

**SBC8173**

**All-in-One PCI/ISA  
CPU Card Series  
with VGA Interface**

**User's Manual**

## **Disclaimers**

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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.

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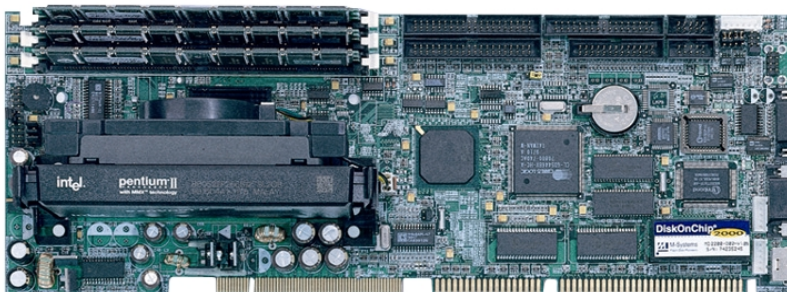
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## Chapter 1

### Introduction



The **SBC8173** is a Pentium® II /Pentium® III -compatible Industrial CPU card based on Intel's 440BX chipset and is fully designed for harsh industrial environment. It features a Slot 1 processor connector that is compatible with Pentium® II and Pentium® III processors. This card accommodates up to 384MB of unbuffer SDRAMs or 768MB of buffer SDRAM configurations.

The **SBC8173** comes with Winbond's W83781D hardware monitoring device that monitors system and CPU temperature, system voltages, and CPU/chassis fan speeds, preventing system crashes by warning the user of adverse conditions. The power management feature provides power savings by slowing down the CPU clock, turning OFF the monitor screen and stopping the HDD spindle motor.

## 1.1 Features

- CPU Speed 233~850MHz, Intel Pentium® II/ Pentium® III
- Bus Speed 66MHz/100MHz
- Intel 440BX AGPset
- Up to 384MB of unbuffer SDRAMs or 768MB of buffer SDRAM system memory, ECC function supported
- Cirrus Logic GD5446 PCI VGA chipset for CRT display
- 7-level programmable watchdog timer, selectable from 1, 2, 4, 8, 16, 32, 64 seconds
- High speed bi-directional SPP/ECP/EPP parallel port
- Hardware Monitoring
- Win 95/98 shut-off

## 1.2 Specifications

- **Processor Socket:** Slot 1 connector
- **Processor:**
  - Intel Pentium® II 333MHz (66MHz / Deschutes)
  - Intel Pentium® II 300/350/400/450/500 MHz (100MHz / Deschutes)
  - Intel Pentium® III 450/500/550/600 MHz (Katmai)
  - Intel Pentium® III 500E/550E/600E/650/700/750/800/850 MHz (Coppermine)
- **Chipset:** Intel 440BX AGPset with PCI EIDE and RTC built-in
- **Secondary Cache:** CPU integrated
- **Memory Sockets:**
  - Three 168-pin DIMM sockets
  - Memory types: SDRAM (Synchronous DRAM)

**NOTE:** *Only SDRAM modules that support SPD (Serial Presence Detect) should be used. Use PC100 modules when running 100MHz CPU bus speed and use PC66/PC100 modules when running 66MHz CPU bus speed.*



