

## **NEAT-406**

Half-size with Flash Disk  
5x86 CPU with 4 MB memory  
on board

User's Guide

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# Check List

Before getting started, please check if the 486 All-in-One Single Board Computer package includes the following items:

- 486 All-in-One board x 1pc
- Updating BIOS Utility diskette x 1 pcs
- Keyboard adapter x 1pc
- FDD cable x 1 pc
- HDD cable x 1 pc
- Printer extension cables with bracket x 1pc
- User's manual x 1pc

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# Chapter 1

## Introduction

The 486 all-in-One Single Board Computer comes equipped with either Intel / AMD / Cyrix / SGS Thomson 80486 CPU series and 4 MB system memory on board. One **socket for Flash Disk**, two serial RS-232 ports (one for RS232/RS422/RS485), enhanced bi-directional parallel port, PCI enhanced IDE hard disk drive interface, floppy disk controller and watchdog timer. The 486 All-in-One board industrial-grade construction ensures continuous, reliable operation in harsh industrial environments.

You can also use this reliable 486 All-in-One to transform any system into a 32-bit 486 compatible computer. Its highly compact form and numerous features make it an ideal cost/performance solution for high-end commercial and industrial applications when fast CPU speed and low mean-time-to-repair are critical.

### 1.1 Specifications

**. Bus Type:**

ISA bus - 98 pin for 16 bit ISA bus

**. CPU:**

On board CPU up to 133 MHz.

**. Cache:**

256KB 2<sup>nd</sup> level cache memory

**. Memory:**

On board 4 MB system memory

Supports FPM/EDO DRAM

Supports one 72-pin SIMM sockets, accept 1,2,4,8,16 or 32 MB SIMM

**. Chipset:**

System Chipset: ALI M1487/M1489

I/O Chipset: SMC 37C669

**. Real Time Clock:**

SGS M48T86 PCI (or compatible) with lithium battery backup for 10 years of

data retention

**. S.S.D.:**

Socket for M-system Disk on Chip

**. IDE:**

Supports up to two, PCI mode 4 enhance IDE hard disk interface

**. Floppy:**

Supports up to two floppy disk drivers, 3.5" and/or 5.25"

**. Parallel Port:**

Enhanced Bi-directional EPP/ECP parallel port

**. Serial port:**

One RS232 port with 16C550 UART

One RS232/422/485 port with 16C550 UART

**. Watchdog Timer:**

Can generate a system RESET, The timer interval is 0 ~ 64 sec (14 level)

**. Keyboard Connector:**

One 6 pin Mini\_Din connector is located on the mounting bracket

One pin header connector for external keyboard adapter

**. PS/2 Mouse Connector:**

One 6 pin Mini\_Din PS/2 mouse connector is located on the mounting bracket

**.Expansion Bus:**

A 16 Bit PC104 connector for expansion modules

**. Power Supply Voltage:**

Single power +5V/2.5A, 8\_pin external power connector

**. Operating Temperature:**

32° to 140° F (0° to 60° C)

**. Board Size:**

185mm X 122mm

## Chapter 2.

### Jumpers and Connectors

Figure below shows the jumper and connector location on the NEAT-406.

#### 2.1 Jumper settings

##### CPU SPEED SELECT(JP3,JP5)

SPEED	JP3	JP5
DX-25,DX2-50	OPEN	2-3
DX-33,DX2-66	1-2,3-4	2-3
DX4-100,5X86-100	1-2,3-4	2-3
5X86-133	1-2,3-4	2-3

##### Reset/Turbo/LED (J2)

	J2
System reset switch	11-12
Turbo Switch	13-14
Turbo LED, Pin 16+, Pin 15-	15-16
HDD LED, Pin 18+, Pin 17-	17-18

##### Watchdog(JP2)

	JP2
Watchdog time out gen. system reset	9-10

##### External keyboard (J3)

	J3
Keyboard clock	1
Keyboard data	2
Keyboard ground	4
Keyboard power	5
no connect	3

**Speaker/Keylock (J2)**

	<b>J2</b>
Internal buzzer	1-3
External speaker (remove 1-3)	1-7
Power LED, Pin 2+, Pin6-	2-6
Keylock	8-10

**External power connector (J1)**

	<b>J1</b>
+5V	1,8
Ground	4,5
+12V	2,7
-12V	3
-5V	6

**Disk On Chip(M-System) Address Select (JP2, 1-8)**

	<b>JP2</b>
C0000-C7FFF	1-2
C8000-CFFFF	3-4
D0000-D7FFF	5-6
D8000-DFFFF	7-8

**CMOS clear(JP1)**

Closed this jumper, power on system 1minute then power off, Remove this jumper
--

**COM2 TYPE SELECT(P4)**

	<b>JP4</b>
RS232	3-5,4-6,9-11,10-12,17-18
RS422	1-3,2-4,7-9,8-10,15-16
RS485	1-3,2-4,7-9,8-10,13-14

## 2.2 Connectors

The connectors allow the CPU card to connect with other parts of the system. Some problems encountered with your system may be caused by loose or improper connections. Ensure that all connectors are in place and firmly attached.

