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# SBC8251

## All-in-One Pentium
## Half-Size CPU Card Family

## User's Manual

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## ESD Precautions

Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This helps to discharge any static electricity on your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

## Unpacking

After unpacking the CPU card, check and see if the following items are included and in good condition. If any of the items is missing or damaged, notify your dealer immediately.

- SBC8251, SBC8251PV or SBC8251V CPU board x 1
- Driver & Utility diskette x 2
- User's Manual x 1
- Warranty Card x 1
- Keyboard adapter x 1
- FDD cable x 1
- HDD cable x 1
- COM, printer extension cables with bracket x 1pc

NOTE: *The Driver & Utility diskettes in the SBC8251 accessories bag only include one (1) BIOS utility diskette. A display driver diskette is negligible, as the SBC8251 does not incorporate an onboard VGA controller chip.*

Make sure that all of the items listed above are present.

## What To Do If There Is A Problem

If there are damaged or missing parts, contact your supplier and/or dealer immediately. Do not attempt to apply power to the board if there is damage to any of its components.

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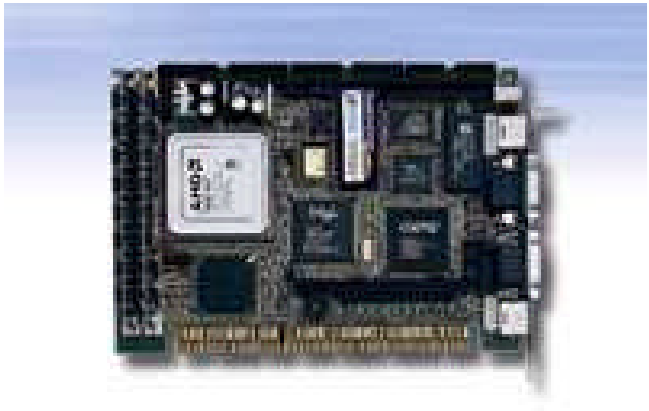
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# Chapter 1
# Introduction



The SBC8251 CPU Card Family consists of industrial grade CPU cards that incorporate the Intel Triton II HX chipset and enhanced I/O chipset - both components ensuring the ISA bus passive backplane compatibility of the CPU cards. This advanced concept along with the PCI Local Bus architecture brings outstanding performance to Windows-based applications.

The SBC8251 CPU Card Family is designed to work with the Intel P54C/P55C and Cyrix 6x86 microprocessors. Its 6-layer structure reduces signal noise and meets all green functions with its built-in power management feature.

The SBC8251 CPU Card Family also includes an EIDE using the 32-bit PCI interface. The video section of SBC8251V and SBC8251PV features the ability to control most EL, mono/color STN and TFT flat panel display as well as standard VGA. The cards come with either a 2MB (SBC8251V & SBC8251PV) EDO DRAM. The VGA display memory on the SBC8251V and SBC8251PV supports a maximum of 2MB. The CHIPS 65550 displays in 640 x 480 resolution on commonly used flat panels, and in true color displays on CRTs.

## 1.1 Specifications

- **CPU:** Intel Pentium P54C/P55C, AMD K5/K6/K6-2, Cyrix 6x86/6x86L/6x86MX/MII, IDT C6/Winchip2-3D microprocessors up to 366MHz
- **System Chipset:**
  - System chipset: Intel Triton II / HX
  - I/O chipset: SMC37C669
- **System Memory:**
  - Supports FPM/EDO DRAMs
  - Two 72-pin SIMM sockets supporting 1/2/4/8/16/32/64 MB SIMM modules
  - Supports SIMM ECC (error check and correction)
- **L2 Cache:** Refer to Section 1.2
- **Display (for SBC8251V and SBC8251PV):**
  - C&T 65550 PCI local bus flat-panel with Windows accelerator and Video playback
  - Onboard memory: Refer to Section 1.2
- **Display resolution:**
  - supports Flat-panel resolutions up to 640 x 480, 800 x 600, and 1024 x 768
  - supports non-interlace CRT monitors, 1024 x 768 64K colors (2MB DRAM)
  - DB-15 VGA connector for CRT monitor and 2 x 22- pin header for flat-panel
  - Supports 3.3V and 5V flat-panel
- **S.S.D.:** Socket for M-System DiskOnChip™
- **IDE:** Supports up to two PCI mode 4 enhance IDE hard disk interfaces
- **Floppy:** Supports up to two floppy disk drives, 3.5" and/or 5.25"

- **Parallel Port:** Enhanced Bi-directional EPP/ECP parallel port
- **USB Port:** One USB port for future expansion
- **Serial Port:** One RS-232 port and one RS-232/ RS-422/RS-485 port, both with 16C550 UARTs
- **Watchdog Timer:** Generates System RESET; timer interval from 0 - 64 seconds (16-level)
- **PS/2 Mouse/KB Connector:**
  - Two 6-pin Mini-Din connectors located on the mounting bracket and one pin header connector for external keyboard
- **Expansion Bus:** 16-bit PC/104 connector for expansion modules
- **Power Supply Voltage:** +5V only
- **Operating Temperature:** 32°F to 140°F (0°C to 60°C)
- **Dimensions:** 185mm(L) X 122mm(W) 7.3in(L) x 4.8in(W)

## 1.2 Distinct Characteristics

The following table shows the unique features distinguishing SBC8251, SBC8251PV and SBC8251V from one another.

| Features | SBC8251V | SBC8251PV | SBC8251 |
|---|---|---|---|
| L2 Cache | 512KB Burst cache memory | 512KB Burst cache memory | 512KB Burst cache memory |
| Onboard Display Memory | 2MB EDO DRAM | 2MB EDO DRAM | Not Available |
| External Bus | ISA | PCI/ISA | ISA |

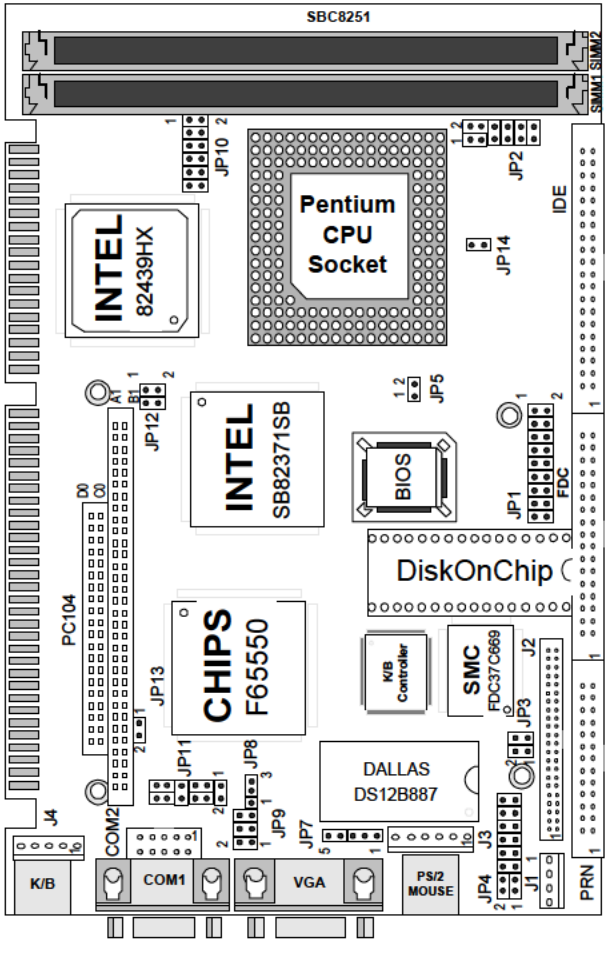
NOTE: *There is no VGA controller chip installed onboard the SBC8251 CPU card.*

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# Chapter 2
# Jumpers and Connectors

## 2.1 Board Layout

The following figure shows the location of jumpers and connectors on the SBC8251 CPU Card Family.



