

NEAT-400

486-based All-In-One
5 1/4" DiskSize SBC

User's Manual

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Packing List

Before getting started, please ensure that the following materials are included:

486 All-In-One Single Board Computer

Utility Disks

- VGA Driver & Utility disks
- Ethernet driver & Utility disk
- Updating BIOS Utility disk
- Audio driver & Utility disk

Accessories

- Keyboard/Mouse/Audio/Ethernet adapter with cable
- FDD cable
- HDD cable
- COM cables with bracket x 2
- Printer/VGA cable with bracket
- User's Manual

If any of above mentioned is missed or damaged, please contact with your supplier immediately.

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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. Also included on-board are CHIPS 65550 **VGA GUI Accelerator** controller, Ethernet controller, Audio controller, one **socket for Flash Disk**, four 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.

Its video section features the ability to control most EL, mono/color STN and TFT flat panel display as well as standard VGA. Equipped with 1MB of EDO DRAM, up to 2MB EDO DRAM (optional). The CHIPS 65550 can display in 640x480 resolution on commonly used flat panels and true color displays on CRT's.

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:

PCI bus - 32 bit PCI bus

. CPU:

On board equipped with SQFP CPU, speed up to AMD 5x86-133.

. Cache:

256KB/512KB 2nd level cache memory

. Memory:

Supports FPM/EDO DRAM module.

Supports on board 16 MB DRAM and one 72-pin SIMM sockets, Or two 72-pin SIMM sockets accept 1,2,4,8,16 or 32 MB SIMM module.

. 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

. Display:

-Chipset: C&T 65550 PCI local bus flat-panel with Windows accelerator and Video play back

- Display memory: on board EDO DRAM 1MB up to 2MB

- Display resolution:

Supports Flat-panel resolutions up to 640x480, 800x600, 1024x768, 1280x1024 Supports non-interlace CRT monitors, 1024x768 64K colors

- Display connector: DB-15 VGA connector for CRT monitor and 2x22 pin header for Flat-panel

- Support 3.3V and 5V Flat-panel

. Networking:

Realtek RTL8139A Ethernet controller, 10/100 base T with RJ-45 connector.

. S.S.D.:

Socket for M-System Disk On Chip

. IDE:

Supports up to two channels 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:

Three 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 ~ 63 sec (14 level)

. Keyboard Connector:

One 8 pin header to connect the keyboard/mouse to mounting bracket.

. Expansion Bus:

A 16 Bit PC104 connector for expansion modules

. Power Supply Voltage:

+5V/2.5A, +12V/0.5A, 6_pin external power connector

. Operating Temperature:

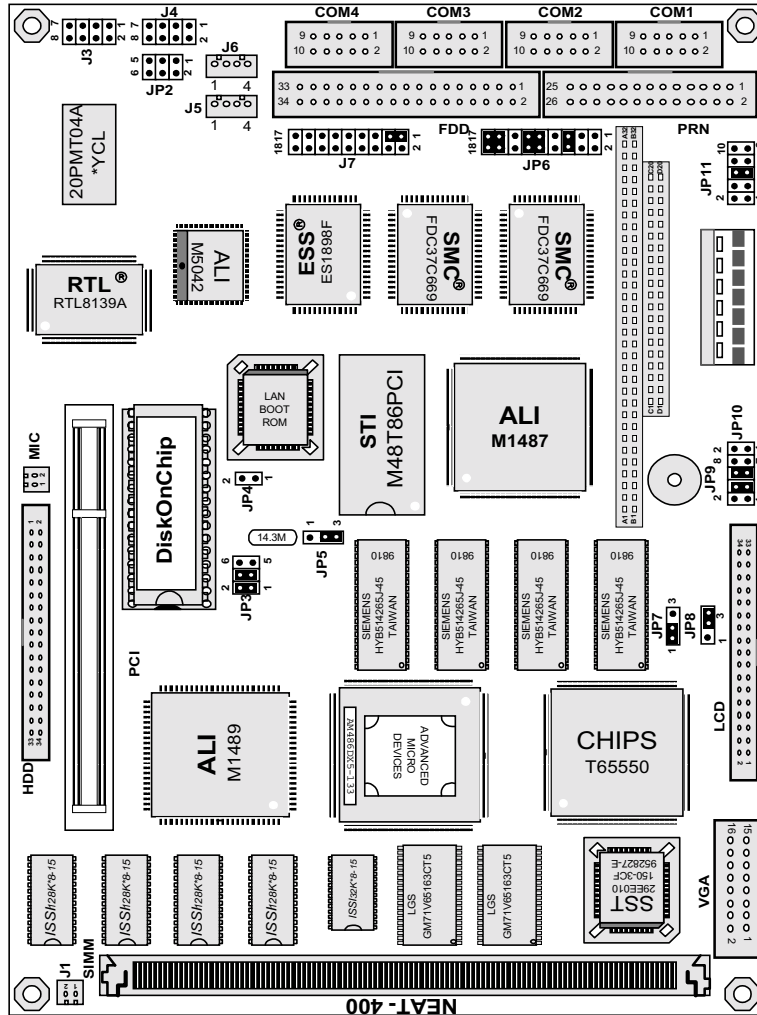
32° to 140° F (0° to 60° C)

. Board Size:

203mm X 146mm

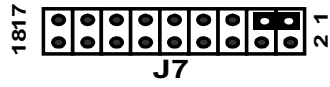
Chapter 2 Jumpers and Connectors

. Component location



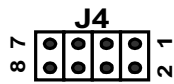
NEAT-400 COMPONENT DRAWING

2.1 Jumpers Setting



Speaker/Key_lock/Reset/Turbo/LED (J7)

| function | J7 |
|------------------------------|-------|
| Internal buzzer | 1-3 |
| External speaker(remove 1-3) | 1-7 |
| Power LED, Pin 2+, Pin6- | 2-6 |
| Keylock | 8-10 |
| System reset switch | 11-12 |
| Turbo Switch | 13-14 |
| Turbo LED, Pin16+, Pin15- | 15-16 |
| HDD LED, Pin18+, Pin17- | 17-18 |



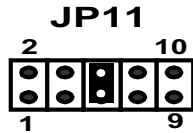
External keyboard/ mouse (J4)

| | J4 |
|-----------------|----|
| Keyboard clock | 1 |
| Mouse clock | 2 |
| Keyboard data | 3 |
| Mouse data | 4 |
| Keyboard ground | 5 |
| Mouse ground | 6 |
| Keyboard power | 7 |
| Mouse power | 8 |



CPU Fan (J1)

| | J1 |
|--------|----|
| Ground | 1 |
| +12V | 2 |

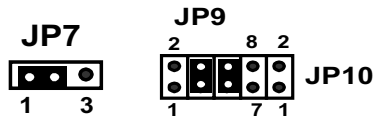


M-System Address Select (JP11, 1-8)

| Disk On Chip address | JP11 |
|----------------------|------|
| C0000-C7FFF | 1-2 |
| C8000-CFFFF | 3-4 |
| D0000-D7FFF | 5-6 |
| D8000-DFFFF | 7-8 |

Watchdog Timer (JP11,9-10)

| | JP11 |
|-------------------------------------|------|
| Watchdog time out gen. system reset | 9-10 |

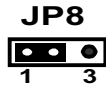


LCD Panel Voltage Select (JP7, JP10)

| | JP7 | JP10 |
|----------------------|-----|-------|
| 3.3V Panel Interface | 1-2 | close |
| 5.0V Panel Interface | 2-3 | open |

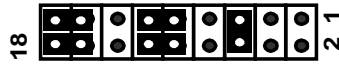
LCD Panel Type Select (JP9)

| |
|--|
| 1-2, 3-4, 5-6, 7-8 four jumpers to select up to 16-type panel |
|--|



Panel Clock Select (JP8)

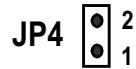
| | JP8 |
|--------------|-----|
| Invert Clock | 1-2 |
| Normal Clock | 2-3 |



JP6

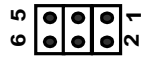
COM2 Select (JP6)

| | JP6 |
|-------|----------------------------|
| RS232 | 5-6,9-11,10-12,15-17,16-18 |
| RS422 | 3-4,7-9,8-10,13-15,14-16 |
| RS485 | 1-2,7-9,8-10,13-15,14-16 |