<b>Component</b>	<b>Label</b>
HDD (IDE) connector	IDE
FDD connector	FDC
Parallel port	PRN
PC/104 connector	PC104
PS/2 MOUSE	MOUSE
Keyboard connectors	J3,KB
Reset switch connector	J2 (11-12)
External speaker connector	J2 (1-7)
HDD LED connector	J2 (17-18)
Turbo switch connector	J2 (13-14)
Turbo LED connector	J2 (15-16)
SBC power connector	J1
RS-232 serial port	COM1, COM2
CMOS RAM clear	JP1

## Chapter 3

# Installation

This chapter describes the procedures for installing the 486 All-in-One board into your system.

The following is a list of typical peripherals required to build a minimum system:

- Passive backplane (optional)
- Power supply
- IBM PC/AT keyboard
- Display card
- Display monitor
- Floppy or hard disk with MS-DOS or Flash Disk emulator

### 3.1 Installing the SIMMs

1. Insert the first SIMM edge connector at a slight angle into the socket of SIMM 2 close to the center of the board. Note that the SIMM is keyed and will only go in one way.
2. Push the SIMM back into the connector carefully until it snaps into place.
3. Check to make sure the SIMM is inserted securely.

### 3.2 Completing the Installation

To complete the installation, the following steps should be followed:

1. Set the configuration jumpers in accordance with Chapter 2.
2. Make sure the power is off.
3. If use PC/104 peripherals, install the PC/104 card into PC/104 socket of the 486 All-in-One board.
4. Install the 486 All-in-One board into a ISA passive backplane or just stand it alone as a Single Board Computer.
5. Connect the applicable I/O cables and peripherals, i.e. floppy disk, hard disk, monitor, keyboard, power supply and etc.

NOTE: the color of pin one is usually red or blue, while others are gray

6. Turn on the power.

## 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.

### *Entering Setup*

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

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

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <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 display and you will again be asked to,

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

## Control Keys

Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item in the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu -- Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu - - Exit current page and return to Main Menu
PgUp / "+" key	Increase the numeric value or make changes
PgDn / “-“ key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
(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

## *Getting Help*

### Main Menu

The on-line 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>.

## *The Main Menu*

Once you enter Award BIOS CMOS Setup Utility, the Main Menu 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.

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

STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	HDD LOW LEVEL FORMAT
POWER MANAGEMENT SETUP	SAVE & EXIT SETUP
PCI CONFIGURATION 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...	

### Standard CMOS setup

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

### BIOS features setup

This setup page includes all the items of Award special enhanced features. See Page 4-11 to Page 4-15 for details.

## Chipset features setup

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

## Power Management setup

This category determines how much power consumption for the system after selecting the items below. Default value is Disable. See Page 4-17 to Page 4-21 for details.

## PCI Configuration setup

This category specifies the setup of PCI related devices and On Board I/O's. See Page 4-22 for details.

## Load BIOS defaults

BIOS defaults function indicate the most appropriate values of the system parameter when the system is in minimum performance.

## Load setup defaults

Chipset defaults function indicate the values required by the system for the maximum performance.

## Password setting

Changes, sets, or disables password. It allows you to limit access to the system and Setup, or just to Setup. See Page 4-25 for details.

## IDE HDD auto detection

Automatically configures hard disk parameters. See Page 4-26 to Page 4-30 for details.

## HDD low level format

This stands for hard disk low level format utility. See Page 4-29 See to Page 4-30 for details.

## Save & exit setup

Saves the CMOS value changes to CMOS and exits setup.

## Exit without save

Abandons all the CMOS value changes and exits setup.

## Standard CMOS Setup Menu

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want for each item.

### Standard CMOS Setup Menu (Support Enhanced IDE)

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

Date (mm:dd:yy) : Fri, Jul 18 1997						
Time(hh:mm:ss) : 00:00:00						
<u>HARD DISKS</u>	<u>TYPE</u>	<u>SIZE</u>	<u>CYLS</u>	<u>HEAD</u>	<u>PRECOMP</u>	<u>LANDE</u>
<u>SECTOR</u>	<u>MODE</u>					
Primary Master	: Auto	0		0	0	0
0	0	Auto				
Primary Slave	: None	0		0	0	0
0	0	Auto				
Drive A : 1.44M , 3.5 in						
Base Memory : 640K						
Drive B : None						
Extended Memory : 31744K						
Video : EGA / VGA						
<u>Other Memory</u> : 384K						
Halt On : All Errors						
Total Memory : 32768K						
ESC : Quit			↑ ↓ → ← : Select Item			
PU / PD / + / - : Modify			(Shift) F2 : Change Color			
F1 : Help						

## Date

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

day	The day of 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), can be keyed in by the numerical / function key
month	The month, Jan through Dec.
year	The year, depend on the year of BIOS

## Time

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

## Primary Master/Primary Slave

This category identifies the types of the channel that has been installed in the computer. There are 45 predefined types and 4 user definable types 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 the type of your hard disk drive 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 for the following items. 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 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".