# 2.2 Jumper Settings

## 2.2.1 CPU BASE Speed Select (JP12)

| Options | Settings |
|---|---|
| 50MHz | Short 1-2, 3-4 |
| 55MHz | Open |
| 66MHz (default) | Short 1-2 |
| 60MHz | Short 3-4 |

## 2.2.2 CPU BUS/CORE Ratio (JP10, 7-12)

| Options | Settings | Options | Settings |
|---|---|---|---|
| x 1.5 | Open | x 4 | Short 7-8,11-12 |
| x 2 (default) | Short 7-8 | x 4.5 | Short 7-8,9-10,11-12 |
| x 2.5 | Short 7-8, 9-10 | x 5.0 | Short 9-10,11-12 |
| x 3 | Short 9-10 | x 5.5 | Short 11-12 |
| x 3.5 | Open | | |

## 2.2.3 CPU VCC3 Select (JP2, 1-6)

| Options | Settings |
|---|---|
| Single Voltage CPUs:<br>Intel P54C, Cyrix 6x86, AMD K5 (default) | Short 1-3, 2-4 |
| Dual Voltage CPUs:<br>Intel P55C, Cyrix 6x86L, 6x86MX, AMD K6 | Short 3-5, 4-6 |

## 2.2.4 CPU VCORE Select (JP2, 7-14,JP14)

| Options | JP14 | JP2 | | |
|---|---|---|---|---|
| | 1-2 | 11-12 | 9-10 | 7-8 |
| 2.0V | Open | Open | Open | Open |
| 2.1V | Open | Open | Open | Short |
| 2.2V | Open | Open | Short | Open |
| 2.3V | Open | Open | Short | Short |
| 2.4V | Open | Short | Open | Open |
| 2.5V | Open | Short | Open | Short |
| 2.6V | Open | Short | Short | Open |
| 2.7V | Open | Short | Short | Short |
| 2.8V | Short | Open | Open | Open |
| 2.9V | Short | Open | Open | Short |
| 3.0V | Short | Open | Short | Open |
| 3.1V | Short | Open | Short | Short |
| 3.2V | Short | Short | Open | Open |
| 3.3V (default) | Short | Short | Open | Short |
| 3.4V | Short | Short | Short | Open |
| 3.5V | Short | Short | Short | Short |

## 2.2.5 Watchdog/Power Detect (JP1, 17-18)

| Option | JP1 |
|---|---|
| Watchdog timeout gen. system reset (default) | Short 17-18 |

## 2.2.6 DiskOnChip™ (M-System) Address Select (JP1, 1-8)

| Options | Settings |
|---|---|
| C0000-C7FFF | Short 1-2 |
| C8000-CFFFF | Short 3-4 |
| D0000-D7FFF (default) | Short 5-6 |
| D8000-DFFFF | Short 7-8 |

## 2.2.7 CMOS Clear (JP7, 1-2)

| Instructions |
|---|
| *Step 1: Turn off power and SHORT pins 1 & 2 of JP7 then turn on the system power for 5 seconds.*<br>*Step 2: Turn off the system power. Remove the jumper on pins 1 & 2 then turn on the power again.* |

## 2.2.8 COM2 Type Select (JP9, JP11)

| Options | JP9 | JP11 |
|---|---|---|
| RS232 (default) | Short 5-6 | Short 3-5,4-6,9-11,10-12 |
| RS422 | Short 3-4 | Short 1-3, 2-4, 7-9, 8-10 |
| RS485 | Short 1-2 | Short 1-3, 2-4, 7-9, 8-10 |

## 2.2.9 LCD Panel Interface (JP8, JP13)

| Options | JP13 | JP8 |
|---|---|---|
| 3.3V LCD Panel | Short | Short 1-2 |
| 5V LCD Panel (default) | Open | Short 2-3 |

## 2.2.10 LCD Panel Type Select (JP1, 11-16)

*Use pins 11-12, 13-14, and 15-16 when selecting any of the 8 panel types supported by the LCD BIOS.*

NOTE: *The BIOS on the SBC8251V and SBC8251PV CPU cards support CRT display only. Before installing any of the supported LCD panels, make sure to update the BIOS for LCD panel display support. Consult your authorized engineers for the appropriate jumper settings.*

## 2.2.11 Flat Panel SHFCLK (JP7, 3-5)

| Options | JP7 |
|---|---|
| Clock Inverted | Short 3-4 |
| Clock (default) | Short 4-5 |

## 2.3 Connectors

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

| Connector | Label |
|---|---|
| HDD (IDE) connector | IDE |
| FDD connector | FDC |
| Parallel port | PRN |
| PC/104 connector | PC104 |
| Keyboard connectors | K/B, J4 |
| Mouse connector | MOUSE |
| Reset switch connector | JP4 (13-14) |
| External speaker connector | JP4 (1-7) |
| HDD LED connector | JP4 (15-16) |
| External power connector | J1, J3 |
| Serial port1 | COM1 |
| Serial port2 | COM2 |
| Analog VGA connector | VGA |
| Flat panel connector | J2 |
| USB port | JP3 |

### 2.3.1 Pin Assignments of Commonly Used Connectors

**Reset/SMI/LED (JP4, 11-16)**

| Pins | Signal |
|---|---|
| 13-14 | System reset switch |
| 11-12 | System Management Interrupt |
| 15-16 | HDD LED, Pin16+, Pin15- |

### Speaker/Keylock (JP4, 1-10)

| Pins | Signal |
|---|---|
| 1-3 | Internal buzzer |
| 1-7 | External speaker (remove 1-3) |
| 2-6 | Power LED, Pin 2+, Pin6- |
| 8-10 | Keylock |

NOTE: *Refer to Appendix B for a complete pin assignments description of all SBC8251 connectors.*

# Chapter 3
# Installation

This chapter describes the procedures for installing the SBC8251 all-in-one CPU cards into your system.

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

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

## 3.1 System Memory Installation

You can install from 1MB up to 64-MB memory onboard using 1/ 2/4/8/16/32 or 64-MB 72-pin FPM/EDO SIMM modules.

1. Ensure that all power to the system are switched OFF.
2. Insert the first SIMM edge connector at a 45-degree angle into the socket of SIMM 1. The SIMM modules must be facing towards the CPU. Note that the SIMMs are latched and will only go in one direction.
3. Carefully push the SIMM towards the CPU until the locking tabs at the side snaps into place.
4. Check to make sure the SIMM is inserted securely.
5. Repeat Steps 2-4 for SIMM 2.

## 3.2 Installing the CPU

1. Align pin one (white dot) on the CPU with pin one of the PGA socket. Pin one of the CPU socket may either be marked on the board or indicated by an arrow sign on the base of the socket. Normally, pin one on the PGA socket is distinguished by its diagonal corner.
2. To complete the CPU installation, gently press the CPU into place.
3. Double-check the insertion and orientation of the CPU before applying power. Improper installation will result in permanent damage to the CPU.

## 3.3 Completing the Installation

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

1. Make sure the power is OFF.
2. Set the configuration jumpers according to the jumper setting on Chapter 2.
3. Install the SBC8251 CPU card into one of the slots on the passive backplane. You may allow the SBC8251 to stand alone as a single board computer.
4. Connect the I/O cables and peripherals, i.e. floppy disk, hard disk, monitor, keyboard, power supply and etc. to the CPU board

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

5. Turn ON the system power.

# Chapter 4
# Award BIOS Setup

The Award BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in a battery-backed RAM (CMOS RAM) that retains the Setup information each time the power is turned off.

## 4.1 Entering Setup

There are two ways to enter the Setup program. You may either turn on the computer and press <Del> immediately, or press the <Del> and/or <Ctrl>, <Alt>, and <Esc> keys simultaneously when the following message appears at the bottom of the screen during POST (Power On Self Test).