CMOS clear (JP4)

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



JP2

Ethernet LED (JP2)

| | JP2 |
|------------------------------|----------------------------|
| Tx LED (pin1 - ,pin2 +) | 1-2 |
| Rx LED (pin3 - ,pin4 +) | 3-4 |
| 10/100 LED (pin5 - ,pin6 +) | LED ON (10), LED OFF (100) |



MIC

Microphone input (MIC)

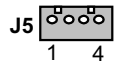
| | MIC |
|---------------|------------|
| Microphone in | 1 |
| Ground | 2 |



J6

Audio Line IN (J6)

| | J6 |
|----------------|-----------|
| Line In Right | 1 |
| Line In Ground | 2 |
| Line In Ground | 3 |
| Line In Left | 4 |



J5

Audio Speaker Out (J5)

| | J5 |
|--------------------|-----------|
| Speaker Out Right | 1 |
| Speaker Out Ground | 2 |
| Speaker Out Ground | 3 |
| Speaker Out Left | 4 |



External Power Connector (J8)

| | J8 |
|--------|-----------|
| +5V | 2 |
| Ground | 5,6 |
| +12V | 3 |
| -12V | 4 |

2.2 Connectors

The connectors allow the board 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.

| Component | Label |
|----------------------------|------------------------|
| HDD (IDE) connector | IDE |
| FDD connector | FDC |
| VGA connector | VGA |
| Flat panel connector | LCD |
| Networking connector | J2/J3 |
| Parallel port | PRN |
| PC/104 connector | PC104 |
| Keyboard connectors | J4 |
| Mouse connectors | J4 |
| Reset switch connector | J7 (11-12) |
| External speaker connector | J7(1-7) |
| HDD LED connector | J7 (17-18) |
| Turbo switch connector | J7 (13-14) |
| Turbo LED connector | J7 (15-16) |
| SBC power connector | J8 |
| CPU fan power connector | J1 |
| RS-232 serial port | COM1, COM2, COM3, COM4 |
| RS422,485 serial port | COM2 |
| CMOS RAM clear | JP4 |

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:

- Power supply
- IBM PC/AT keyboard
- 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 1 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. 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
5. 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 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 key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys.

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

| |
|---------------------|
| <i>Control Keys</i> |
|---------------------|

| | |
|---------------|---|
| 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 Op- tion Page Setup Menu |
| (Shift)F2 key | Change color from total 16 colors. F2 to select color for- ward, (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 several 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 | INTEGRATED PERIPHERALS |
| BIOS FEATURES SETUP | SUPERVISOR PASSWORD |
| CHIPSET FEATURES SETUP | USER PASSWORD |
| POWER MANAGEMENT SETUP | IDE HDD AUTO DETECTION |
| PCI CONFIGURATION SETUP | HDD LOW LEVEL FORMAT |
| LOAD BIOS DEFAULTS | SAVE & EXIT SETUP |
| LOAD SETUP DEFAULTS | EXIT WITHOUT SAVING |
| Esc : Quit | ↑ ↓ → ← : Select Item |
| F10 : Save & Exit Setup | (Shift) F2 : Change Color |
| Time, Date, Hard Disk Type... | |

Standard CMOS setup

This setup page includes all the items in 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 4-19 to Page 4-23 for details.

PCI Configuration

This category specifies the setup of PCI related devices and On Board I/O's. See Page 4-24 for details.

Load BIOS defaults

The BIOS defaults have been set by the manufacturer and represent setting, which provide the minimum requirements for your system to operate.

Load setup defaults

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

Supervisor / User Password setting

Changes, sets, or disables password. It allows you to limit access to the system and Setup, or just to Setup. See Page 4-27 for details.

IDE HDD auto detection

Automatically detect and configure hard disk parameters. See Page 4-28 to Page 4-30 for details.

HDD low level format

This stands for hard disk low level format utility. See Page 4-31 to Page 4-32 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) : Tue, Jan 13 1998 | | | | | | |
| Time(hh:mm:ss) : 13:52:00 | | | | | | |
| | <u>CYLS.</u> | <u>HEADS</u> | <u>PRECOMP</u> | <u>LANDZONE</u> | <u>SECTORS</u> | <u>MODE</u> |
| Drive C : | 0 | 0 | 0 | 0 | 0 | Auto |
| Drive D : | 0 | 0 | 0 | 0 | 0 | Auto |
| Drive A : 1.44M , 3.5 in | | | | | | |
| Drive B : None | | | | | | |
| Video : EGA / VGA | | | | | | |
| Halt On : All Errors | | | | | | Base Memory : 640K |
| | | | | | | Extended Memory : 31744K |
| | | | | | | <u>Other Memory : 384K</u> |
| | | | | | | Total Memory : 32768K |
| ESC : Quit | | ↑ ↓ → ← : Select Item | | PU / PD / + / - : Modify | | |
| F1 : Help | | (Shift) F2 : Change Color | | | | |

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, from 1900 through 2099 |

Time

The time format is <hour> <minute> <second>. 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 you select TYPE "Auto", BIOS will auto detect the HDD & CD-ROM Drive at POST stage and showing the IDE for HDD & CD-ROM.

| | |
|----------|---------------------|
| TYPE | Drive type |
| CYLS. | number of cylinders |
| HEADS | number of heads |
| PRECOMP | write precom |
| LANDZONE | landing zone |
| SECTORS | number of sectors |
| MODE | Mode type |

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 monitors adapters. |
| Absent | Without VGA controller on system |
| 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.

| | |
|-------------------|--|
| All errors | The system boot will not be stopped for any error that may be detected. |
| No errors | Whenever the BIOS detects a non-fatal error the system will be stopped and you will be prompted. |
| 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 <64MB : Non-OS2 | 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: Many disk diagnostic programs, which attempt to access the boot sector table can cause the above warning message. If you will be running such a program, we recommend disable Virus Protection first.

CPU Internal Cache/External Cache

These two categories speed up memory access. 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). Option items are: (1) C,CDROM,A (2) CDROM,C,A (3) D,A,SCSI (4) SCSI,A,C (5) SCSI,C,A (6) C only (7) A,C,SCSI (8) C,A,SCSI. Default value is "C,CDROM,A".

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

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

This allows you to determine the Default State of numeric keypad. By default, the system boots up with NumLock 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 |

Gate A20 Option

This entry allows you to select how the Gate A20 is handled. The Gate A20 is a device used to address memory above 1 MB. Initially, the Gate A20 was handled via a pin on the keyboard. Today, while keyboards still provide this support, it is more common, and much faster, for system chipset to provide support for Gate A20.

| | |
|--------|----------|
| Normal | keyboard |
| Fast | chipset |

Typematic Rate Setting

This determines if the typematic rate is to be used. When disabled, continually holding down a key on your keyboard will generate only one instance. In other words, the BIOS will only report that the key is down. When the typematic rate is enabled, the BIOS will report as before, but it will then wait a moment, and, if the key is still down, it will begin the report that the key has been depressed repeatedly. For example, you would use such a feature to accelerate cursor movements with arrow keys.

| | |
|----------|------------------------|
| Enabled | Enable typematic rate |
| Disabled | Disable typematic rate |

Typematic Rate (Chars/Sec)

When the typematic rate is enabled, this selection allows you select the rate at which the keys are accelerated.

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

Typematic Delay (Msec)

When the Typematic rate is enabled, this selection allows you to select the delay between when the key was first depressed and when the acceleration begins.

| | |
|------|-----------|
| 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.

OS Select for DRAM > 64 MB

This item allows you to access the memory that over 64MB in OS/2.

The choice: Non-OS2, OS2

PCI / VGA Palette Snoop

It determines whether the MPEG ISA / VESA VGA cards can work with PCI / VGA or not.

| | |
|----------|--|
| Enabled | Wen PCI/VGA working with MPEG ISA/VESA VGA card. |
| Disabled | Wen PCI/VGA not working with MPEG ISA/VESA VGA card. |

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/D0000 - DFFFF Shadow

These categories determine whether optional ROM's will be copied to RAM. An example of such option ROM would be support of on board M_system disk_on_chip and SCSI.

| | |
|----------|-----------------------------|
| Enabled | Optional shadow is enabled |
| Disabled | Optional shadow is disabled |

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 Memory Hole(15M-16M) : Disabled ISA I/O Recovery : Enabled Fast-Back-to-Back : Enabled | ESC : Quit ↑ ↓ → ← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values F2 : Color (Shift) F6 : Load BIOS Defaults F7 : Load Setup Defaults |
|--|--|

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speed and access to system memory resources, such as DRAM and external cache. It also coordinates communications between the conventional ISA bus and PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system. Such a scenario might occur if your system had mixed speed DRAM chips installed, so that greater delays may be required to preserve the integrity of the data held in the slower memory chips.