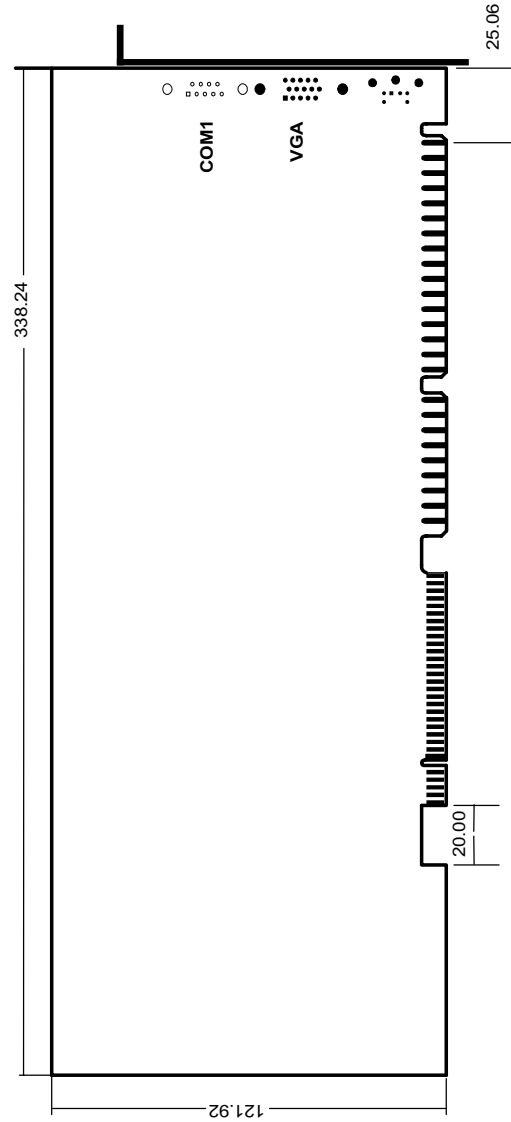
- **BIOS:** Award BIOS, PnP support
  - FLASH EEPROM (256KB) for BIOS update
  - ISA Plug and Play (PnP) extension
  - Power management
- **Multi I/O:** Winbond W83977TF
- **Parallel Port:** One high-speed parallel port, SPP/EPP/ECP mode
- **Serial Port:** Two 16550 UART compatible ports with COM1 as RS232 and COM2 jumper configurable as RS232/422/485
- **Enhanced IDE:**
  - Two Bus Mastering EIDE mode, up to 4 devices
  - Two EIDE interfaces for up to four devices
  - Supports PIO Mode 3/4 or Ultra DMA/33 IDE Hard Disk and ATAPI CD-ROM.
- **FDD Interface:** Two floppy drives (360KB, 720KB, 1.2MB, 1.44MB, 2.88MB, LS-120)
- **PCI VGA Controller:**
  - Cirrus Logic GD5446 CRT VGA PCI local bus controller with 2MB video RAM
  - Supports up to 1280 x 1024 resolution
  - Onboard 2MB EDO display memory
- **USB Interface:** Two USB pin-header connectors, compliant with USB Specification Rev. 1.0
- **DiskOnChip™:** The M-Systems flask disk supports system boot and storage capacity from 2MB to 72MB.
- **Watchdog Timer:** 7-level, programmable
  - Write I/O port 130H to set the timer
  - Write I/O port 131H with 0EH to enable watchdog.
  - Read I/O port 130H to disable watchdog.
  - Time-out timing select 1/2/4/8/16/32/64 seconds
- **Green Function:** Power management via BIOS, activated through mouse/keyboard movement

- **Keyboard and Mouse Connectors:**
  - One mini-DIN connector supporting external keyboard and mouse
  - One 5-pin connector supporting internal keyboard
  - One 5-pin connector supporting internal mouse
- **IrDA Interface:** Pin-header connector for the optional IrDA external connector
- **PICMG Compliance:** Fully compliant to PICMG standards
- **Power Consumption:**
  - +5V @10A, +12V @200mA, -12V @50mA (max.)  
(Pentium® II 400MHz, 128MB SDRAM)
- **Environmental and Mechanical:**
  - Temperature: 0°C to 60°C
  - Humidity: 5% to 95%
  - Dimensions: 340.7mm x 121.9mm

### **1.3 Intelligence**

- **Windows 95/98 shut-off:** Allows shut-off control from within Windows 95 and through an ATX power supply.
- **Year 2000 Compliant BIOS:** The onboard Award BIOS is Year 2000 Compliant and will pass software applications that have the tendency to invoke INT1AH function 04H such as year2000.exe utility released by NSTL.
- **Temperature Monitoring and Alert (optional):** Two sensor connectors on the **SBC8173** monitors the CPU and system temperature. When temperature exceeds the safe heat level, this feature alerts the user through the speaker or buzzer.

## 1.4 Board Dimensions



SBC8173 Board Dimensions

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## Chapter 2

### Installation

This chapter provides information on how to configure the jumpers and connectors on the **SBC8173** in order to set up a workable system.

#### 2.1 CPU Installation

The **SBC8173** Industrial CPU Card supports a Slot 1 connector processor socket for Pentium® II or Pentium® III processors. This connector secures the installation of the processor, ensuring the proper installation of the CPU.

Before installing the Pentium® II/ Pentium® III processor into the Slot 1 connector, ensure that the CPU fan is securely installed. After doing so, insert the processor into the Slot 1 connector. Locking mechanism on both sides of the Slot 1 connector will 'click' and secure the Pentium® II/ Pentium® III processor.

To uninstall the Pentium® II/ Pentium® III processor, simply push the locking mechanism on both sides simultaneously and remove the Pentium® II/ Pentium® III processor. No tools are needed.