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

If the message disappears before you respond and you still wish to enter Setup, restart the system and try again. This is possible by turning the system power to OFF then to ON, pressing the "RESET" button on the system case, or by simultaneously pressing <Ctrl>, <Alt>, and <Del> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will be prompted with the following:

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

## 4.2 Control Keys

| | |
|---|---|
| Up arrow | Moves cursor to the previous item |
| Down arrow | Moves cursor to the next item |
| Left arrow | Moves cursor to the item on the left hand |
| Right arrow | Move to the item in the right hand |
| Esc key | Main Menu -- Quits and deletes changes into CMOS<br>Status Page Setup Menu and Option Page Setup Menu -- Exits current page and returns to Main Menu |
| PgUp/"+" key | Increases the numeric value or makes changes |
| PgDn/"–" key | Decreases the numeric value or makes changes |
| F1 key | General help, only for Status Page Setup Menu and Option Page Setup Menu |
| (Shift) F2 key | Change color from total 16 colors. F2 to select color forward, (Shift) F2 to select color backward |
| F3 key | Reserved |
| F4 key | Reserved |
| F5 key | Restores the previous CMOS value from CMOS, only for Option Page Setup Menu |
| F6 key | Loads the default CMOS value from BIOS default table, only for Option Page Setup Menu |
| F7 key | Loads the Setup default , only for Option Page Setup Menu |
| F8 key | Reserved |
| F9 key | Reserved |
| F10 key | Saves all the CMOS changes, only for Main Menu |

## 4.3 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>.

## 4.4 The Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from ten setup functions and two exit choices. Use the arrow keys to select the setup function you intend to configure then press <Enter> to accept or enter its 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 |
| PNP/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 option includes all the items in a standard compatible BIOS.

- **BIOS Features Setup**
  This setup page includes all the items of Award special enhanced features.
- **Chipset Features Setup**
  This setup option includes all the items of chipset special features.
- **Power Management Setup**
  This category determines the power consumption of the system after selecting its items. Default value is Disabled.
- **PnP/PCI Configuration Setup**
  This category specifies the setup of PNP/PCI related devices.
- **Load BIOS Defaults**
  BIOS defaults indicates the most appropriate values of the system parameter in which the system can operate at a minimum performance.
- **Load Setup Defaults**
  Chipset defaults indicate the values required by the system for maximum performance.
- **Integrated Peripherals**
  This page includes all the items of IDE hard drive and Programmed Input / Output features.
- **Supervisor / User Passwords**
  Change, set or disable password. It allows you to limit access to the system and Setup, or just to Setup.
- **IDE HDD Auto Detection**
  Automatically configures hard disk parameters.
- **HDD Low Level Format**
  Hard disk low level format utility.
- **Save & Exit Setup**
  Saves CMOS value changes to CMOS and exits setup.
- **Exit Without Saving**
  Abandons all CMOS value changes and exits setup.

## 4.5 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 in each item.

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

Date (mm:dd:yy) : Fri, Jul 18 1997

Time(hh:mm:ss) : 00:00:00

| HARD DISKS | TYPE | SIZE | CYLS | HEAD | PRECOMP | LANDE | SECTOR | MODE |
|---|---|---|---|---|---|---|---|---|
| Primary Master | Auto | 0 | 0 | 0 | 0 | 0 | 0 | Auto |
| Primary Slave: | None | 0 | 0 | 0 | 0 | 0 | 0 | Auto |

Drive A : 1.44M , 3.5 in

Base Memory: 640K
Drive B : None
Extended Memory :

Halt On : All Errors
Total Memory : 32768K

ESC : Quit
PU / PD / + / - : Modify
F1 : Help

↑ ↓ → ← : Select Item]
(Shift) F2 : Change Color

- **Date**
  The date format is <day>, <date> <month> <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 key in the numerical / function key |
| month | The month, Jan through Dec. |
| year | The year, depend on the year of BIOS |

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

- **Primary Master / Primary Slave**
  The categories identify the types of one channel that have been installed in the computer. There are 45 predefined types and 4 user definable types are for Enhanced IDE BIOS. Type 1 to Type 45 are predefined. Type User is user-definable.
  Press <PgUp>/<+> or <PgDn>/<–> to select a numbered hard disk type or type the number and press <Enter>. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use Type User to define your own drive type manually.
  If you select Type User, related information is asked to be entered to the following items. Enter the information directly from the keyboard and press <Enter>. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.
  If the controller of HDD interface is ESDI, select "Type 1".
  If the controller of HDD interface is SCSI, select "None".
  If the controller of HDD interface is CD-ROM, select "Auto".

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

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

- **Drive A type / Drive B type**
  The category identifies the types of floppy disk drive A or drive B that have been installed in the computer.

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

- **Video**
  The category selects the type of adapter used for the primary system monitor that must match your video display card and monitor. Although secondary monitors are supported, you do not have to select the type in Setup. You have two ways to boot up the system:

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

| | |
|---|---|
| EGA/VGA | Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SEGA, or PGA monitor adapters. |
| CGA 40 | Color Graphics Adapter, power up in 40 column mode |
| CGA 80 | Color Graphics Adapter, power up in 80 column mode |
| MONO | Monochrome adapter, includes high resolution monochrome adapters |

- **Error halt**
  The category determines whether the computer will stop if an error is detected during power up.

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

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

# 4.6 BIOS Features Setup Menu

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

| | | | |
|---|---|---|---|
| Virus Warning | :Disabled | Video BIOS Shadow | :Enabled |
| CPU Internal Cache | :Enabled | C8000-CBFFF Shadow | :Disabled |
| External Cache | :Enabled | CC000-CFFFF Shadow | :Disabled |
| Quick Power On Self Test | :Disabled | D0000-D3FFF Shadow | :Disabled |
| Boot Sequence | :C,CDROM,A | D4000-D7FFF Shadow | :Disabled |
| Swap Floppy Drive | :Disabled | D8000-DBFFF Shadow | :Disabled |
| Boot Up Floppy Seek | :Enabled | DC000-DFFFF Shadow | :Disabled |
| Boot Up NumLock Status | :On | | |
| Boot Up System Speed | :High | | |
| Gate A20 Option | :Fast | | |
| Typematic Rate Setting | :Disabled | ESC : Quit ↑↓→←: Select Item | |
| Typematic Rate(Chars/Sec) | :6 | F1 : Help PU/PD/+/- : Modify | |
| Typematic Delay (Msec) | :250 | F5 : Old Values (Shift) F2 : Color | |
| Security Option | :Setup | F6 : Load BIOS Defaults | |
| PCI/VGA Palette Snoop | :Disable | F7 : Load Setup Defaults | |
| OS Select for DRAM >64MB | :Non-OS2 | | |

- **Virus Warning**

  This category flashes on the screen. During and after the system boot up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system with the following error message. You can run an anti-virus program to locate the problem.

> ! W A R N I N G !
> *Disk boot sector is to be modified*
> *Type "Y" to accept write or "N" to abort write*
> *Award Software, Inc.*

| | |
|---|---|
| Enabled | Activates automatically when the system boots up causing a warning message to appear when there is an attempt to access the boot sector or hard disk partition table. |
| Disabled | No warning message will appear when attempts to access the boot sector or hard disk partition table are made. |

NOTE: *Many disk diagnostic programs that attempt to access the boot sector table can cause the above warning message. If you will be running such a program, we recommend that you first disable the Virus Protection beforehand.*

- **CPU Internal Cache/External Cache**
  These two categories speed up memory access. However, it depends on the CPU/chipset design. The default value is Enabled. CPUs without Internal Cache will not show the "CPU Internal Cache" item in the menu.

| | |
|---|---|
| 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 Enabled, BIOS will shorten or skip some check items during POST.

| | |
|---|---|
| Enabled | Enable quick POST |
| Disabled | Normal POST |

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

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

- **Boot Up Floppy Seek**
  During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360Kb type is 40 tracks while 720Kb, 1.2MB and 1.44MB 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. There will not be any warning message if the drive installed is 360K. |

- **Boot Up NumLock Status**
  The default value is On.

| | |
|---|---|
| On | Keypad is number keys |
| Off | Keypad is arrow keys |

- **Boot Up System Speed**
  It selects the default system speed - the speed that the system will run at immediately after power up.