Auto Configuration

Pre-defined values for DRAM, cache .. timing according to CPU type &
 BIOS Setup

system clock.

Memory Hole (15M-16M)

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

| | |
|----------|----------------------------|
| Enabled | Memory hole supported. |
| Disabled | Memory hole not supported. |

ISA I/O recovery time

The recovery time is the length of time which the system will delay after the completion of an input / output request. This delay takes place because the CPU is operating so much faster than the input / output bus that the CPU must be delayed to allow for the completion of the I/O.

Integrated Peripherals Menu

ROM PCI/ISA BIOS
INTEGRATED PERIPHERALS
AWARD SOFTWARE INC.

| | | | |
|--------------------------|------------|-----------------------|-----------------------------------|
| On-Chip Local Bus IDE | : Enabled | Onboard Serial Port 3 | : 3E8 |
| IDE Buffer for DOS & Win | : Enabled | Serial Port 3 Use IRQ | : IRQ10 |
| IDE HDD Block Mode | : Enabled | Onboard Serial Port 4 | : 2E8 |
| IDE Primary Master PIO | : Auto | Serial Port 4 Use IRQ | : IRQ11 |
| IDE Primary Slave PIO | : Auto | | |
| Onboard FDC Controller | : Enabled | | |
| Onboard UART1 | : 3F8/IRQ4 | | |
| Onboard UART2 | : 2F8/IRQ3 | | |
| Onboard UART 2 Mode | : Standard | | |
| Onboard Parallel Port | : 378/IRQ7 | | |
| Parallel Port Mode | : Normal | | |
| | | ESC | : Quit ↑ ↓ → ← :Select Item |
| | | F1 | : Help PU/D/+/- :Modify |
| | | F5 | :Old Values (Shift) F2 : Color |
| | | F6 | :Load BIOS Defaults |
| | | F7 | :Load Setup Defaults |

Power Management Setup

The Power management setup will appear on your screen like this:

| | | | |
|---|--|--|--|
| ROM PCI/ISA BIOS | | | |
| POWER MANAGEMENT SETUP | | | |
| AWARD SOFTWARE, INC. | | | |
| Power Management : Disable PM Control by APM : Yes Video Off Option : Susp, Stby -> Off Video Off Method : DPMS Support MODEM Use IRQ : 3 ** PM Timers ** HDD Off After : Disable Doze Mode : Disable Standby Mode : Disable Suspend Mode : Disable ** PM Events ** VGA : OFF FDD(3FXh) : ON LPT & COM : LPT/COM HDD (1FXh) : ON NMI : OFF IRQ3 (COM 2) : ON IRQ4 (COM 1) : ON | IRQ5 (LPT 2) : ON IRQ6 (Floppy Disk) : ON IRQ7 (LPT 1) : ON IRQ8 (RTC Alarm) : OFF IRQ9 (IRQ2 Redir) : ON IRQ10 (Reserved) : OFF IRQ11 (Reserved) : OFF IRQ12 (PS/2 Mouse) : ON IRQ13 (Coprocesor) : OFF IRQ14 (Hard Disk) : ON IRQ15 (Reserved) : OFF | | |
| | | ESC: Quit ↑↓→← : Select Item F1 : Help PU / PD / + / - : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults | |

Power Management

This category allows you to select the type (or degree) of power saving and is directly related to the following modes:

1. Doze mode
2. Standby mode
3. Suspend mode
4. HDD power down

There are four selections for Power Management, three of which have fixed mode settings.

| 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 SYNC +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 | 1. OFF | The specified event activity will not affect the PM timers. |
| 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) | 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!

PCI Configuration Setup

You can manually configure the PCI Device's IRQ. The following pages tell you the options of each item and describe the meaning of each option.

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

| | |
|---|---|
| PnP BIOS auto-config : Disabled Slot 1 Using INT# : AUTO Slot 2 Using INT# : AUTO Slot 3 Using INT# : AUTO Slot 4 Using INT# : AUTO 1st Available IRQ : 10 2nd Available IRQ : 11 3rd Available IRQ : 12 4th Available IRQ : 9 PCI IRQ Activated By : Level PCI IDE 2nd Channel : Enable PCI IDE IRQ Map To : PCI-AUTO Primary IDE INT# : A | CPU to PCI Write buffer : Enabled CPU to PCI Byte Merge : Enabled PCI to DRAM Buffer : Enabled ESC: Quit ↑↓→← : Select Item F1 : Help PU / PD / + / - : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults |
|---|---|

The following pages tell you the options of each item and describe the meaning of each option.

| Item | Options | Descriptions |
|--|--------------------------|---|
| A . Slot 1 Using INT# Slot 2 Using INT# Slot 3 Using INT# Slot 4 Using INT# | AUTO A B C D | AUTO : BIOS will – Ask the PCI device which INT (A-D) does it want to use for interrupt. – 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# Slot 2 Using INT# Slot 3 Using INT# Slot 4 Using INT# | AUTO A B C D | A,B,C,D : These options are reserved for "Dirty" cards from which the system BIOS cannot tell which INT does it use. Note: – 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- Function PCI devices because options A, B, C, D will force the BIOS to assign IRQs for function only. |
| B. 1st Available IRQ 2nd Available IRQ 3rd Available IRQ 4th Available IRQ | 3 4 5 7 9 10 11 12 14 15 NA | The system BIOS will assign these 4 available IRQs to the found PCI devices. |
| C. PCI IRQ Activated by | Edge Level | To tell the chipset the IRQ signals input is level or edge trigger. |
| 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 | PCI-SLOT1 PCI-SLOT2 PCI-SLOT3 <u>PCI-SLOT4</u> – assign IRQ 14 for primary IDE INT# IRQ 15 for secondary IDE INT# for the specified slot <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 & 15 directly from ISA slot through a cord. (This cord is called Legacy Header) |
| F. Primary IDE INT# Secondary IDE INT# | A B | To assign the interrupt number that is using by the PCI IDE card. |

Supervisor/User Password Setting

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

Supervisor password: can enter and change the options of the setup menus.

User password : just can only enter but do not have the right to change the options of the setup menus.

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

ENTER PASSWORD:

Type the password, up to eight characters in length, 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 will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

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

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

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 that is appropriate for them.

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

| | <u>CYLS.</u> | <u>HEADS</u> | <u>PRECOMP</u> | <u>LANDZONE</u> | <u>SECTORS</u> | <u>MODE</u> |
|--------------------------------------|--------------|--------------|----------------|-----------------|----------------|--------------|
| Drive C: | | | | | | |
| Select Drive C Option (N = Skip) : N | | | | | | |
| OPTION | SIZE | CYLS | HEADS | PRECOMP | LANDZONE | SECTORS MODE |
| 2 (Y) | 133 | 648 | 64 | 0 | 2594 | 63 LBA |
| 1 | 1339 | 2595 | 16 | 65535 | 2594 | 63 NORMAL |
| 3 | 1338 | 1297 | 32 | 65535 | 2594 | 63 LARGE |

Note: Some Oses (SCO-UNIX before V5.0) must use "NORMAL" for installation

<II> Standard CMOS Setup

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

BIOS Setup

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, heads & sectors for NORMAL mode are 1024, 16 & 63.

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

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:

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

LARGE mode

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

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

Example of LARGE mode:

| CYLS. | HEADS | SECTOR | MODE |
|-------|-------|--------|--------|
| 1120 | 16 | 59 | NORMAL |
| 560 | 32 | 59 | 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, 2 multiply the number of heads. A reverse transformation process will be made inside INT13h in order to access the right HDD address.