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

None	No floppy drive installed
360K, 5.25 in	5-1/4 inch PC-type standard drive; 360 kilobyte capacity
1.2M, 5.25 in	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity
720K, 3.5 in	3-1/2 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in	3-1/2 inch double-sided drive; 1.44 megabyte capacity
2.88M, 3.5 in	3-1/2 inch double-sided drive; 2.88 megabyte capacity

### Video

This category selects the type of adapter used for the primary system monitor that must match your video display card and monitor. Although secondary monitor is supported, you do not have to select the type in Setup.

You have two ways to boot up the system:

1. When you have VGA as primary and monochrome as secondary, the selection of the video type is "VGA Mode".
2. When you have monochrome as primary and VGA as 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.
---------	--

Absent	The system will discard the VGA adaptor.
CGA 80	Color Graphics Adapter, power up in 80 column mode
MONO	Monochrome adapter, includes high resolution monochrome adapters

## Error halt

This category 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 be stopped for a keyboard error; it will be stopped for all other errors.
All, But Diskette	The system boot will not be stopped for a disk error; it will be stopped for all other errors.
All, But Disk/Key	The system boot will not be stopped for a keyboard or disk error; it will be stopped for all other errors.

## Memory

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

### Base Memory

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed on the motherboard, or 640K for systems with 640K 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 beyond 1MB in the CPU's memory address map.

### Other Memory

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

### Total Memory

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

## BIOS Features Setup Menu

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

Virus Warning : Disabled CPU Internal Cache : Enabled External Cache : Enabled Quick Power On Self Test : Disabled Boot Sequence : C,CDROM,A Swap Floppy Drive : Disabled Boot Up Floppy Seek : Enabled Boot Up NumLock Status : On Boot Up System Speed : High Gate A20 Option : Fast Typematic Rate Setting : Disabled TypematicRate(Chars/Sec) : 6 Typematic Delay (Msec) : 250 Security Option : Setup PCI/VGA Palette Snoop : Disable OS Select for DRAM : Non-OS2 >64MB	Video BIOS Shadow : Enabled C8000-CFFFF Shadow : Disabled D0000-D7FFF Shadow : Disabled D8000-DFFFF Shadow : Disabled  ESC : Quit                    ↑ ↓ → ← : Select Item F1 : Help                    PU/PD/+/- : Modify F5 : Old Values            (Shift) F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults
---	---

### Virus Warning

This category flashes on the screen. During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system and the following error message will appear, in the mean time, you can run an anti-virus program 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	Activates automatically so that the warning message will appear after the system boots up if there is any attempt to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when there is any attempt to access the boot sector or hard disk partition table.

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

## CPU Internal Cache/External Cache

These two categories speed up memory access. However, they depend on CPU/chipset design. The default value is Enable. If your CPU does not have Internal Cache then this item "CPU Internal Cache" will not be shown.

Enabled	Enable cache
Disabled	Disable cache

## Quick Power On Self Test

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

Enabled	Enable quick POST
Disabled	Normal POST

## Boot Sequence

This category determines which drive computer searches first for the disk operating system (i.e., DOS). Default value is 'C,CDROM,A'.

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

## Boot Up Floppy Seek

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

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

## Boot Up NumLock Status

The default value is On.

On	Keypad is number keys
Off	Keypad is arrow keys

## Boot Up System Speed

It selects the default system speed - the speed that the system will run immediately after power up.

High	Set the speed to high
Low	Set the speed to low

## IDE HDD Block Mode

Enabled	Enable IDE HDD Block Mode. The BIOS will detect the block size of the HDD and send block command automatically.
Disabled	Disable IDE HDD Block Mode

## Gate A20 Option

Normal	The A20 signal is controlled by keyboard controller or chipset hardware.
Fast	Default : Fast. The A20 signal is controlled by Port 92 or chipset specific method.

## 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 value of this 2 items and the default is controlled by 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)

This is the time between the first and second character displayed when holding a key.

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

## Security Option

This category 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 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.

## System BIOS Shadow

It determines whether system BIOS will be copied to RAM or the system BIOS is always shadow to support LBA HDD.

Enabled	System shadow is enabled
Disabled	System shadow is disabled

## Video BIOS Shadow

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

Enabled	Video shadow is enabled
Disabled	Video shadow is disabled

## C8000 - CFFFF Shadow/E8000 - EFFFF Shadow

These categories determine whether optional ROM will be copied to RAM by 16K byte or 32K byte per/unit and the size depends on chipset..

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disabled

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

2. IDE second channel control:  
Enable : enable secondary IDE port and BIOS will assign IRQ15 for this port.  
Disable: disable secondary IDE port and IRQ15 is available for other device.  
The item is optional only for PCI BIOS.

3. Some of the sound cards have an onboard CD-ROM controller which uses IDE Secondary Port. In order to avoid PCI IDE conflict, the IDE secondary channel control has to select "disable" before CD-ROM can work.