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

- **Gate A20 Option**

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

- **Typematic Rate Setting**
  This determines the typematic rate.

| | |
|---|---|
| Enabled | Enable typematic rate and typematic delay programming |
| Disabled | Disable typematic rate and typematic delay programming. The system BIOS will use default value of these 2 items and the default is controlled by keyboard. |

- **Typematic Rate (Chars/Sec)**

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

- **Typematic Delay (Msec)**
  This sets the time between the first and second character displayed when holding a key.

| | |
|---|---|
| 250 | 250 msec |
| 500 | 500 msec |
| 750 | 750 msec |
| 1000 | 1000 msec |

- **Security Option**
  This category allows you to limit access to the system and Setup, or just to Setup.

| | |
|---|---|
| System | The system will not boot and access to Setup will be denied if the incorrect password is 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, just press <Enter> and it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.*

- **OS Select for DRAM >64**
  This item allows you to access the memory over 64MB under OS/2. The available settings are Non-OS2 and OS2.

- **PCI / VGA Palette Snoop**
  It determines whether or not the MPEG ISA/VESA VGA Cards can work with PCI/VGA.

| | |
|---|---|
| Enabled | When PCI/VGA working with MPEG ISA/VESA VGA Card. |
| Disabled | When 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 - CBFFF Shadow / DC000 - DFFFF Shadow**
  These categories determine whether optional ROM will be copied to RAM. An example of such option ROM would be support of on-board SCSI.

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

## 4.7 Chipset Features Setup Menu

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

| | | | |
|---|---|---|---|
| Auto Configuration | :Enabled | Memory Parity / ECC Check | :Auto |
| DRAM Timing | :70ns | Single Bit Error Report | :Enabled |
| DRAM RAS# Precharge Time | :4 | L2 Cache Cacheable Size | :64MB |
| DRAM R/W Leadoff Timing | :7/6 | Chipset NA# Asserted | :Enabled |
| Fast RAS# To CAS# Delay | :3 | Pipeline Cache Timing | :Faster |
| DRAM Read Burst(EDO/FPM) | :x333/x444 | Passive Release | :Enabled |
| DRAM Write Burst Timing | :x333 | Delayed Transaction | :Disabled |
| Turbo Read Leadoff | :Disabled | | |
| DRAM Speculative Leadoff | :Enabled | | |
| Turn-Around Insertion | :Disabled | | |
| ISA Clock | :PCICLK/4 | | |
| System BIOS Cacheable | :Disabled | | |
| Video BIOS Cacheable | :Disabled | | |
| 8 Bit I/O Recovery Time | :1 | ESC : Quit ↑ ↓ → ← : Select Item | |
| 16 Bit I/O Recovery Time | :1 | F1 : Help PU/PD/+/- : Modify | |
| Memory Hole At 15M-16M | :Disabled | F5 : Old Values (Shift) F2 : Color | |
| Peer Concurrency | :Enabled | F6 : Load BIOS Defaults | |
| Chipset Special Features | :Enabled | F7 : Load Setup Defaults | |
| DRAM ECC/PARITY Select | :Parity | | |

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also coordinates communications between the conventional ISA bus and the 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.

- **Auto Configuration**
  Pre-defined values for DRAM, cache timing according to CPU type & system clock.
  The available settings are Enabled, Disabled.

NOTE: *When this item is enabled, the pre-defined items are obsolete and will only be displayed on the screen.*

## 4.7.1 DRAM Settings

The first chipset settings deal with CPU access to dynamic random access memory (DRAM). The default timings have been carefully chosen and should only be altered if data is being lost. Such a scenario might well 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.

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

| | |
|---|---|
| 60ns | DRAM Timing Type |
| 70ns | DRAM Timing Type |

- **DRAM RAS# Precharge Time**
  DRAM must continually be refreshed or it will lose its data. Normally, DRAM is refreshed entirely as the result of a single request. This option allows you to determine the number of CPU clocks allocated for the Row Address Strobe to accumulate its charge before the DRAM is refreshed. If insufficient time is allowed, refresh may be incomplete and data lost.

| | |
|---|---|
| 3 | Three clocks |
| 4 | Four clocks |

- **DRAM R/W Leadoff Timing**
  This sets the number of CPU clocks allowed before reads and writes to DRAM are performed.

| | |
|---|---|
| 7/6 | Seven clocks leadoff for reads and six clocks leadoff for writes |
| 6/5 | Six clocks leadoff for reads and five clocks leadoff for writes |

- **Fast RAS# to CAS# Delay**
  When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from Row Address Strobe (RAS) to Column Address Strobe (CAS).

| | |
|---|---|
| 3 | Three CPU clock delay |
| 2 | Two CPU clock delay |

- **DRAM Read <EDO/FPM>**
  This sets the timing for burst mode reads from two different DRAM(EDO/FPM). Burst read and write requests are generated by the CPU in four separate parts. The first part provides the location within the DRAM where the read or write is to take place while the remaining three parts provide the actual data. The lower the timing numbers, the faster the system will address memory.

| | |
|---|---|
| x222/x333 | Read DRAM (EDO/FPM) timings are 2-2-2/3-3-3 |
| x333/x444 | Read DRAM (EDO/FPM) timings are 3-3-3/4-4-4 |
| x444/x444 | Read DRAM (EDO/FPM) timings are 4-4-4/4-4-4 |

- **DRAM Write Burst Timing**
  This sets the timing for burst mode writes from DRAM. Burst read and write requests are generated by the CPU in four separate parts. The first part provides the location within the DRAM where the read or write is to take place while the remaining three parts provide the actual data. The lower the timing numbers, the faster the system will address memory.

| | |
|---|---|
| x222 | Write DRAM timings are 2-2-2-2 |
| x333 | Write DRAM timings are 3-3-3-3 |
| x444 | Write DRAM timings are 4-4-4-4 |

- **Turbo Read Leadoff**
  The turbo read leadoff may be required in certain system designs to support layouts or faster memories. The available choices are Enabled and Disabled.

- **DRAM Speculative Leadoff**
  The 430HX chipset is capable of allowing a DRAM read request to be generated slightly before the address has been fully decoded. This can reduce all read latencies.
  More simply, the CPU will issue a read request and included with this request is the place (address) in memory where the desired data is to be found. This request is received by the DRAM controller. When the speculative Leadoff' is enabled, the controller will issue the read command slightly before it has finished determining the address. The available settings are Enabled and Disabled.

- **Turn-Around Insertion**
  When this is enabled, the chipset will insert one extra clock to the turn-around of back-to-back DRAM cycles. The available options are Enabled and Disabled.

- **ISA Clock**
  This item allows you to select the ISA clock speed.

| | |
|---|---|
| PCI CLK/3 | ISA clock =PCI clock/3 |
| PCI CLK/4 | ISA clock =PCI clock/4 |

## 4.7.2 Cache Features

- **System BIOS Cacheable**
  When enabled, accesses to the system BIOS ROM addressed at F0000H-FFFFFH are cached, provided that the cache controller is enabled.

| | |
|---|---|
| Enabled | BIOS access cached |
| Disabled | BIOS access not cached |

- **Video BIOS Cacheable**
  As with caching the System BIOS above, enabling the Video BIOS cache will cause access to video BIOS addressed at C0000H to C7FFFH to be cached, if the cache controller is also enabled.

| | |
|---|---|
| Enabled | Video BIOS access cached |
| Disabled | Video BIOS access not cached |

- **8 Bit I/O Recovery Time**
  The recovery time is the length of time, measured in CPU clocks, 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.
  This item allows you to determine the recovery time allowed for 8 bit I/O. Choices are from NA, 1 to 8 CPU clocks.

- **16 Bit I/O Recovery Time**
  This item allows you to determine the recovery time allowed for 16 bit I/O. Choices are from NA, 1 to 4 CPU clocks.

- **Memory Hole at 15M-16M**
  In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB.