Maximum HDD size:

| | | |
|---|------------------|-------------|
| | no. Cylinder | (1024) |
| x | no. Head | (32) |
| x | no. Sector | (63) |
| x | bytes per sector | (512) |
| | | <hr/> |
| | | 1 Gigabytes |

(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 Utility</u> SELECT DRIVE BAD TRACKE LIST PREFORMAT | NO. CYLS HEAD |
| Current select drive is : C | |
| DRIVE: C CYLINDER : 0 HEAD: 0 | |

| | CYLINDER | HEAD | PRECOMP | LANDZONE | SECTOR | MODE |
|------------------|----------|------|---------|----------|--------|------|
| Drive C: 1282 Mb | 621 | 64 | 0 | 2483 | 63 | LBA |
| Drive D: 0 Mb | 0 | 0 | 65535 | 65535 | 0 | AUTO |

| | | |
|--|----------------|----------------|
| Up/Down - Select item | Enter - Accept | ESC-Exit/Abort |
| Copyright © Award Software, Inc. 1992-98 All Rights Reserved | | |

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-FFFFF shadow RAM so that POST will go faster |
| 01-02 | Reserved |
| 03 | Initialize EISA registers (EISA BIOS only) |
| 04 | Reserved |
| 05 | 1. Keyboard Controller Self-Test 2. Enable Keyboard Interface |
| 06 | Reserved |
| 07 | Verifies CMOS 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"> 1. Initialize the first 32 interrupt vectors with corresponding Interrupt handlers Initialize INT no from 33-120 with Dummy (Spurious) Interrupt Handler 2. Issue CUID instruction to identify CPU type 3. Early Power Management initialization (OEM specific) |
| 0B | <ol style="list-style-type: none"> 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) <ul style="list-style-type: none"> -Assign CSN to PnP ISA card -Create resource map from ESCD 5. Assign IO & Memory for PCI devices (PCI BIOS only) |
| 0C | Initialization of the BIOS Data Area (40 : 0N – 40:FF) |
| 0D | <ol style="list-style-type: none"> 1. Program some of the Chipset 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 is found, the speaker will beep |
| 0E | <ol style="list-style-type: none"> 1. Initialize the APIC (Multi-Processor BIOS only) 2. Test video RAM (If Monochrome display device found) 3. Show messages including: <ul style="list-style-type: none"> -Award Logo, Copyright string, BIOS Date code & Part No. -OEM specific sign on messages -Energy Star Logo (Green BIOS ONLY) -CPU brand, type & speed -Test system BIOS checksum (Non-Compress Version) |
| 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"> 1. Test Base Memory from 256K to 640K 2. Test Extended Memory from 1M to the top of memory |

| 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">1. Try to turn on Level 2 cache Note: if L2 cache has already turned on in POST 3D, this part would be skipped2. Set the boot up speed according to Setup setting3. Last chance for Chipset initialization4. Last chance for Power Management initialization (Green BIOS only)5. Show the system configuration table |
| 62 | <ol style="list-style-type: none">1. Setup daylight saving according to Setup value2. Program the NUM Lock, typematic rate & typematic speed according to Setup setting |
| 63 | <ol style="list-style-type: none">1. If there is any change in the hardware configuration, update the ESCD information (PnP BIOS only)2. Clear memory that has been used3. Boot system via INT 19H |
| 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 |

Chapter 5

Display

The on-board VGA interface of the NEAT-400 supports traditional analog CRT monitors and a wide range of popular LCD, EL, and gas plasma flat panel displays. It can drive CRT displays with resolutions up to 1024x768 in 256 colors. It is also capable of driving color panel displays with resolutions of 640x480 in 256K colors.

5.1 Drivers and Utilities

5.1.1 Microsoft Windows 3.1

The graphic installation program "SETUP.EXE" supports a simple installation procedure of the display driver program. You may install these drivers either through Windows or in DOS. To use Setup, follow the steps as below:

1. Ensure that MS Windows 3.1 is up and running properly, using the standard VGA driver. Exit from Windows.
2. Place the *Windows 3.1x display Driver Diskette* in drive A. Type **A:<ENTER>** to make it be the default drive. Type **SETUP <ENTER>** to run the drive SETUP program. Press any key to get to the application list. Using the arrow keys, select **Windows Version 3.1** and press **<ENTER>** key. Press **<ENTER>** key to select **All Resolutions**, then press **<END>** to begin the installation. At this point, you will be asked for the path to your Windows system directory (default C:\WINDOWS). When the installation is complete, press any key to continue. Press **<ESC>** key followed by **Y** to exit to **DOS**.
3. Change to the directory where you installed Windows (default C:\WINDOWS)
4. Type **SETUP<ENTER>** to run the Windows Setup program. It will show the current Windows configuration. Use the "up" arrow key to move to the Display line and press **<ENTER>**. A list of display drivers will be shown. Use the arrow keys to select one of the drivers starting with an asterisk (*) and press **<ENTER>**.
5. Follow the directions on the screen to complete the setup. In most cases, you may press **<ENTER>** to accept the suggested option. When setup is done, it will return to **DOS**. Type **<WIN>** to start Windows with the new display driver.

5.1.2 MS Windows 95 / NT Mode Driver Install

1. ENSURE that the MS Windows 95 or NT is up and running properly using the VGA driver that has been detected.
2. OPEN the "My computer" program group and SELECT the "Control Panel" icon.
3. SELECT the "Display" icon and then SELECT the "Settings" page.
4. SELECT the "Change Display Type" selection bar, and then SELECT the "Change" button next to the Adapter Type.
5. On the "Select Device" page, SELECT the "Have Disk" button to install the display driver from the diskette.
6. After the "Have Disk" button selected a "Install From Disk" window will appear. SELECT the "Browse" button to browse the directory "X:\WIN95" of your diskette drive. (X=A or B)
7. The files *.INF will appear under the file name list. SELECT "OK" to return to the "Install From Disk" window. Under the statement "Copy manufacturer's files from" SELECT "OK" to start installing the driver files from the FLOPPY drive.
8. "Select device" window will appear. Under Models, the driver file name will be listed, SELECT "OK" to close "Select Device" window and select "Color Palette" and "Desktop Area" of your choice.
9. Once the desired color palette (the number of colors) and desktop area (resolution) has been chosen, the Windows 95 or NT system will be restarted to load this accelerated driver.

5.1.3 MS Windows 95 Refresh Rate Utility Regulation

1. Open the "My computer" program group and SELECT the "Control panel" icon.
2. Double click on *DISPLAY* and SELECT "CHIPS". There will now be a refresh tab for changing the refresh rate. You may click the tab to change the refresh rate.

5.2 Panel Support

The NEAT-400 SBC board provides a very convenient way to setup panels that are up to 16 types. But the factory default is CRT model only. For connecting with falt panel, please contact with supplier.

I. For 40K BIOS

If you install a standard 40K BIOS on the board, the NEAT-400 board supports 8 panels as follows:

| Panel # | Panel Type |
|---------|------------------------------------|
| 1 | 1024x768 Dual Scan STN Color Panel |
| 2 | 1280x1024 TFT Color Panel |
| 3 | 640x480 Dual Scan Color Panel |
| 4 | 800x600 Dual Scan Color Panel |
| 5 | 640x480 Sharp TFT Color Panel |
| 6 | 640x480 18-bit TFT Color Panel |
| 7 | 1024x768 TFT Color Panel |
| 8 | 800x600 TFT Color Panel |

Meanwhile, please also set the jumpers on **JP9** as the following:

| Panel # | 7-8 | 5-6 | 3-4 | 1-2 |
|---------|------|-------|-------|-------|
| 1 | Open | Close | Close | Close |
| 2 | Open | Close | Close | Open |
| 3 | Open | Close | Open | Close |
| 4 | Open | Close | Open | Open |
| 5 | Open | Open | Close | Close |
| 6 | Open | Open | Close | Open |
| 7 | Open | Open | Open | Close |
| 8 | Open | Open | Open | Open |

II. For 44K BIOS

If you install a standard 44K BIOS on the board, the NEAT-400 board supports 14 panels as the following:

| Panel # | Panel Type |
|---------|---|
| 1 | 1024x768 Dual Scan STN Color Panel |
| 2 | 1280x1024 TFT Color Panel |
| 3 | 640x480 Dual Scan Color Panel |
| 4 | 800x600 Dual Scan Color Panel |
| 5 | 640x480 Sharp TFT Color Panel |
| 6 | 640x480 18-bit TFT Color Panel |
| 7 | 1024x768 TFT Color Panel |
| 8 | 800x600 TFT Color Panel |
| 9 | 800x600 TFT Color Panel (44K BIOS only) |
| 10 | 800x600 TFT Color Panel (44K BIOS only) |
| 11 | 800x600 Dual Scan Color Panel (44K BIOS only) |
| 12 | 800x600 Dual Scan Color Panel (44K BIOS only) |
| 13 | 1024x768 TFT Color Panel (44K BIOS only) |
| 14 | 1024x 768 TFT Color Panel (44K BIOS only) |
| 15 | Reserved |
| 16 | Reserved |