## Chipset Features Setup Menu

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

Auto Configuration : Enabled AT-BUS Clock : CLK/4 DRAM Read Timing : Normal DRAM Write Timing : Normal SRAM Read Timing : 3-2-2-2 SRAM Write Timing : 0 Wait Hidden Refresh : Disabled ISA I/O Recovery : Enabled Fast-Back-to-Back : Enabled On-Chip Local Bus IDE : Enabled IDE Buffer for DOS & Win : Enabled IDE HDD Block Mode : Enabled IDE Primary Master PIO : Auto IDE Primary Slave PIO : Auto	Onboard FDC Controller : Enabled Onboard UART1 : Auto Onboard UART2 : Auto Onboard UART 2 Mode : Standard Onboard Parallel Port : 378/IRQ7 Parallel Port Mode : Normal ECP Mode Use DMA : 3 Parallel Port EPP Type : EPP1.7 ESC : Quit    ↑↓→← : Select Item F1 : Help    PU/PD/+/- : Modify F5 : Old Values (Shift)    F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults
---	---



Item	Options	Descriptions
A. Power Management	1. Disable	Global Power Management will be disabled.
	2. User Define	Users can configure their own power management.
	3. Min Saving	Pre-defined timer values are used so that all timers are in their MAX value.
	4. Max Saving	Pre-defined timer values are used so that all timers are in MIN value.
B. PM Control by APM	1. No	System BIOS will ignore APM when power management is running the system.
	2. Yes	System BIOS will wait for APM prompt before it enters any PM mode e.g. DOZE, STANDBY or SUSPEND. Note: If APM is installed, and 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!
		Note: – if APM is not installed, this option has no effect.
C. Video Off Option	1. Always On	System BIOS will never turn off the screen.
	2. Suspend -> Off	Screen off when system is in SUSPEND mode.
	3. Susp, Stby -> Off	Screen off when system is in STANDBY or SUSPEND mode.
	4. All Modes -> Off	Screen off when system is in DOZE, STANDBY or SUSPEND mode.
		Note: The M/B markers are recommended to fix this item to (2) or (3) and hide it by using MODBIN Utility.
D. Video Off Method	1. Blank Screen	The system BIOS will only blank off the screen when it disables the video.
	2. V/H SYN C+Blank	In addition to (1), BIOS will also turn off the V-SYNC & H-SYNC signals form VGA cards to monitor.
	3. DPMS	This function is enabled only for the VGA card supporting DPMS.
		Note: Green monitors detect the V/H SYNC signals to turn off its electron gun.

Item	Options	Descriptions
E. MODEM Use IRQ	3	This set the IRQ number that modem use You can choose the IRQ no. by yourself.
F. HDD Power Down (#) Remark 2	1. Disable	HDD's motor will not be off.
	2. 1 Min 2 Min 3 Min 4 Min 5 Min 6 Min 7 Min 8 Min 9 Min 10 Min 11 Min 12 Min 13 Min 14 Min 15 Min	Defines the continuous HDD idle time before the HDD enters the power saving mode (motor off).
	3 When Suspend	BIOS will turn the HDD motor off when system is in SUSPEND mode.
		Note: - (2) & (3) can be selected at the same time. - When HDD is in power saving mode, any access to the HDD will wake the HDD up.
G. Doze Mode (*) Remark 1	1. Disable	System will never enter the DOZE mode.
	2. 10 Sec 20 Sec 30 Sec 40 Sec 1 Min 3 Min 5 Min 10 Min 15 Min 20 Min 30 Min 40 Min 1 Hr 2 Hr 3 Hr	Defines the continuous idle time before the system enters the 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. The screen may be off depending on (E).

Item	Options	Descriptions
H. Standby Mode (*) Remark 1	1. Disable	System will never enter STANDBY mode.
	2. 10 Sec 20 Sec 30 Sec 40 Sec 1 Min 3 Min 5 Min 10 Min 15 Min 20 Min 30 Min 40 Min 1 Hr 2 Hr 3 Hr	Defines the continuous idle time before the system enters the 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 (E).
I. Suspend Mode (*) Remark 1	1. Disable	System will never enter the SUSPEND mode.
	2. 10 Sec 20 Sec 30 Sec 40 Sec 1 Min 3 Min 5 Min 10 Min 15 Min 20 Min 30 Min 40 Min 1 Hr 2 Hr 3 Hr	Defines the continuous idle time before the system enters the SUSPEND mode.  If any item defined in (J) is enabled and active, The SUSPEND timer will be reloaded.
		Note: Normally, When the SUSPEND mode puts the system into low speed or 8 MHz, the clock is stopped, and the screen may be off depending on (E).

Item	Options	Descriptions
J. VGA FDD(3FXh) LPT & COM HDD (1FXh) NMI IRQ3 (COM 2) IRQ4 (COM 1) 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)	1. OFF	The specified event activity will not affect the PM timers.
	2. ON	The specified event activity causes the PM Timers to be reloaded. For example, the Power Management Unit(PMU) monitors the specified activities as PM events.