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

- **Peer Concurrency**
  Peer concurrency means that more than one PCI device can be active at a time.

| | |
|---|---|
| Enabled | Multiple PCI devices can be active |
| Disabled | Only one PCI device can be active at a time |

- **Chipset Special Features**
  When disabled, the chipset behaves as if it were there earlier. The available choices are Enabled and Disabled.
- **DRAM ECC/Parity Select**
  This item allows you to select between two methods of DRAM error checking, ECC and Parity.
- **Memory Parity ECC Check**
  This item allows you to select between three methods of memory error checking, Auto, Enabled and Disabled.
- **Single Bit Error Report**
  When a single bit error is detected, the offending DRAM row ID is latched. The latched Valued is held until software explicitly clears the error status flag. You can select Enabled or Disabled.
- **L2 cache Cacheable Size**
  This item determines the size of the L2 cacheability: 64MB / 512MB.
- **Chipset NA# Asserted**
  This item allows you to select between two method of chipset NA# asserted during CPU write cycles /CPU line fills, Enabled and Disabled.
- **Pipeline Cache Timing**
  This item allows you to select two timing of pipeline cache, Faster and Fastest.

# 4.8 Integrated Peripherals

The Integrated peripherals will appear on your screen like this:

**ROM PCI/ISA BIOS**
**INTEGRATED PERIPHERALS**
**AWARD SOFTWARE, INC.**

| | | |
|---|---|---|
| IDE HDD Block Mode | : Enabled | |
| PCI Slot IDE 2nd Channel | : Enabled | |
| On-Chip Primary PCI IDE | : Enabled | |
| IDE Primary Master PIO | : Auto | |
| IDE Primary Slave PIO | : Auto | |
| Onboard FDC Controller | : Enabled | |
| Onboard UART 1 | : Auto | ESC: Quit ↑↓→←: Select Item |
| Onboard UART 2 | : Auto | F1 : Help PU / PD / + / - : Modify |
| Onboard Parallel Port | : 378/IRQ7 | F5 : Old Values (Shift)F2 : Color |
| Parallel Port Mode | : Normal | F6 : Load BIOS Defaults |
| | | F7 : Load Setup Defaults |

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

| | |
|---|---|
| Enabled | IDE controller uses block mode |
| Disabled | IDE controller uses standard mode |

- **PCI Slot IDE 2nd Channel**
  This item allows you designate an IDE controller board inserted into one of the physical PCI slots as your secondary IDE controller.

| | |
|---|---|
| Enabled | External IDE controller designated as the secondary controller |
| Disabled | No IDE controller occupying a PCI slot. |

- **IDE PIO**
  IDE hard drive controllers can support up to two separate hard drives. These drives have a master/slave relationship which are determined by the cabling configuration used to attach them to the controller. Your system supports two IDE controllers--a primary and a secondary--so you have to ability to install up to four separate hard disks.

PIO means Programmed Input/Output. Rather than have the BIOS issue a series of commands to effect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the complete task by themselves. This simpler and more efficient (and faster).
Your system supports five modes, numbered from 0 (default) to 4, which primarily differ in timing. When *Auto* is selected, the BIOS will select the best available mode. This is true for the next two setup items:

- IDE Primary Master PIO
- IDE Primary Slave PIO

- **On-Chip Primary PCI IDE**
  As stated above, your system includes two built-in IDE controllers, both of which operate on the PCI bus. This setup item allows you either to enable or disable the primary controller. You might choose to disable the controller if you were to add a higher performance or special controller.

| | |
|---|---|
| Enabled | Primary HDD controller used -- Default |
| Disabled | Primary HDD controller not used. |

# 4.9 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 | ** Power Down & Resume Events ** | |
| PM Control by APM | : Yes | IRQ3 (COM2) | : ON |
| Video Off Method | : DPMS | IRQ4 (COM1) | : ON |
| MODEM Use IRQ | : 3 | IRQ5 (LPT2 | : ON |
| | | IRQ6 (Floppy Disk | : OFF |
| | | IRQ7 (LPT1) | : ON |
| Doze Mode | : Disable | IRQ8 (RTC Alarm | : OFF |
| Standby Mode | : Disable | IRQ9 (IRQ2 Redir | : ON |
| Suspend Mode | : Disable | IRQ10 (Reserved | : ON |
| HDD Power Down | : Disable | IRQ11 (Reserved | : ON |
| | | IRQ12 (PS/2 Mouse | : ON |
| | | IRQ13 (Coprocessor) | : ON |
| ** Wake Up Events In Doze & Standby ** | | IRQ14 ( Hard Disk) | : ON |
| IRQ3 (Wake-Up Event) | : ON | IRQ15 (Reserved) | : ON |
| IRQ4 (wake-Up Event) | : ON | | |
| IRQ8 (Wake-Up Event) | : ON | ESC: Quit | ↑↓→←: Select Item |
| IRQ12 (Wake-Up Event) | : ON | 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:
  - Doze Mode
  - Standby Mode
  - Suspend Mode
  - HDD Power Down

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

| | |
|---|---|
| Disable (default) | No power management. Disables all four modes |
| Min. Power Saving | Minimum power management. Doze Mode = 1 hr. Standby Mode = 1 hr., Suspend Mode = 1 hr., and HDD Power Down = 15 min. |
| Max. Power Saving | Maximum power management – ONLY AVAILABLE FOR SL CPU. Doze Mode = 1 min., Standby Mode = 1 min., Suspend Mode = 1 min., and HDD Power Down = 1 min. |
| User Defined | Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr. except for HDD Power Down which ranges from 1 min. to 15 min. and disable. |

- **PM Control APM**
  When enabled, an Advanced Power Management device will be activated to enhance the Max. Power Saving mode and stop the CPU internal clock.
  If the Max. Power Saving is not enabled, this will be preset to *No*.

- **Video Off Method**
  This determines the manner in which the monitor is blanked.

| | |
|---|---|
| V/H SYNC+Blank | This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer. |
| Blank Screen | This option only writes blanks to the video buffer. |
| DPMS | Initial display power management signaling. |

### 4.9.1 PM Timers

The following four modes are Green PC power saving functions which are only user configurable when *User Defined* Power Management has been selected. See above for available selections.

- **Doze Mode**
  When enabled and after the set time of system inactivity, the CPU clock will run at slower speed while all other devices still operate at full speed.

- **Standby Mode**
  When enabled and after the set time of system inactivity, the fixed disk drive and the video would be shut off while all other devices still operate at full speed.
- **Suspend Mode**
  When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.
- **HDD Power Down**
  When enabled and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

### 4.9.2 Power Down & Resume Events

Power Down and Resume events are I/O events whose occurrence can prevent the system from entering a power saving mode or can awaken the system from such a mode. In effect, the system remains alert for anything that occurs to a device that is configured as *On*, even when the system is in a power down mode.

The following is a list of IRQ's, Interrupt Requests, which can be exempted much as the COM ports and LPT ports above can. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

As stated above, the choices are *On* and *Off. Off* is the default.

When set as *Off*, activity will neither prevent the system from going into a power management mode nor awaken it.

- 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)

# 4.10 PnP/PCI Configuration Setup

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

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

| | | | |
|---|---|---|---|
| Resources Controlled By | Manual | PCI IRQ Activated By | : Level |
| Reset Configuration Data | Disabled | PCI IDE IRQ Map To | : PCI-AUTO |
| | | Primary IDE INT# | : A |
| IRQ-3 assigned to | : Legacy ISA | Secondary IDE INT# | : B |
| IRQ-4 assigned to | : Legacy ISA | | |
| IRQ-5 assigned to | : PCI/ISA PnP | Used MEM base addr | : N/A |
| IRQ-7 assigned to | : Legacy ISA | | |
| IRQ-9 assigned to | : PCI/ISA PnP | | |
| IRQ-10 assigned to | : PCI/ISA PnP | | |
| IRQ-11 assigned to | : PCI/ISA PnP | | |
| IRQ-12 assigned to | : PCI/ISA PnP | | |
| IRQ-14 assigned to | : Legacy ISA | | |
| IRQ-15 assigned to | : Legacy ISA | | |
| DMA-0 assigned to | : PCI/ISA PnP | | |
| DMA-1 assigned to | : PCI/ISA PnP | | |
| DMA-3 assigned to | : PCI/ISA PnP | ESC: Quit | ↑↓→←: Select Item |
| DMA-5 assigned to | : PCI/ISA PnP | F1 : Help | PU / PD / + / - : Modify |
| DMA-6 assigned to | : PCI/ISA PnP | F5 : Old Values | (Shift)F2 : Color |
| DMA-7 assigned to | : PCI/ISA PnP | F6 : Load BIOS Defaults | |
| | | F7 : Load Setup Defaults | |

- **Resource Controlled by**
  The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows® 95. Choices are *Auto* and Manual.