Meanwhile, please also set the jumpers on **JP9** as the following:

| Panel # | 7-8 | 5-6 | 3-4 | 1-2 |
|---------|-------|-------|-------|-------|
| 1 | Close | Close | Close | Close |
| 2 | Close | Close | Close | Open |
| 3 | Close | Close | Open | Close |
| 4 | Close | Close | Open | Open |
| 5 | Close | Open | Close | Close |
| 6 | Close | Open | Close | Open |
| 7 | Close | Open | Open | Close |
| 8 | Close | Open | Open | Open |
| 9 | Open | Close | Close | Close |
| 10 | Open | Close | Close | Open |

Display

(continued)

| Panel # | 7-8 | 5-6 | 3-4 | 1-2 |
|----------------|------------|------------|------------|------------|
| 11 | Open | Close | Open | Close |
| 12 | Open | Close | Open | Open |
| 13 | Open | Open | Close | Close |
| 14 | Open | Open | Close | Open |
| 15 | Open | Open | Open | Close |
| 16 | Open | Open | Open | Open |

5.3 Video Modes

The display chipset C&T 65550 support all standard VGA modes as well as a wide selection of extended modes. The following table lists the modes and vertical refresh rates that BIOS can support.

Table 1: Standard Video Display Modes

| Video Mode | VESA VBE Mode | Pixel Resolution | Color Res. | Mode Type | Display Adapter | Font Size | Char. Disp. | Dot Clock (MHz) | Horiz. Freq. (MHz) | Vert Freq. (Hz) | Video Mem. (KB) |
|------------|---------------|------------------|------------|-----------|-----------------|-----------|-------------|-----------------|--------------------|-----------------|-----------------|
| 00h | -- | 320x200 | 16(gray) | Text | CGA | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |
| | | 320x350 | 16(gray) | | EGA | 8x14 | 40x25 | 25 | 31.5 | 70 | 256 |
| | | 360x400 | 16 | | VGA | 9x16 | 40x25 | 28 | 31.5 | 70 | 256 |
| 01h | -- | 320x200 | 16 | Text | CGA | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |
| | | 320x350 | 16 | | EGA | 8x14 | 40x25 | 25 | 31.5 | 70 | 256 |
| | | 360x400 | 16 | | VGA | 9x16 | 40x25 | 28 | 31.5 | 70 | 256 |
| 02h | -- | 640x200 | 16(gray) | Text | CGA | 8x8 | 80x25 | 25 | 31.5 | 70 | 256 |
| | | 640x350 | 16(gray) | | EGA | 8x14 | 80x25 | 25 | 31.5 | 70 | 256 |
| | | 720x400 | 16 | | VGA | 9x16 | 80x25 | 28 | 31.5 | 70 | 256 |
| 03h | -- | 640x200 | 16 | Text | CGA | 8x8 | 80x25 | 25 | 31.5 | 70 | 256 |
| | | 640x350 | 16 | | EGA | 8x14 | 80x25 | 25 | 31.5 | 70 | 256 |
| | | 720x400 | 16 | | VGA | 9x16 | 80x25 | 28 | 31.5 | 70 | 256 |
| 04h | -- | 320x200 | 4 | Graph | All | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |
| 05h | -- | 320x200 | 4(gray) | Graph | CGA | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |
| | | 320X200 | 4(gray) | | EGA | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |
| | | 320X200 | 4 | | VGA | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |
| 06h | -- | 640x200 | 2 | Graph | All | 8x8 | 80x25 | 25 | 31.5 | 70 | 256 |
| 07h | -- | 720x350 | Mono | Text | MDA | 9x14 | 80x25 | 28 | 31.5 | 70 | 256 |
| | | 720x350 | Mono | | EGA | 9x14 | 80x25 | 28 | 31.5 | 70 | 256 |
| | | 720x400 | Mono | | VGA | 9x16 | 80x25 | 28 | 31.5 | 70 | 256 |
| 08h-0Ch | -- | Reserved | | | - | | - | | | | |
| 0Dh | -- | 320x200 | 16 | Graph | E/VGA | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |
| 0Eh | -- | 640x200 | 16 | Graph | E/VGA | 8x8 | 80x25 | 25 | 31.5 | 70 | 256 |
| 0Fh | -- | 640x350 | Mono | Graph | E/VGA | 8x14 | 80x25 | 25 | 31.5 | 70 | 256 |
| 10h | -- | 640x350 | 16 | Graph | E/VGA | 8x14 | 80x25 | 25 | 31.5 | 70 | 256 |
| 11h | -- | 640x480 | 2 | Graph | VGA | 8x16 | 80x30 | 25 | 31.5 | 60 | 256 |
| 12h | -- | 640x480 | 16 | Graph | VGA | 8x16 | 80x30 | 25 | 31.5 | 60 | 256 |
| 13h | -- | 320x200 | 256 | Graph | VGA | 8x8 | 40x25 | 25 | 31.5 | 70 | 256 |

Display

Table 2: Extended Video Modes

| Video Mode | VESA VBE Mode | Pixel Resolution | Color Res. | Mode Type | Mem. Org | Font Size | Char. Disp. | Dot Clock (MHz) | Horiz. Freq. (MHz) | Vert Freq. (Hz) | Video Mem. (KB) |
|------------|---------------|------------------|------------|----------------------|----------|-----------|-------------|-----------------|--------------------|-----------------|-----------------|
| 20h | 120 | 640x480 | 16 | Graph(L) Pack Pix | | 8x16 | 80x30 | 25.175 | 31.5 | 60 | 256 |
| | | | | | | | | 31.5 | 37.5 | 75 | 256 |
| | | | | | | | | 36 | 43.3 | 85 | 256 |
| 22h | 122 | 800x600 | 16 | Graph(L) Pack Pix | | 8x16 | 100x37 | 36 | 35.1 | 56 | 256 |
| | | | | | | | | 40 | 37.9 | 60 | 256 |
| | | | | | | | | 49.5 | 46.9 | 75 | 256 |
| | | | | | | | | 56.25 | 53.7 | 85 | 256 |
| 24h | 124 | 1024x768 | 16 | Graph(L) Pack Pix | | 8x16 | 128x48 | 44.9 | 35.5 | 43(I) | 384 |
| | | | | | | | | 65 | 48.4 | 60 | 384 |
| | | | | | | | | 78.75 | 60 | 75 | 384 |
| | | | | | | | | 94.5 | 68.7 | 85 | 384 |
| 28h | 128 | 1280x1024 | 16 | Graph(L) Pack Pix | | 8x16 | 160x64 | 8.75 | 47 | 43(I) | 640 |
| | | | | | | | | 108 | 64 | 60 | 640 |
| 2Ah* | -- | 1600x1200 | 16 | Graph(L) Pack Pix | | 8x16 | 200x75 | -- | -- | -- | 938 |
| 30h | 101h | 640x480 | 256 | Graph(L) Pack Pix | | 8x16 | 80x30 | 25.175 | 31.5 | 60 | 300 |
| | | | | | | | | 31.5 | 37.5 | 75 | 300 |
| | | | | | | | | 36 | 43.3 | 85 | 300 |
| 31h | 100h | 640x400 | 256 | Graph(L) Pack Pix | | 8x16 | 80x25 | 25.175 | 31.5 | 70 | 256 |
| 32h | 103h | 800x600 | 256 | Graph(L) Pack Pix | | 8x16 | 100x37 | 36 | 35.1 | 56 | 469 |
| | | | | | | | | 40 | 37.9 | 60 | 469 |
| | | | | | | | | 49.5 | 46.9 | 75 | 469 |
| | | | | | | | | 56.25 | 53.7 | 85 | 469 |
| 34h | 105h | 1024x768 | 256 | Graph(L) Pack Pix | | 8x16 | 128x48 | 44.9 | 35.5 | 43(I) | 768 |
| | | | | | | | | 65 | 48.4 | 60 | 768 |
| | | | | | | | | 78.75 | 60 | 75 | 768 |
| | | | | | | | | 94.5 | 68.7 | 85 | 768 |
| 38h | 107h | 1280x1024 | 256 | Graph(L) Pack Pix | | 8x16 | 160x64 | 78.75 | 47 | 43(I) | 1280 |
| | | | | | | | | 108 | 64 | 60 | 1280 |

