot. The lists below indicate you the error messages. Please follow the instruction to adjust your system. If the error still occurred, please contact with your distributor for maintenance.

C0 : Turn off OEM specific cache, shadow.....

03 : Initialize all the standard devices with default values Standard devices includes :
DMA controller (8237).
Programmable Interrupt Controller (8259).
Programmable Interval Timer (8254).
RTC chip.

05 : 1.Keyboard Controller Self-Test.
2.Enable Keyboard Interface.

07 : Verfies CMOS's basic R/W functionality.

BE : Program defaults values into chipset according to the MODBINable Chipset Default Table.

C1 : Auto-detection of onboard DRAM & Cache.

C5 : Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster.

08 : Test the first 256K DRAM.

09 : 1. Program the configuration register of Cyrix CPU according to the MODBINable Cyrix 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 CPUID instruction to identify CPU type.
   3. Early Power Management initialization (OEM specific).

0B : 1.Verify the 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 I/O & Memory for PCI devices (PCI BIOS only).

0C : Initialization of the BIOS Data Area (40 : 0N-40:FF).

0D : 1. Program some of the Chipset's value according to Setup. (Early Setup
   Value Program).
   2. Measure CPU speed for display & decide the system clock speed.
   3. Video initialization including Monochrome ,CGA, EGA/VGA. If no
   display device found, the speaker will beep.

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 Loge (Green BIOS only).
       -CPU brand, type & speed.
       -Test system BIOS checksum (Non-compress Version only).

0F : DMA channel 0 test.

10 : DMA channel 1 test.

11 : DMA page registers test.

14 : Test 8254 Timer 0 Counter2.

15 : Test 8259 interrupt mask bits for channel 1.

16 : Test 8259 interrupt mask bits for channel 2.

19 : Test 8259 functionality.

30 : Detect Base Memory & Extended Memory Size.

31 : 1. Test Base Memory from 256K to 640K.
    2. Test Extended Memory from 1M to the top of memory.

32 : 1.Display the Award Plug & Play BIOS Extension message (PnP BIOS only).
    2.Program all onboard super I/O chips (if any) including COM ports, LPT
     ports, FDD port....according to setup value.

3C : Set flag to allow users to enter CMOS Setup Utility.

3D : 1 Initialize Keyboard.
    2 Install PS2 mouse.

3E : Try to turn on Level 2 cache.
    Note : Some chipset may need to turn on the L2 cache in this stage. But
          usually, the cache is turn 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, programmed the chipset with pre-defined
     value 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 & parallel ports.

45 : Initialize math coprocessor.

4E : If there is any error detected (such as video, kb....), show all the error
   messages the screen & wait for user to press <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.

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 I/O, Memory, IRQ & DMA TO PnP ISA devices.
      -initialize all PnP ISA ROMs.
   4. Program shadows 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 & parallel ports.
   2. Initialize time value in BIOS data area by translate the RTC time value into a
      timer tick value.

60 : Setup Virus Protection (Boot Sector Protection) functionality according to
   Setup setting.

61 : 1. Try to turn on Level 2 cache.
   Note : if L2 cache is already turned on in POST 3D, this part will be skipped.
   2. Set the boot up speed according to Setup setting.
   3. Last chance for Chipset initialization.
   4. Last chance for Power Management initialization (Green BIOS   only).
   5. Show the system configuration table.

62 : 1.Setup daylight saving according to Setup value.
　　2.Program the NumLock, typematic rate & typematic speed according to
　　　Setup setting.

63 : 1. If there is any changes in the hardware configuration, update the ESCD
　　　information (PnP BIOS only).
　　2. Clear memory that have been used.
　　3. Boot system via INT 19H.

FF : System Booting. this means that the BIOS already pass the control right to the
　　operating system.

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