- **Reset Configuration Data**
  This item allows you to determine reset the configuration data or not. Choices are *Enabled* and *Disabled*.

- **IRQ and DMA Assigned to**
  This item allows you to determine the IRQ / DMA assigned to the ISA bus and is not available to any PCI slot. Choices are *Legacy ISA* and *PCI/ISA PnP*.

- **PCI IRQ Activated by**
  This sets the method by which the PCI bus recognizes that an IRQ service is being requested by a device. Under all circumstances, you should retain the default configuration unless advised otherwise by your system's manufacturer. Choices are *Level* and *Edge*.

- **PCI IDE IRQ Map to**
  This allows you to configure your system to the type of IDE disk controller in use. By default, Setup assumes that your controller is an ISA (Industry Standard Architecture) device rather than a PCI controller. The more apparent difference is the type of slot being used. If you have equipped your system with a PCI controller, changing this allows you to specify which slot has the controller and which PCI interrupt (A, B,C or D) is associated with the connected hard drives. Remember that this setting refers to the hard disk drive itself, rather than individual partitions. Since each IDE controller supports two separate hard drives, you can select the INT# for each. Again, you will note that the primary has a lower interrupt than the secondary as described in *lot x Using INT#*" above.
  Selecting "*PCI Auto*" allows the system to automatically determine how your IDE disk system is configured.

## 4.11 Password Setting

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

**ENTER PASSWORD:**

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

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

**PASSWORD DISABLED.**

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

## 4.12 IDE HDD Auto Detection

The Enhance IDE feature is 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 supported by the HDD including NORMAL, LBA & LARGE.

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

Users can select a mode appropriate for them.

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

HARD DISKS TYPE SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE

Primary Master :

Select Primary Master Option (N = Skip ) : N

| OPTION | SIZE | CYLS | HEADS | PRECOMP | LANDZONE | SECTORS | MODE |
|---|---|---|---|---|---|---|---|
| 1 (Y) | 516 | 1120 | 16 | 65535 | 1119 | 59 | NORMAL |
| 2 | 516 | 524 | 32 | 0 | 1119 | 63 | LBA |
| 3 | 516 | 560 | 32 | 65535 | 1119 | 59 | LARGE |

<II> Standard CMOS Setup

| | CYLS | Heads | Precomp | Landzone | Sector | Mode |
|---|---|---|---|---|---|---|
| Primary Master :User(516MB) | 1120 | 16 | 65535 | 1119 | 59 | NORMAL |
| Primary Slave :None (203MB) | 684 | 16 | 65535 | 685 | 38 | ---------- |
| Secondary Master : | None | 0 | 0 | 0 | 0 | 0 0 |
| Secondary Slave : | None | 0 | 0 | 0 | 0 | 0 0 |

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

2. HDD Modes

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

- NORMAL mode

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

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

| | | |
|---|---|---|
| | no. Cylinder | ( 1024) |
| x | no. Head | ( 16) |
| x | no. Sector | ( 63) |
| x | no. per sector | ( 512) |
| | | 528 Megabytes |

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

- LBA (Logical Block Addressing) mode

  A new HDD accessing method to overcome the 528MB 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 8.4GB which is obtained by the following formula:

| | | |
|---|---|---|
| | no. Cylinder | ( 1024) |
| x | no. Head | ( 255) |
| x | no. Sector | ( 63) |
| x | bytes per sector | ( 512) |
| | | 814 Gigabytes |

- **LARGE mode**

  Extended HDD access mode supported by Award Software.

  Some IDE HDDs contain more than 1024 cylinder without LBA support (in some cases, user does 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, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT13h in order to access the right HDD address!

  Maximum HDD size:

| | | |
|---|---|---|
| | no. Cylinder | ( 1024) |
| x | no. Head | ( 32) |
| x | no. Sector | ( 63) |
| x | bytes per sector | ( 512) |

  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). It may fail to access a HDD with LBA (LARGE) mode selected if you are running under a Operating System that replaces the whole INT 13h.

## 4.13 Hard Disk Low Level Format Utility

This Award Low-Level-Format Utility is designed as a tool to save your time formatting your hard disk. The utility automatically looks for the necessary information of the drive you selected. This utility 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.

| **Hard Disk Low Level Format Utility** | BAD TRACKS TABLE<br>NO. CYLS HEAD |
|---|---|
| SELECT DRIVE<br>BAD TRACK LIST<br>PREFORMAT | |
| Current select drive is : C<br><br>DRIVE: C CYLINDER : 0 HEAD: 0 | |

| | Size | CYLS | Head | Precomp | Landz | Sector | Mode |
|---|---|---|---|---|---|---|---|
| Primary Master: | 0 | 0 | 0 | 0 | 0 | 0 | AUTO |
| Primary Slave: | 0 | 0 | 0 | 0 | 0 | 0 | AUTO |

Up/Down - Select item Enter - Accept ESC-Exit/Abort

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- **Control Keys**
  Use the Up and Down arrow keys to move around the selections displayed on the upper screen. Press <Enter> to accept the selection. Press <Esc> to abort the selection or exit the utility.
- **Select Drive**
  Select from installed hard disk drive C or D. Listed at the bottom of the screen is the drive automatically detected by the utility.
- **Bad Track List**
  - Auto scan bad track
    The utility will automatically scan bad tracks and list the bad tracks on the window at the right side of the screen.
  - Add bad track
    Directly type in the information of the known bad tracks on 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 on the window at the right side of the screen.
- Clear bad track table
  Clear the whole bad track list on the window at the right side of the screen.

- **Preformat**
  - Interleave
    Select the interleave number of the hard disk drive 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.

## 4.14 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.

## 4.15 BIOS Reference - POST Codes

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

| POST (hex) | Description |
|---|---|
| 01-02 | Reserved |
| C0 | Turn off OEM specific cache, shadow... |
| 03 | 1. Initialize EISA registers (EISA BIOS only)<br>2. Initialize all the standard devices with default values<br>Standard devices include:<br>-DMA controller (8237)<br>-Programmable Interrupt Controller (8259)<br>-Programmable Interval Timer (8254)<br>-RTC chip |
| 04 | Reserved |
| 05 | 1. Keyboard Controller Self-Test<br>2. Enable Keyboard Interface |
| 06 | Reserved |
| 07 | Verifies CMOS basic R/W functionality |
| BE | Program defaults values into chipset according to the MODBINable Chipset Default Table |
| C1 | Auto-detection of onboard DRAM & Cache |
| C5 | Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster |
| 08 | Test the first 256K DRAM |
| 09 | 1. Program the configuration register of Cyrix CPU according to the MODBINable Cyrix Register Table<br>2. OEM specific cache initialization (if needed) |
| 0A | 1. Initialize the first 32 interrupt vectors with corresponding Interrupt handlers<br>Initialize INT no. from 33-120 with Dummy (Spurious) Interrupt Handler<br>2. Issue CPUID instruction to identify CPU type<br>3. Early Power Management initialization (OEM specific) |

Continued . . . . .