Notes: I = Interlaced L = Linear * =Modes 3Ah is for flat panel only

Table 2: Extended Video Modes (continued)

| Video Mode | VESA VBE Mode | Pixel Resolution | Color Res. | Mode Type | Mem. Org | Font Size | Char. Disp. | Dot Clock (MHz) | Horiz. Freq. (MHz) | Vert Freq. (Hz) | Video Mem. (KB) |
|------------|---------------|------------------|------------|-----------|----------|-----------|-------------|-----------------|--------------------|-----------------|-----------------|
| 3Ah* | -- | 1600x1200 | 256 | Graph(L) | Pack Pix | 8x16 | 200x75 | - | -- | -- | 1875 |
| 40h | 110h | 640x480 | 32K | Graph(L) | Pack Pix | 8x16 | 80x30 | 25.175 | 31.5 | 60 | 600 |
| | | | | | | | | 31.5 | 37.5 | 75 | 600 |
| | | | | | | | | 36 | 43.3 | 85 | 600 |
| 41h | 111h | 640x480 | 64K | Graph(L) | Pack Pix | 8x16 | 80x30 | 25.175 | 31.5 | 60 | 600 |
| | | | | | | | | 31.5 | 37.5 | 75 | 600 |
| | | | | | | | | 36 | 43.3 | 85 | 600 |
| 42h | 113h | 800x600 | 32K | Graph(L) | Pack Pix | 8x16 | 100x37 | 36 | 35.1 | 56 | 938 |
| | | | | | | | | 40 | 37.9 | 60 | 938 |
| | | | | | | | | 49.5 | 46.9 | 75 | 938 |
| | | | | | | | | 56.25 | 53.7 | 85 | 938 |
| 43h | 114h | 800x600 | 64K | Graph(L) | Pack Pix | 8x16 | 100x37 | 36 | 35.1 | 56 | 938 |
| | | | | | | | | 40 | 37.9 | 60 | 938 |
| | | | | | | | | 49.5 | 46.9 | 75 | 938 |
| | | | | | | | | 56.25 | 53.7 | 85 | 938 |
| 44h | 116h | 1024x768 | 32K | Graph(L) | Pack Pix | 8x16 | 128x48 | 44.9 | 35.5 | 43(1) | 1536 |
| | | | | | | | | 65 | 48.4 | 60 | 1536 |
| 45h | 117h | 1024x768 | 64K | Graph(L) | Pack Pix | 8x16 | 128x48 | 44.9 | 35.5 | 43(1) | 1536 |
| | | | | | | | | 65 | 48.4 | 60 | 1536 |
| 50h | 112h | 640x480 | 16M | Graph(L) | Pack Pix | 8x16 | 80x30 | 25.175 | 31.5 | 60 | 900 |
| | | | | | | | | 31.5 | 37.5 | 75 | 900 |
| | | | | | | | | 36 | 43.3 | 85 | 900 |
| 52h | 115h | 800x600 | 16M | Graph(L) | Pack Pix | 8x16 | 100x37 | 36 | 35.1 | 56 | 1407 |
| | | | | | | | | 40 | 37.9 | 60 | 1407 |
| 6Ah | 102h | 800x600 | 16 | Graph | Planar | 8x16 | 100x37 | 36 | 35.1 | 56 | 256 |
| | | | | | | | | 40 | 37.8 | 60 | 256 |
| | | | | | | | | 49.5 | 46.9 | 75 | 256 |
| | | | | | | | | 56.25 | 53.7 | 85 | 256 |

Notes: I = Interlaced L = Linear * =Modes 3Ah is for flat panel only

Table 2: Extended Video Modes (continued)

| Video Mode | VESA VBE Mode | Pixel Resolution | Color Res. | Mode Type | Mem. Org | Font Size | Char. Disp. | Dot Clock (MHz) | Horiz. Freq. (MHz) | Vert Freq. (Hz) | Video Mem. (KB) |
|------------|---------------|------------------|------------|-----------|----------|-----------|-------------|-----------------|--------------------|-----------------|-----------------|
| 64h | 104h | 1024x768 | 16 | Graph | Planar | 8x16 | 128x48 | 44.9 | 35.5 | 43(I) | 384 |
| | | | | | | | | 65 | 48.4 | 60 | 384 |
| | | | | | | | | 78.75 | 60 | 75 | 384 |
| | | | | | | | | 94.5 | 68.7 | 85 | 384 |
| 68h | 106h | 1280x1024 | 16 | Graph | Planar | 8x16 | 160x64 | 78.75 | 47 | 43(I) | 640 |
| | | | | | | | | 108 | 64 | 60 | 640 |
| 70h | 101h | 640x480 | 256 | Graph | Pack Pix | 8x16 | 80x30 | 25.175 | 31.5 | 60 | 300 |
| | | | | | | | | 31.5 | 37.5 | 75 | 300 |
| | | | | | | | | 36 | 43.3 | 85 | 300 |
| 71h | 100h | 640x400 | 256 | Graph | Pack Pix | 8x16 | 80x25 | 25.175 | 31.5 | 70 | 256 |
| 72h | 103h | 800x600 | 256 | Graph | Pack Pix | 8x16 | 100x37 | 36 | 35.1 | 56 | 469 |
| | | | | | | | | 40 | 37.9 | 60 | 469 |
| | | | | | | | | 49.5 | 46.9 | 75 | 469 |
| | | | | | | | | 56.25 | 53.7 | 85 | 469 |
| 74h | 105h | 1024x768 | 256 | Graph | Pack Pix | 8x16 | 128x48 | 44.9 | 35.5 | 43(I) | 768 |
| | | | | | | | | 65 | 48.4 | 60 | 768 |
| | | | | | | | | 78.75 | 60 | 75 | 768 |
| | | | | | | | | 94.5 | 68.7 | 85 | 768 |
| 78h | 107h | 1280x1024 | 256 | Graph | Pack Pix | 8x16 | 160x64 | 78.75 | 47 | 43(I) | 1280 |
| | | | | | | | | 108 | 64 | 60 | 1280 |

Notes: I = Interlaced L = Linear

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, watchdog timer will reset the system automatically. "disable watchdog output then enable watchdog output" will refresh the watchdog timer.

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 ; SET WATCH DOG ENABLE
in al, dx
jmp short $+2
```

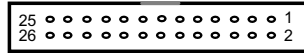
(3) **Disable watchdog output:**