\* Remark 1: All items mark with (\*) in this menu, will be loaded with predefined

values as long as the item 'Power Management' is not configured to 'User Defined'

These items are:

Item 'System Doze' , 'System Standby' & 'System Suspend'

# Remark 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 the global power management is disabled!



A . Slot 1 Using INT#	AUTO	AUTO : BIOS will
Slot 2 Using	A	– Ask the PCI device
INT#	B	which
Slot 3 Using	C	INT (A-D) does it
INT#	D	want to
Slot 4 Using		use for interrupt.
INT#		– Check out which IRQ
		is
		available from the
		above.
		– Tell the device which
		IRQ
		has been
		assigned to it.

Item	Options	Descriptions
A . Slot 1 Using INT#	AUTO	A,B,C,D : These options are reserved
Slot 2 Using	A	for “Dirty” cards from which the system BIOS cannot tell which INT does it use.
INT#	B	
Slot 3 Using	C	
INT#	D	
Slot 4 Using		Note:
INT#		– Choose “AUTO” for all devices unless you know exactly which card is a dirty device and which INTs that card uses.
		– Choose only “AUTO” for Multi-Func PCI devices because options A, B, C, D will force the BIOS to assign IRQs for function 0 only.
B. 1st Available IRQ	3	The system BIOS will assign these 4 available IRQs to the found PCI devices.
2nd Available IRQ	4	
3rd Available IRQ	5	
4th Available IRQ	7	
	9	
	10	
	11	
	12	
	14	
	15	
	NA	
C. PCI IRQ Activated by	Edge	To tell the chipset the IRQ signals input is level or edge trigger.
	Level	

D. PCI IDE 2nd Channel	Enable Disable	Enable/disable 2nd channel of PCI/IDE card. It includes I/O port (170H~177H) and IRQ 15 assignment
E. PCI IDE IRQ Map To	PCI-AUTO PCI-SLOT1 PCI-SLOT2 PCI-SLOT3 PCI-SLOT4 ISA	<u>PCI-AUTO</u> The BIOS will: – scan for PCI IDE devices and determine the location of the PCI IDE device  (See item below)

Item	Options	Description
E. PCI IDE IRQ Map To	PCI-AUTO PCI-SLOT1 PCI-SLOT2 PCI-SLOT3 PCI-SLOT4 ISA	<p>PCI-SLOT1 PCI-SLOT2 PCI-SLOT3 <u>PCI-SLOT4</u></p> <p>– assign IRQ 14 for primary IDE INT#  IRQ 15 for secondary IDE INT#  for the specified slot</p> <p><u>ISA</u> – The BIOS will not assign any IRQs even if PCI IDE card is found. Because some IDE cards connect the IRQ 14 &amp; 15 directly from ISA slot thru a cord. (This cord is called Legacy Header)</p>
F. Primary IDE INT# Secondary IDE INT#	A B	To assign the interrupt number that is using by the PCI IDE card.

## *Password Setting*

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

### ENTER PASSWORD:

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 disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

### PASSWORD DISABLED.

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

## IDE HDD Auto Detection

The Enhance IDE features was included in all Award BIOS. The following is a brief description of this feature.

### 1. Setup Changes

<I> Auto-detection

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

If HDD does not support LBA modes, no 'LBA' option will be shown.

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

Users can select a mode which is appropriate for them.

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

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ
SECTOR		MODE				
Prim	Select Primary Master Option (N = Skip) : N					
OPTION	SIZE	CYLS	HEADS	PRECOMP	LANDZONE	SECTORS
MODE						
2 (Y)	1337	648	64	0		2594
63		LBA				
1	1339	2595	16	65535		2594
2		NORMAL				

### <II> Standard CMOS Setup

SECTOR	MODE	CYLS	HEADS	PRECOMP	LANDZONE
Drive C : User (516MB)		1120	16	65535	1119
59	NORMAL				
Drive D : None (203MB)		684	16	65535	
685	38	-----			

When HDD type is in 'user' type, the "MODE" option will be opened for user to select their own HDD mode.

## (2) HDD Modes

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

### NORMAL mode

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

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

$$\begin{array}{r}
 \text{no. Cylinder} \quad (1024) \\
 \times \text{ no. Head} \quad (16) \\
 \times \text{ no. Sector} \quad (63) \\
 \hline
 \times \text{ no. per sector} \quad (512) \\
 \hline
 528 \text{ Megabytes}
 \end{array}$$

If a 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

This is a new HDD accessing method to overcome the 528 Megabyte bottleneck. The number of cylinders, heads & 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 Gigabytes which is obtained by the following formula:

$$\begin{array}{r}
 \text{no. Cylinder} \quad (1024) \\
 \times \text{ no. Head} \quad (255) \\
 \times \text{ no. Sector} \quad (63) \\
 \hline
 \times \text{ bytes per sector} \quad (512) \\
 \hline
 8.4 \text{ Gigabytes}
 \end{array}$$

## LARGE mode

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

Some IDE HDDs contain more than 1024 cylinders without the LBA support

(in some cases, users do not want LBA). The Award BIOS provides another alternative to support these kinds of HDD.

Example of LARGE mode:

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

BIOS tricks DOS (or other OS) that the number of cylinders 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 INT13h in order to access the right HDD address.