| POST (hex) | Description |
|---|---|
| 0B | 1. Verify the RTC time is valid or not<br>2. Detect bad battery<br>3. Read CMOS data into BIOS stack area<br>4. PnP initializations including (PnP BIOS only)<br>- Assign CSN to PnP ISA card<br>- Create resource map from ESCD<br>5. Assign IO & Memory for PCI devices (PCI BIOS only) |
| 0C | Initialization of the BIOS Data Area (40 : 0N – 40:FF) |
| 0D | 1. Program some of the chipset value according to Setup. (Early Setup Value Program)<br>2. Measure CPU speed for display & decide the system clock speed<br>3. Video initialization including Monochrome, CGA, EGA/VGA. If no display device found, the speaker will beep |
| 0E | 1. Initialize the APIC (Multi-Processor BIOS only)<br>2. Test video RAM (If Monochrome display device found)<br>3. Show messages including:<br>- Award Logo, Copyright string, BIOS Date code & Part No.<br>- OEM specific sign on messages<br>- Energy Star Logo (Green BIOS ONLY)<br>- CPU brand, type & speed<br>- Test system BIOS checksum(Non-Compress Version only) |
| 0F | DMA channel 0 test |
| 10 | DMA channel 1 test |
| 11 | DMA page registers test |
| 12-13 | Reserved |
| 14 | Test 8254 Timer 0 Counter 2. |
| 15 | Test 8259 interrupt mask bits for channel 1 |
| 16 | Test 8259 interrupt mask bits for channel 2 |
| 17 | Reserved |
| 19 | Test 8259 functionality |
| 1A-1D | Reserved |

Continued . . . . .

| POST (hex) | Description |
|---|---|
| 1E | If EISA NVM checksum is good, execute EISA initialization (EISA BIOS only) |
| 1F-29 | Reserved |
| 30 | Detect Base Memory & Extended Memory Size |
| 31 | 1. Test Base Memory from 256K to 640K<br>2. Test Extended Memory from 1M to the top of memory |
| 32 | 1. Display the Award Plug & Play BIOS Extension message (PnP BIOS only)<br>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<br>2. Install PS2 mouse |
| 3E | Try to turn on Level 2 cache<br>**Note:** *Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST 61h.* |
| 3F-40 | Reserved |
| BF | 1. Program the rest of the chipset value according to Setup. (Later Setup Value Program)<br>2. If auto-configuration is enabled, programmed the chipset with pre-defined values in the MODBINable Auto-Table |
| 41 | Initialize floppy disk drive controller |
| 42 | Initialize Hard drive controller |
| 43 | If it is a PnP BIOS, initialize serial & 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 |

Continued . . . . .

| POST (hex) | Description |
|---|---|
| 4F | 1. If password is needed, ask for password<br>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<br>2. Later PCI initializations (PCI BIOS only)<br>- assign IRQ to PCI devices<br>- initialize all PCI ROMs<br>3. PnP Initializations (PnP BIOS only)<br>- assign IO, Memory, IRQ & DMA to PnP ISA devices<br>- initialize all PnP ISA ROMs<br>4. Program shadows RAM according to Setup settings<br>5. Program parity according to Setup setting<br>6. Power Management Initialization<br>- Enable/Disable global PM<br>- APM interface initialization |
| 53 | 1. If it is NOT a PnP BIOS, initialize serial & parallel ports<br>2. Initialize time value in BIOS data area by translate the RTC time value into a timer tick value |
| 60 | Setup Virus Protection (Boot Sector Protection) functionality according to Setup setting |
| 61 | 1. Try to turn on Level 2 cache<br>**Note:** *If L2 cache is already turned on in POST 3D, this part will be skipped.*<br>2. Set the boot up speed according to Setup setting<br>3. Last chance for Chipset initialization<br>4. Last chance for Power Management initialization (Green BIOS only)<br>5. Show the system configuration table |
| 62 | 1. Setup daylight saving according to Setup value<br>2. Program the NUM Lock, typematic rate & typematic speed according to Setup setting |

Continued . . . . .

| POST (hex) | Description |
|---|---|
| 63 | 1. If there is any changes in the hardware configuration, update the ESCD information (PnP BIOS only)<br>2. Clear memory that have been used<br>3. Boot system via INT 19H |
| FF | System Booting. This means that the BIOS already pass 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 onboard VGA interface of SBC8251V and SBC8251PV 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 of up to 1024x768 in 256 colors. It is also capable of driving color panel displays with resolutions of 640x480 in 64K colors.

## 5.1 Drivers and Utilities

### 5.1.1 Microsoft Windows 3.1

The graphic installation program (SETUP.EXE) supports a simple installation procedure for the display driver setup program and the power management program.

To use Setup, follow the steps below:

1. Ensure that MS Windows 3.1 is operating properly using the standard VGA driver.
2. Select the MAIN group in Program Manager.
3. Click on FILE or press <ALT> + <F>.
4. Click on RUN or press <R> to select command line.
5. Type A:SETUP.EXE (if the display driver disk is in the B drive, type in B:SETUP.EXE) and then press <Enter>. An hourglass icon will appear indicating the loading of program.

### 5.1.2 MS Windows 95 / NT Mode Driver Installation

1. ENSURE that MS Windows 95 or NT is running properly using the SVGA driver it has 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 Adapter Type.
5. On the "Select Device" page, SELECT the "Have Disk" button to install the Cirrus display driver from the diskette.
6. After the "Have Disk" button is selected an "Install From Disk" window will appear. SELECT the "Browse" button to browse the directory "X:\WIN95" of your diskette dirve. (X=A or B)
7. The files *.INF will appear under file name list. SELECT "OK" to return to the "Install From Disk" windows. 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 to 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 using the 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 then SELECT "CHIPS". There will now be a refresh tab for changing the refresh rate, then click the tab to change refresh rate.

## 5.2 Panel Support

The SBC8251V and SBC8251PV board computer provide a very convenient way to setup 7 types of panel displays.

- **For 40K BIOS**
  If you install standard 40K BIOS on the board, the SBC8251V and SBC8251PV boards support the following 7 panels:

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

Remember to set jumper **JP1** according the to table below:

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

## 5.3 Video Modes

The display chipset C&T65550 supports all standard VGA modes as well as a wide selection of extended modes. The following tables lists the modes and vertical refresh rates that this BIOS can support.

***Table 1: Standard Video Display Modes***

| Video Mode | VESA VBE Mode | Pixel Res. | 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 |

## Table 2: Extended Video Modes

| Video Mode | VESA VBE Mode | Pixel Res. | 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 | 1024x76 | 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 |
| 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 |
| | | | | | | | | 48.75 | 60 | 75 | 768 |
| | | | | | | | | 94.5 | 68.7 | 85 | 768 |
| 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 |

Continued . . . . .

| Video Mode | VESA VBE Mode | Pixel Res. | Color Res. | Mode Type | Mem Org | Font Size | Char. Disp. | Dot Clock (MHz) | Horiz Freq. (MHz) | Vert Freq (Hz) | Video Mem. (KB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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(I) | 1536 |
| | | | | | | | | 65 | 48.4 | 60 | 1536 |
| 45h | 117h | 1024x768 | 64K | Graph(L) | Pack Pix | 8x16 | 128x48 | 44.9 | 35.5 | 43(I) | 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 |
| 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 |
| 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 |

Continued . . . . .

| Video Mode | VESA VBE Mode | Pixel Res. | Color Res. | Mode Type | Mem Org | Font Size | Char. Disp. | Dot Clock (MHz) | Horiz Freq. (MHz) | Vert Freq (Hz) | Video Mem. (KB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

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

The actual availability of any particular mode, however, depends on the capabilities of the display device, the amount of memory installed, whether operation is at 3.3 volts or 5 volts, the MCLK setting, and other system parameters. For more information on mode timings and availability, please refer to the most recent revision of the display chipset HiQVideo™ Series Mode Support Application Note or your agent.

**This page does not contain any information.**

# Appendix A
# Watchdog Timer

## Watchdog Timer Configuration

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

Regarding 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 go into a dead loop or go into an abnormal cycle, the watchdog timer cannot be refresh immediately. Meanwhile, the system will be reset by watchdog timer automatically. The watchdog timer will be refresh by "disable watchdog output" then "enable watchdog output"

The following flowchart shows the normal structure of system program.