```
mov dx,043h ; SET WATCH DOG DISABLE
in al,dx
jmp short $+2
```

Appendix B Connectors' Pin Assignment

Parallel port connector

PRN



Drawing of parallel port box header

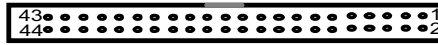
Parallel/Printer connector (PRN)

| 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 |

Pin Assignments

HDD Connector (IDE)

IDE



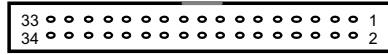
Drawing of IDE 44 pin box header

| Pin no. | Signal | Pin no. | Signal |
|---------|--------|---------|----------|
| 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 | IORDY | 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 |
| 41 | VCC | 42 | VCC |
| 43 | GND | 44 | N.C. |

Pin Assignments

FDD Connector (FDD)

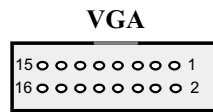
FDD



Drawing of FDD 34 pin box header

| Pin no. | Signal |
|-----------|-----------------|
| 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 |

CRT Display Connector (VGA)

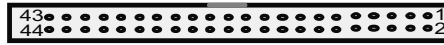


Drawing of VGA box header

| Pin no. | Signal |
|----------------|---------------|
| 1 | RED |
| 2 | GND |
| 3 | GREEN |
| 4 | N/C |
| 5 | BLUE |
| 6 | GND |
| 7 | N/C |
| 8 | N/C |
| 9 | GND |
| 10 | GND |
| 11 | GND |
| 12 | H-SYNC |
| 13 | N/C |
| 14 | V-SYNC |
| 15 | N/C |
| 16 | N/C |

Flat Panel Display Connector pin header (LCD)

LCD

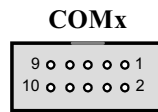


Drawing of flat panel 44 pin box header

| Pin no. | Signal | Pin no. | Signal |
|---------|--------|---------|--------|
| 1 | +12V | 2 | +12V |
| 3 | GND | 4 | GND |
| 5 | VDD | 6 | VDD |
| 7 | ENVEE | 8 | GND |
| 9 | P0 | 10 | P1 |
| 11 | P2 | 12 | P3 |
| 13 | P4 | 14 | P5 |
| 15 | P6 | 16 | P7 |
| 17 | P8 | 18 | P9 |
| 19 | P10 | 20 | P11 |
| 21 | P12 | 22 | P13 |
| 23 | P14 | 24 | P15 |
| 25 | P16 | 26 | P17 |
| 27 | P18 | 28 | P19 |
| 29 | P20 | 30 | P21 |
| 31 | P22 | 32 | P23 |
| 33 | GND | 34 | GND |
| 35 | CLOCK | 36 | FLM |
| 37 | M | 38 | LP |
| 39 | GND | 40 | EN_BKL |
| 41 | GND | 42 | ENVDD |
| 43 | VDD | 44 | VDD |

Pin Assignments

Serial port connector



Drawing of serial port box header

RS-232 Connector (COM1, COM3, COM4)

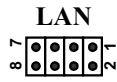
| Pin no. | Signal |
|----------------|---------------|
| 1 | DCD |
| 2 | DSR |
| 3 | RX |
| 4 | RTS |
| 5 | TX |
| 6 | CTS |
| 7 | DTR |
| 8 | RI |
| 9 | GND |
| 10 | VCC |

RS-232/422/485 Connector (COM2)

| Pin no. | RS232 | RS422 | RS485 |
|----------------|--------------|--------------|--------------|
| 1 | DCD | TX- | DATA- |
| 2 | DSR | RTS + | |
| 3 | RX | TX+ | DATA+ |
| 4 | RTS | RTS - | |
| 5 | TX | RX+ | |
| 6 | CTS | CTS + | |
| 7 | DTR | RX- | |
| 8 | RI | CTS - | |
| 9 | GND | GND | |
| 10 | N.C. | N.C. | |

Pin Assignments

Ethernet connector pin header (J3)

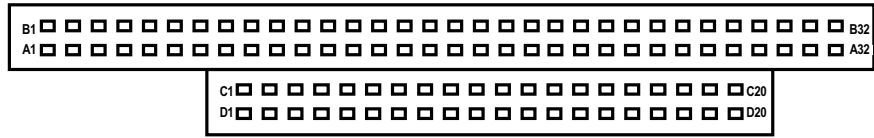


Drawing of Ethernet pin header

| Pin no. | signal |
|---------|--------|
| 1 | TX+ |
| 2 | TX- |
| 3 | RX+ |
| 4 | NC |
| 5 | NC |
| 6 | RX- |
| 7 | NC |
| 8 | N.C. |

PC/104 Connector

PC104



Drawing of PC104 pin header

| Pin no. | A | B | C | D |
|---------|----------|----------|-------|----------|
| 1 | IOCHCHK* | GND | SBHF | MEMCS16* |
| 2 | SD7 | RESETDRV | LA23 | IOSC16* |
| 3 | SD6 | +5V | LA22 | IRQ10 |
| 4 | SD5 | IRO9 | LA21 | IRO11 |
| 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 | DRO5 |
| 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 | -- | -- |
| 24 | SA7 | IRQ4 | -- | -- |
| 25 | SA6 | IRO3 | -- | -- |
| 26 | SA5 | DACK2* | -- | -- |
| 27 | SA4 | TC | -- | -- |
| 28 | SA3 | BALE | -- | -- |
| 29 | SA2 | +5V | -- | -- |
| 30 | SA1 | OSC | -- | -- |
| 31 | SA0 | GND | -- | -- |
| 32 | GND | GND | -- | -- |

Pin Assignments

Appendix C

Installing DiskOnChip of M-systems

. Installing the DiskOnChip 2000 :

When installing or removing the DiskOnChip be sure to first touch a grounded surface to discharge any static electricity from your body.

Use the following procedure to install the DiskOnChip:

1. Align pin 1 on the DiskOnChip with the pin1 of socket.
2. Push the DiskOnChip into the socket carefully until it is fully seated.
3. Check to make sure the DiskOnChip is installed securely, and there are no bent pins.
Caution: The DiskOnChip may be permanent damaged if installed incorrectly.
4. To install the DiskOnChip as drive C on a system without a hard disk, set the CMOS setup of drive C to NOT INSTALLED (indicating that no physical magnetic disk is installed), and reboot the computer. The DiskOnChip 2000 will installed as drive C. The DiskOnChip needs to formatted with the system files in order for it to be a bootable drive.

. Configuring the DiskOnChip 2000 as the boot device:

In order to configure the DiskOnChip as the boot device, the operating system files need to be copied into it. Copying the operating system files into DiskOnChip should be done like in any other hard disk. The following is an example of a typical initialization process:

1. Set the DiskOnChip as a regular drive in your system (not a boot drive).
2. Install a bootable floppy diskette in drive A, and boot the system from drive A.
3. At the **DOS** prompt, type **SYS C:** to transfer the **DOS** system files to the DiskOnChip. (assuming the DiskOnChip is installed as drive C)
4. Copy any files needed into DiskOnChip.
5. Remove floppy diskette and reboot the system. The system will boot from the DiskOnChip and will allow you to run and access any files that have been copied into the DiskOnChip.

. Configuring the DiskOnChip 2000 as the first drive:

The DiskOnChip can be configured as the last drive (default) or as the first drive in the system. When configured as the last drive, the DiskOnChip is installed as drive D if there is another hard drive installed, and as drive C if no other hard drive is installed. When configured as the first drive, the DiskOnChip is always installed as drive C. To configure the DiskOnChip as first drive, proceed as follows:

1. Boot the system and make sure the DiskOnChip is installed correctly as drive D.
2. At the **DOS** prompt type **DUPDATE D:/FIRST /S:DOC2000.EXB**
3. After rebooting the system, the DiskOnChip will appear as drive C:

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 are 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 |
| 00C0000-00EFFFF | I/O device BIOS ROM or RAM buffer |
| 00F0000-00FFFFFF | System BIOS ROM |
| 0100000-BFFFFFFF | System extension memory |

Appendix G

Ethernet Software Configuration

On board Ethernet interface of the 486 All-In-One board supports all major network operating systems. I/O address and interrupts are easily configured via the RSET8139.EXE program. To execute the configuration, to view the current configuration, or to run diagnostics, do the following:

1. Power on the 486 All-In-One board. Ensure that the RSET8139.EXE file is located in the working drive.
2. At the prompt type RSET8139.EXE and press <Enter>. The Ethernet configuration program will then be displayed.
3. This simple screen shows all the available options for the Ethernet interface. Just highlight the option you wish to change by using the Up and Down keys. To change a selected item, press <Enter>, and a screen will appear with available options. Highlight your option and press <Enter>. Each highlighted option has a help message guide displayed at the bottom of the screen for additional information.
4. After you have made your selection and are certain with your choice, press ESC. A prompt will appear asking if you want to save the configuration. Press Y if you want to save.

The Ethernet Setup Menu also offers three very useful diagnostic functions. They are:

1. Run EEPROM test
2. Run Diagnostics on Board
3. Run Diagnostics on Network

Each option has its own display screen, which shows the format and result of any diagnostic test undertaken.

Ethernet Driver Support

These drivers are designed to work in a workstation environment under Windows NT, Win 95 or DOS operating system. You may install these drivers for your application.

Appendix H

Audio driver installation

Windows 95

1. Power up your computer and wait for Windows 95 to boot up.
2. Once Windows 95 is up and running, a "New Hardware Found" message box will appear and announce the detection of ESS Plug and Play Audio driver. Select the item "Driver form disk provided by hardware manufacturer" and click "OK".
3. In the "Install from Disk" dialog box, select drive **A:\win95** (if A: is your 3.5"floppy drive) and insert the ESS1869 driver disk. Then click "OK".
4. Once you have install your sound card, you can check for it by going into **Control Panel** and select the **SYSTEM** icon. Under Device Manager, select the Sound, video and game controllers form the device list. The ESS ES1869 Plug and Play Audio Drive and game port/joystick device icons will appear showing that Windows 95 has detected the new sound card.

Windows NT

1. Power up your computer and wait for Windows NT to boot up.
2. Once Windows NT is up and running, select "Multimedia" message box will appear and announce the detection of ESS Plug and Play AudioDrive. Select the "devices" page and select item "add", then click "OK".
3. In the "unlisted or Update driver" dialog box, select drive A:\winnt (if A: is your 3.5"floppy drive) and insert the ESS1869 Drivers disk. Then click "OK".

Windows 3.1X

1. Form Program Manager selects Run under File.
2. Type A:\Win3.1\SETUP.EXE.
3. Follow the installation instructions.
4. Once you have installed the Win3.1 driver, you have also installed the DOS driver automatically.

DOS

1. Under DOS, insert your audio driver disk into floppy drive A (assume A:>dos).
2. Copy a:\dos*. * C:\ess1869
3. Edit C:\autoexec.bat
4. Add control parameters by key in:

c:\ess1869\esscfg

c:\ess1869\essvol [/?] [/v:xx] [/l:xx] [/w:xx] [/m:xx] [/c:xx] [/s:xx]

| | | |
|--------|-----------|-----------------------------------|
| note : | no option | display all volume settings |
| | /? | Display help |
| | /v | Change master volume |
| | /l | Change line volume |
| | /w | Change wave volume |
| | /m | Change mic volume |
| | /c | Change cd volume |
| | /s | Change synthesizer volume |
| | xx | volume value. Note: no xx means 0 |

the value range of volume is 0-15

OS/2

1. Open an OS/2 Window and run the EINSTALL.EXE program on the installation disk by typing "A:\OS2\EINSTALL". The program first runs ESDetect.EXE to auto detect the chip, then calls ESUNINST.EXE to remove old drivers. That program will create a backup of CONFIG.SYS named CONFIG.ESS and remove the audio device lines from CONFIG.SYS. It also creates a backup of MPM2.INI named MPM2.ESS and removes the audio drivers information from MPM2.INI. In addition, it removes any other ESS driver information in COMPLIST.INI. After then, the installation program calls Multimedia Application Install program, MINSTALL.EXE. After it finishes, another program, ESCONFIG.EXE, will be called to update CONFIG.SYS if necessary.
2. When Multimedia Application Install program brings up, a check mark beside ES1869 AudioDrive means that item is already selected. To toggle selection, click the mouse on the item. Click the Install button to start the installation. Once the drivers are installed, shutdown OS/2 and reset the computer for the new ES1869 drivers to take effect.
3. If the installation cannot be completed, read the logs EINSTALL.LOG in \MMOS2\INSTALL subdirectory and MINSTALL.LOG in \MMOS2\INSTALL subdirectory or root directory to find out the problem.
4. If during the installation an error saying the audio device is already in use by another application comes up, make sure all applications that utilize audio have been closed. If this is caused by system sounds not closing the audio device, you have three options to remedy this situation:

- A. Remove the audio driver by running ESUNINST.EXE.
- B. Go to Sounds object in System Setup folder and uncheck. Enable system sounds option. After the driver is installed properly, check the option to enable system sounds.
- C. Run DINSTSND.CMD in d:\MMOS2\INSTALL subdirectory. After the driver is installed properly, run INSTSND.CMD d: to enable system sounds.

Perform one of these operations and reboot to disable system sounds. Install the drivers again.

- 5. If WIN-OS/2 is installed in the system, start WIN-OS/2 and run "A:\SETUP" to install WIN-OS/2 drivers. Change the WIN-OS/2 settings to the following if necessary:

AUDIO_ADAPTER_SHARING = Required

INT_DURING_IO = On

- 6. Since OS/2 Warp 3.0 MINSTALL.EXE changes the icons of MIDI player and Digital Video player to that of Digital Audio player in the Multimedia folder, you may want to change them back to the originals. To change the icon of MIDI player, right click MIDI player to bring up the menu. Select Settings, select General, and click the Find... button. In the Start Folder window, enter \MMOS2\INSTALL. Click the Find button and a window of all found icons appears. Select MIDIPLAY.ICO and click OK. Close the MIDI player Settings notebook. For Digital Video player, repeat the above steps but select VIDPLAY.ICO instead.

7. If the MIDI plays are not smooth in WIN-OS/2, you need to change the timer resolution. Edit SYSTEM.INI in your Windows directory. Under [timer.driv] are TIMERMax386Res and TIMERMax286Res. You need to change the values to less than 8 from the default of 10.

These are the files copied to your hard disk for the MMPM/2 component:

```
\MMOS2
    ES1869DD.SYS
    VAUDDRV.SYS
    ESDAEMON.EXE
    SPATIAL.EXE
\MAMOS2\DLL
    CARDINFO.DLL
    ESSVSD88.DLL
\MAMOS2\HELP
    ES1869IN.HLP
\OS2\BOOT
    CLOCK01.SYS
    CLOCK02.SYS
    TIMER0.SYS
```

Updating the Software Driver

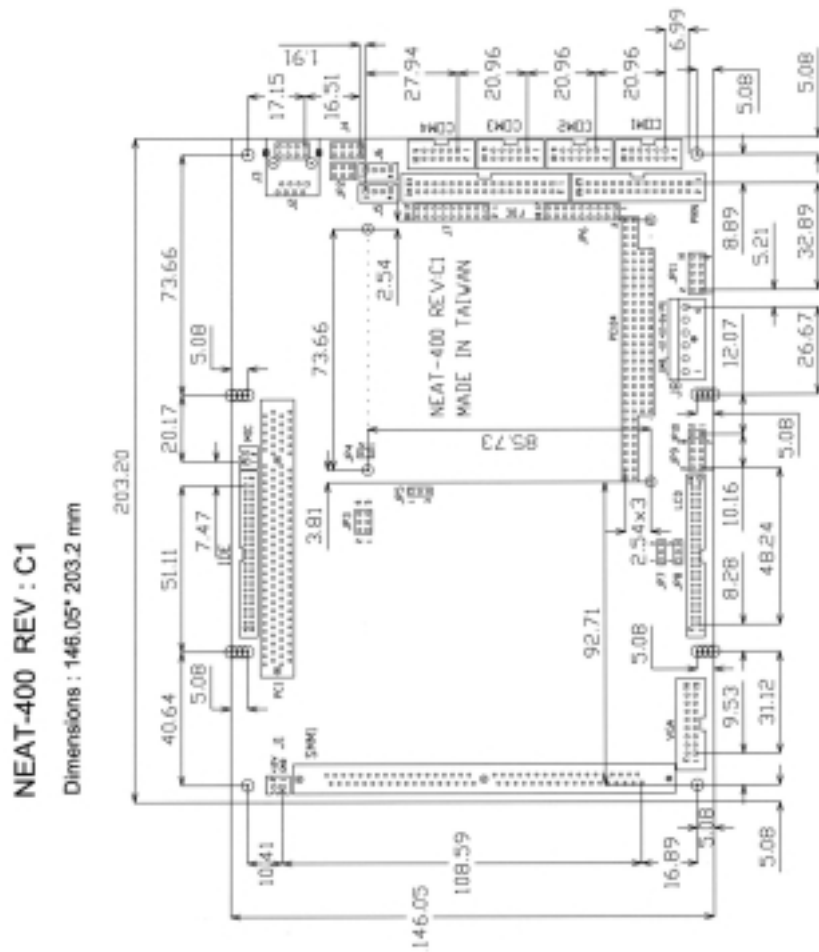
1. Select the SYSTEM icon form Control Panel.
2. Select Device Manager and select the “sound, video and game controllers” icon.
3. Under “sound, video and game controllers”, select ESS ES1869 Plug and Play AudioDrive.
4. In the dialog box, select Driver to show the sound card software driver. Click on

the button "Change Driver".

5. Click on the button "Have Disk" and insert your new driver disk into the floppy drive. Follow the instructions as they appear on screen.

Appendix I

Mechanical Drawing



Mechanical drawing