Maximum HDD size:

$$\begin{array}{r} \text{no. Cylinder} \quad (1024) \\ \times \text{ no. Head} \quad (32) \\ \times \text{ no. Sector} \\ \hline \text{bytes per sector} \quad (512) \\ \hline 1 \text{ Gigabytes} \end{array}$$

### (3) Remarks

To support LBA or LARGE mode of HDDs, there must be some software

involved. All these software are located in the Award HDD Service Routine (INT 13h). You may not be able to access a HDD with LBA (LARGE) mode selected if you are running under an Operating System which replaces the whole INT 13h.

## *Hard Disk Low Level Format Utility*

This Award Low-Level-Format Utility is designed as a tool to save your time when you format your hard disk. This Utility automatically looks for the necessary information of the drive you selected. It also searches for bad tracks and lists them for your reference.

Shown below is the Main Menu after you enter into the Award Low-Level-Format Utility.

<u>Hard disk Low-level-format</u> SELECT DRIVE BAD TRACKE LIST PREFORMAT	BAD TRACKS TABLE NO. CYLS HEAD
Current select drive is : C	
DRIVE: C    CYLINDER : 0    HEAD: 0	

  

	CYLINDERS	HEADS	SECTORS	PRECOMP	LANDZONE
Drive C: 40 Mb	977	5	17	300	977
Drive D: None	0	0	0	0	0

  

Up/Down - Select item      Enter - Accept      ESC-Exit/Abort
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### Control Keys

Use the Up and Down arrow keys to move around the selections displayed on the upper screen. Press [Enter] to accept the selection. Press Esc to abort the selection or exit the Utility.

### SELECT DRIVE

Select from installed hard disk drive C or D. Listed at the bottom of the screen is the drive automatically detected by the utility.

## BAD TRACK LIST

### Auto scan bad track

The utility will automatically scan bad tracks and list the bad tracks in the window at the right side of the screen.

### Add bad track

Directly type in the information of the known bad tracks in the window at the right side of the screen.

### Modify bad track

Modify the information of the added bad tracks in the window at the right side of the screen.

### Delete bad track

Delete the added bad tracks in the window at the right side of the screen.

### Clear bad track table

Clear the whole bad track list in the window at the right side of the screen.

## PREFORMAT

### Interleave

Select the interleave number of the hard disk drive on which you wish to perform low level format. You may select from 1 to 8. Check the documentation that came with the drive for the correct interleave number, or select 0 for utility automatic detection.

### Auto scan bad track

This allows the utility to scan first then format by each track.

### Start

Press <Y> to start low level format.

## ***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 or Pressing the "RESET" button on the system case. You may also restart by simultaneously press <Ctrl>, <Alt>, and <Delete> keys. Upon restart the system, immediately press <Insert> to load BIOS default CMOS value for boot up.

## ***BIOS Reference - POST Codes***

NOTE: ISA POST codes are typically output to port address 80h.

POST (hex)	Description
C0	1. Turn off OEM specific cache, shadow... 2. Initialize all the standard devices with default values Standard devices includes: -DMA controller (8237) -Programmable Interrupt Controller (8259) -Programmable Interval Timer (8254) -RTC chip
C1	Auto-detection of onboard DRAM & Cache
C3	1. Test system BIOS checksum 2. Test the first 256K DRAM 3. Expand the compressed codes into temporary DRAM area including the compressed System BIOS & Option ROMs
C5	Copy the BIOS from ROM into E0000-FFFFFF 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 basic R/W functionality
BE	Program default values into chipset according to the MODBINable Chipset Default Table
09	1. Program the configuration register of Cyrix CPU according to the MODBINable Cyrix Register Table 2. OEM specific cache initialization (if needed)

POST(hex)	Description
0A	<ol style="list-style-type: none"> <li>1. Initialize the first 32 interrupt vectors with corresponding Interrupt handlers Initialize INT no from 33-120 with Dummy(Suprious) Interrupt Handler</li> <li>2. Issue CPUID instruction to identify CPU type</li> <li>3. Early Power Management initialization (OEM specific)</li> </ol>
0B	<ol style="list-style-type: none"> <li>1. Verify the RTC time is valid or not</li> <li>2. Detect bad battery</li> <li>3. Read CMOS data into BIOS stack area</li> <li>4. PnP initializations including (PnP BIOS only) <ul style="list-style-type: none"> <li>-Assign CSN to PnP ISA card</li> <li>-Create resource map from ESCD</li> </ul> </li> <li>5. Assign IO &amp; Memory for PCI devices (PCI BIOS only)</li> </ol>
0C	Initialization of the BIOS Data Area (40 : 0N – 40:FF)
0D	<ol style="list-style-type: none"> <li>1. Program some of the Chipset value according to Setup. (Early Setup Value Program)</li> <li>2. Measure CPU speed for display &amp; decide the system clock speed</li> <li>3. Video initialization including Monochrome, CGA, EGA/VGA. If no display device is found, the speaker will beep</li> </ol>
0E	<ol style="list-style-type: none"> <li>1. Initialize the APIC (Multi-Processor BIOS only)</li> <li>2. Test video RAM (If Monochrome display device found)</li> <li>3. Show messages including: <ul style="list-style-type: none"> <li>-Award Logo, Copyright string, BIOS Date code &amp; Part No.</li> <li>-OEM specific sign on messages</li> <li>-Energy Star Logo (Green BIOS ONLY)</li> <li>-CPU brand, type &amp; speed</li> <li>-Test system BIOS checksum(Non-Compress Version only)</li> </ul> </li> </ol>
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 & Extended Memory Size
31	<ol style="list-style-type: none"> <li>1. Test Base Memory from 256K to 640K</li> <li>2. Test Extended Memory from 1M to the top of memory</li> </ol>