### Watchdog timer examples:

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

```
        mov al,0ah
        mov dx,70h
        out dx,al
        jmp short $+2
        mov dx,71h
        in al,dx
        jmp short $+2
        and al,0f0h
add ax,TimeValue        ;       TimeValue= 00h..0fh,
reference as                    following watchdog timeout
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 (sec.) |
|---|---|
| 0 | None |
| 1 | 0.5 |
| 2 | 1 |
| 3 | 0.015 |
| 4 | 0.03 |
| 5 | 0.06 |
| 6 | 0.125 |
| 7 | 0.25 |

| Time Value | Time Out (sec.) |
|---|---|
| 8 | 0.5 |
| 9 | 1 |
| A | 2 |
| B | 4 |
| C | 8 |
| D | 16 |
| E | 32 |
| F | 64 |

### (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
# Connector Pin Assignments

## External Keyboard (J4)

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Keyboard clock | 4 | Ground |
| 2 | Keyboard data | 5 | Power |
| 3 | NC | | |

## External Power Connectors (J1, J3)

| J1 Pin | Signal | J1 Pin | Signal |
|---|---|---|---|
| 1 | -12V | 3 | Ground |
| 2 | -5V | 4 | +12V |

| J3 Pin | Signal |
|---|---|
| 1, 2, 3 | +5V |
| 4, 5, 6 | Ground |

## Parallel/Printer Connector (PRN)

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | Strobe | 7 | Data 5 | 13 | + Select |
| 2 | Data 0 | 8 | Data 6 | 14 | - Auto Feed |
| 3 | Data 1 | 9 | Data 7 | 15 | - Error |
| 4 | Data 2 | 10 | -Acknowledge | 16 | - INIT Printer |
| 5 | Data 3 | 11 | Busy | 17 | - Select Input |
| 6 | Data 4 | 12 | Paper Empty | 18-25 | Ground |

## HDD Connector (IDE)

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | - RST | 15 | D1 | 29 | N.C. |
| 2 | GND | 16 | D14 | 30 | GND |
| 3 | D7 | 17 | D0 | 31 | IRQ |
| 4 | D8 | 18 | D15 | 32 | -IO CS16 |
| 5 | D6 | 19 | GND | 33 | A1 |
| 6 | D9 | 20 | N.C. | 34 | N.C. |
| 7 | D5 | 21 | N.C. | 35 | A0 |
| 8 | D10 | 22 | GND | 36 | A2 |
| 9 | D4 | 23 | IOW | 37 | CS0 |
| 10 | D11 | 24 | GND | 38 | CS1 |
| 11 | D3 | 25 | IOR | 39 | -ACT |
| 12 | D12 | 26 | GND | 40 | GND |
| 13 | D2 | 27 | IORDY | | |
| 14 | D13 | 28 | BALE | | |

## FDD Connector (FDD)

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1-33 (odd) | GND | 14 | Driver Select A | 26 | Track 0 |
| 2 | High Density | 16 | Motor Enable B | 28 | Write Protect |
| 4, 6 | Unused | 18 | Direction | 30 | Read Data |
| 8 | Index | 20 | Step Pulse | 32 | Select Head |
| 10 | Motor Enable A | 22 | Write Data | 34 | Disk Change |
| 12 | Driver Select B | 24 | Write Enable | | |

## CRT Display Connector (VGA)

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | RED | 6 | GND | 11 | N/C |
| 2 | GREEN | 7 | GND | 12 | N/C |
| 3 | BLUE | 8 | GND | 13 | H-SYNC |
| 4 | N/C | 9 | N/C | 14 | V-SYNC |
| 5 | GND | 10 | GND | 15 | N/C |

## Flat Panel Display Connector mini pin header(J2)

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | +12V | 16 | P7 | 31 | P22 |
| 2 | +12V | 17 | P8 | 32 | P23 |
| 3 | GND | 18 | P9 | 33 | GND |
| 4 | GND | 19 | P10 | 34 | GND |
| 5 | VDD | 20 | P11 | 35 | CLOCK |
| 6 | VDD | 21 | P12 | 36 | FLM |
| 7 | ENVEE | 22 | P13 | 37 | M |
| 8 | GND | 23 | P14 | 38 | LP |
| 9 | P0 | 24 | P15 | 39 | GND |
| 10 | P1 | 25 | P16 | 40 | EN_BKL |
| 11 | P2 | 26 | P17 | 41 | GND |
| 12 | P3 | 27 | P18 | 42 | ENVDD |
| 13 | P4 | 28 | P19 | 43 | VDD |
| 14 | P5 | 29 | P20 | 44 | VDD |
| 15 | P6 | 30 | P21 | | |

## RS-232 Connector (COM1)

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | DCD | 4 | DTR | 7 | RTS |
| 2 | RX | 5 | GND | 8 | CTS |
| 3 | TX | 6 | DSR | 9 | RI |

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

| Pin | RS232 | RS422 | RS485 |
|---|---|---|---|
| 1 | DCD | TX- | DATA- |
| 2 | DSR | | |
| 3 | RX | TX+ | DATA+ |
| 4 | RTS | | |
| 5 | TX | RX+ | |
| 6 | CTS | | |
| 7 | DTR | RX- | |
| 8 | RI | | |
| 9 | GND | GND | GND |
| 10 | N.C. | N.C. | |

## PC/104 Connector

| Pin | A | B | C | D |
|---|---|---|---|---|
| 0 | -- | -- | GND | GND |
| 1 | IOCHCHK* | GND | SBHE | MEMCS16* |
| 2 | SD7 | RESETDRV | LA23 | IOSC16* |
| 3 | SD6 | +5V | LA22 | IRQ10 |
| 4 | SD5 | IRQ9 | LA21 | IRQ11 |
| 5 | SD4 | -5V | LA20 | IRQ12 |
| 6 | SD3 | DRQ2 | LA19 | IRQ15 |
| 7 | SD2 | -12V | LA18 | IRQ14 |
| 8 | SD1 | OWS* | LA17* | DACK0* |
| 9 | SD0 | +12V | MEMR* | DRQ0* |
| 10 | IOCHRDY* | GND | MEMW* | DACK5* |
| 11 | AEN | SMEMW* | SD8 | DRQ5 |
| 12 | SA19 | SMEMR* | SD9 | DACK6* |
| 13 | SA18 | IOW* | SD10 | DRQ6 |
| 14 | SA17 | IOR* | SD11 | DACK7* |
| 15 | SA16 | DACK3* | SD12 | DRQ7 |
| 16 | SA15 | DRQ3 | SD13 | +5V |
| 17 | SA14 | DACK1* | SD14 | MASTER* |
| 18 | SA13 | DRQ1 | SD15 | GND |
| 19 | SA12 | REFRESH* | NC | GND |
| 20 | SA11 | SYSCLK | -- | -- |
| 21 | SA10 | IRQ7 | -- | -- |
| 22 | SA9 | IRQ6 | -- | -- |
| 23 | SA8 | IRQ5 | -- | -- |
| 24 | SA7 | IRQ4 | -- | -- |
| 25 | SA6 | IRQ3 | -- | -- |
| 26 | SA5 | DACK2* | -- | -- |
| 27 | SA4 | TC | -- | -- |
| 28 | SA3 | BALE | -- | -- |
| 29 | SA2 | +5V | -- | -- |
| 30 | SA1 | OSC | -- | -- |
| 31 | SA0 | GND | -- | -- |
| 32 | GND | GND | -- | -- |

**' *' means 'Low active single'**
**'--' means 'None'**

## USB Connector (JP3)

| Pin | Signal |
|---|---|
| 1 | USB- |
| 2 | Vcc |
| 3 | USB+ |
| 4 | GND |

**This page does not contain any information.**

# Appendix C
# Installing DiskOnChip™

Onboard the SBC8251, you will find the socket for DiskOnChip™ of M-systems located at U5. Please follow the procedures below when installing the DiskOnChip™.

### I. For 32-pin DiskOnChip™

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

### II. For 28-pin DiskOnChip™

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

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

**This page does not contain any information.**

# Appendix D
# Updating the BIOS

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

1. Insert the diskette in drive A or B. Locate the file "AWDFLASH.EXE".
2. Type AWDFLASH under the A: or B: prompt.
3. The screen will ask you enter the file name. Enter the 'filename' that updates the BIOS, and which came from your agent or Award Software Inc. Type <N> when asked with the question 'Do you want to save BIOS (y/n)?'.
4. The question 'Are you sure to program (y/n)?' will then appear. Type <Y>.
5. Turn off the power after the system has updated the BIOS.
6. Turn on the power again.

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