POST(hex)	Description
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
33-3B	Reserved
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 the L2 cache to be turned on in this stage. But usually, the cache is turned on later in POST 61h
3F-40	Reserved
BF	1. Program the rest of the Chipset value according to Setup. (Later Setup Value Program) 2. If auto-configuration is enabled, programmed the chipset with predefined 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 & parallel ports
44	Reserved
45	Initialize math coprocessor.
46-4D	Reserved
4E	If there is any error detected (such as video, kb...), show all the error messages on 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
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 & 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

POST(hex)	Description
61	<ol style="list-style-type: none"> <li>1. Try to turn on Level 2 cache Note: if L2 cache has already turned on in POST 3D, this part would be skipped</li> <li>2. Set the boot up speed according to Setup setting</li> <li>3. Last chance for Chipset initialization</li> <li>4. Last chance for Power Management initialization (Green BIOS only)</li> <li>5. Show the system configuration table</li> </ol>
62	<ol style="list-style-type: none"> <li>1. Setup daylight saving according to Setup value</li> <li>2. Program the NUM Lock, typematic rate &amp; typematic speed according to Setup setting</li> </ol>
63	<ol style="list-style-type: none"> <li>1. If there is any change in the hardware configuration, update the ESCD information (PnP BIOS only)</li> <li>2. Clear memory that has been used</li> <li>3. Boot system via INT 19H</li> </ol>
FF	System Booting. This means that the BIOS has already passed the control right to the operating system

Unexpected Errors:

POST(hex)	Description
B0	If interrupt occurs in protected mode.
B1	Unclaimed NMI occurs

# Appendix A

## Watchdog Timer

### Watchdog Timer Configuration

The watchdog timer will reset the system automatically if the system program does not refresh the watchdog timer during the watchdog time out interval. It is defined at I/O port **0443H** and **043H** to enable/disable the watchdog time out function.

Regarding to the watchdog function, user must have a program to set the watchdog time out value, and refresh the watchdog timer cycle. If the system program goes into a dead loop or goes into an abnormal cycle, the watchdog timer cannot be refreshed immediately. Meanwhile, the system will be reset by watchdog timer automatically. The watchdog timer will be refreshed by “disable watchdog output” then “enable watchdog output”.

The following flowchart shows the normal structure of system program.

### Watchdog timer examples:

#### (1) Setup watchdog timer time out value:

```
mov al,0ah
mov dx,70h
out dx,al
jmp short $+2
mov dx,71h
in al,dx
jmp short $+2
and al,0f0h
add ax,TimeValue ; TimeValue= 00h..0fh, reference as
following watchdog
time out table
out dx,al
jmp short $+2
mov al, 0bh
mov dx, 70h
out dx, al
jmp short $+2
mov dx, 71h
in al, dx
```

```

jmp short $+2
or al, 08h
out dx, al
jmp short $+2

```

**Watchdog Time Out Table:**

Time Value	Time Out	Time Value	Time Out
0	None	8	0.5 sec.
1	0.5 sec.	9	1 sec.
2	1 sec.	A	2 sec.
3	0.015 sec.	B	4 sec.
4	0.03 sec.	C	8 sec.
5	0.06 sec.	D	16 sec.
6	0.125 sec.	E	32 sec.
7	0.25 sec.	F	64 sec.

(2) **Enable watchdog output:**

```

mov dx, 443h
in al, dx
jmp short $+2

```

```

; SET WATCH DOG ENABLE

```

(3) **Disable watchdog output:**

```

mov dx, 043h
in al, dx
jmp short $+2

```

```

; SET WATCH DOG DISABLE

```

## Appendix B

### Connectors' Pin Assignment

#### Parallel/Printer connector (PRN)

Pin no.	Signal
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	+ Select
14	- Auto Feed
15	- Error
16	- INIT Printer
17	- Select Input
18-25	Ground

**HDD Connector (IDE)**

<b>Pin no.</b>	<b>Signal</b>	<b>Pin no.</b>	<b>Signal</b>
1	- RST	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	N.C.
21	N.C.	22	GND
23	IOW	24	GND
25	IOR	26	GND
27	IRDY	28	N.C.
29	N.C.	30	GND
31	IRQ	32	-IO CS16
33	A1	34	N.C.
35	A0	36	A2
37	CS0	38	CS1
39	-ACT	40	GND

**FDD Connector (FDD)**

<b>Pin no.</b>	<b>Signal</b>
1-33(odd)	GND
2	High Density
4, 6	Unused
8	Index
10	Motor Enable A
12	Driver Select B
14	Driver Select A
16	Motor Enable B
18	Direction
20	Step Pulse
22	Write Data
24	Write Enable
26	Track 0
28	Write Protect
30	Read Data
32	Select Head
34	Disk Change

**RS-232 Connector (COM1)**

Pin no.	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

**RS-232/422/485 Connector (COM2)**

Pin no.	RS232	RS422	RS485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	
4	DTR	RX-	
5	GND	GND	
6	DSR	RTS +	
7	RTS	RTS -	
8	CTS	CTS +	
9	RI	CTS -	

**PC/104 Connector**

Pin no.	A	B	C	D
0	--	--	GND	GND
1	IOCHCHK*	GND	SBHE	MEMCS16*
2	SD7	RESETDRV	LA23	IOSC16*
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	OWS*	LA17*	DACK0*
9	SD0	+12V	MEMR*	DRQ0*
10	IOCHRDY*	GND	MEMW*	DACK5*
11	AEN	SMEMW*	SD8	DRQ5
12	SA19	SMEMR*	SD9	DACK6*
13	SA18	IOW*	SD10	DRQ6
14	SA17	IOR*	SD11	DACK7*
15	SA16	DACK3*	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1*	SD14	MASTER*
18	SA13	DRQ1	SD15	GND
19	SA12	REFRESH*	NC	GND
20	SA11	SYSCLK	--	--
21	SA10	IRQ7	--	--
22	SA9	IRQ6	--	--
23	SA8	IRQ5	--	--

**PC/104 Connector ( continued)**

Pin no.	A	B	C	D
24	SA7	IRQ4	--	--
25	SA6	IRQ3	--	--
26	SA5	DACK2*	--	--
27	SA4	TC	--	--
28	SA3	BALE	--	--
29	SA2	+5V	--	--
30	SA1	OSC	--	--
31	SA0	GND	--	--
32	GND	GND	--	--

**Remark:**

'\*' means 'Low active single'

'--' means 'None'

## Appendix C

### Installing DiskOnChip of M-systems

On the NEAT-406 board, you can find the socket, location U12, for DiskOnChip of M-systems. Please follow the procedures as below to install the DiskOnChip you bought:

#### I. For 32-pin DiskOnChip

1. Align the notched end of the chip with the notched end of the socket.
2. Align the chip's pins with the socket holes.
3. Gently press the chip into the socket.

#### II. For 28-pin DiskOnChip

1. Align the non-notched end of the chip with the non-notched end of the socket.
2. Align the chip's pins with the socket's holes.  
(chip's pin28 with the socket's hole32)
3. Gently press the chip into the socket.

For further technical information of DiskOnChip , please see the attached manual in the DiskOnChip package or contact the agent of M-systems.

## Appendix D

### Updating BIOS

You should find one diskette for updated BIOS program in the package. The updating procedures are as the following:

1. Insert the diskette(There is a file "AWDFLASH.EXE") in drive A or B.
2. Type AWDFLASH under the prompt A or B.
3. The screen will ask you to enter the file name for programming. Please enter the 'filename' for the updating BIOS that is from your agent. Meanwhile, please type 'N' to answer the question 'Do you want to save BIOS (y/n)?' at the bottom of the screen.
4. After that, please type 'Y' to answer the question 'Are you sure to program (y/n)?' at the bottom line of the current screen.
5. Turn off the power after the system updates the BIOS.
6. Turn on the power again.

## Appendix E

### I/O Port Address Map

Address ( HEX )	Device
000-01F	DMA controller 1
020-021	Interrupt controller 1
022-023	M1487/M1489 chipset address
040-05F	Timer 1 & 2
043	Disable Watch-dog timer operation (read)
060-06F	Keyboard controller
070-071	Real Time Clock, Non_Maskable interrupt
080-09F	DMA page register
0A0-0A1	Interrupt controller 2
0C0-0DF	DMA controller 2
0F0	Clear math. Coprocessor busy signal
0F1	Reset math. Coprocessor
0F8-0FF	Math. Coprocessor
1F0-1F8	Fixed disk controller
200-207	Game port
278-27F	Parallel port #2
2E8-2EF	Serial port #4 (COM 4)
2F8-2FF	Serial port #2 (COM 2)
300-31F	Prototype card / Streaming Tape Adapter
378-37F	Parallel port #1
380-38F	SDLC, Bisynchronous 2
3A0-3AF	SDLC, Bisynchronous 1
3B0-3BF	Monochrome Display , Parallel port 0
3C0-3CF	EGA card
3D0-3DF	CGA card
3E8-3EF	Serial port #3 (COM3)
3F0-3F7	Floppy Disk controller
3F8-3FF	Serial port #1 (COM1)
443	Enable Watch-dog timer operation (read)

Appendix F  
**Memory Address Map**

Address ( HEX )	Device
0000000-009FFFF	System memory
00A0000-00BFFFF	Display memory
00C0000-00DFFFF	I/O device BIOS ROM or RAM buffer
00E0000-00EFFFF	PCI device ROM
00F0000-00FFFFFF	System BIOS ROM
0100000-BFFFFFFF	System extension memory