**CAUTION:** *When removing the Pentium processor, be extra careful so as not to damage the DIMM sockets.*

#### 2.2 Memory Installation

The **SBC8173** Industrial CPU Card supports three 168-pin DIMM (Dual In-line Memory Module) sockets for a maximum total memory of 384MB unbuffer SDRAMs or 768MB buffer SDRAMs. The memory modules can come in sizes of 16MB, 32MB, 64MB, 128MB and 256MB (for buffer type) SDRAMs.

When populating the DIMM sockets, DIMM0,1,2 or DIMM3 bank can be populated first. Refer to the following table on how to configure the memory.

**NOTE:** Use SDRAM modules with PC100 specification when running 100MHz CPU bus speed. With 66MHz CPU bus speed, SDRAM modules with PC66 or PC100 specification can be used. You have to install the Pentium® II/ Pentium® III processor before installing the memory modules.

168-pin DIMM (3.3V) Unbuffer SDRAM

**8MB SDRAM installed on Bank0**

Bank0	Bank1	Bank2	Total Memory
8MB	-----	-----	8MB
8MB	-----	8MB	16MB
8MB	-----	16MB	24MB
8MB	-----	32MB	40MB
8MB	-----	64MB	72MB
8MB	-----	128MB	132MB
8MB	8MB	8MB	24MB
8MB	8MB	16MB	32MB
8MB	8MB	32MB	48MB
8MB	8MB	64MB	80MB
8MB	8MB	128MB	144MB
8MB	16MB	8MB	32MB
8MB	16MB	16MB	40MB
8MB	16MB	32MB	56MB
8MB	16MB	64MB	88MB
8MB	16MB	128MB	152MB

Bank0	Bank1	Bank2	Total Memory
8MB	32MB	8MB	48MB
8MB	32MB	16MB	56MB
8MB	32MB	32MB	72MB
8MB	32MB	64MB	104MB
8MB	32MB	128MB	168MB
8MB	64MB	8MB	80MB
8MB	64MB	16MB	88MB
8MB	64MB	32MB	104MB
8MB	64MB	64MB	136MB
8MB	64MB	128MB	200MB
8MB	128MB	8MB	144MB
8MB	128MB	16MB	152MB
8MB	128MB	32MB	168MB
8MB	128MB	64MB	200MB
8MB	128MB	128MB	264MB

**16MB SDRAM installed on Bank0**

Bank0	Bank1	Bank2	Total Memory
16MB	-----	-----	16MB
16MB	-----	8MB	24MB
16MB	-----	16MB	32MB
16MB	-----	32MB	48MB
16MB	-----	64MB	80MB

Bank0	Bank1	Bank2	Total Memory
16MB	32MB	8MB	56MB
16MB	32MB	16MB	64MB
16MB	32MB	32MB	80MB
16MB	32MB	64MB	112MB
16MB	32MB	128MB	176MB

Continued. . . . .

Bank0	Bank1	Bank2	Total Memory
16MB	-----	128MB	144MB
16MB	8MB	8MB	32MB
16MB	8MB	16MB	40MB
16MB	8MB	32MB	56MB
16MB	8MB	64MB	88MB
16MB	8MB	128MB	152MB
16MB	16MB	8MB	40MB
16MB	16MB	16MB	48MB
16MB	16MB	32MB	64MB
16MB	16MB	64MB	96MB
16MB	16MB	128MB	160MB

Bank0	Bank1	Bank2	Total Memory
16MB	64MB	8MB	88MB
16MB	64MB	16MB	96MB
16MB	64MB	32MB	112MB
16MB	64MB	64MB	144MB
16MB	64MB	128MB	208MB
16MB	128MB	8MB	152MB
16MB	128MB	16MB	160MB
16MB	128MB	32MB	176MB
16MB	128MB	64MB	208MB
16MB	128MB	128MB	272MB

**32MB SDRAM installed on Bank0**

Bank0	Bank1	Bank2	Total Memory
32MB	-----	-----	32MB
32MB	-----	8MB	40MB
32MB	-----	16MB	48MB
32MB	-----	32MB	64MB
32MB	-----	64MB	96MB
32MB	-----	128MB	160MB
32MB	8MB	8MB	48MB
32MB	8MB	16MB	56MB
32MB	8MB	32MB	72MB
32MB	8MB	64MB	104MB
32MB	8MB	128MB	168MB
32MB	16MB	8MB	52MB
32MB	16MB	16MB	64MB
32MB	16MB	32MB	80MB
32MB	16MB	64MB	112MB
32MB	16MB	128MB	176MB

Bank0	Bank1	Bank2	Total Memory
32MB	32MB	8MB	72MB
32MB	32MB	16MB	80MB
32MB	32MB	32MB	96MB
32MB	32MB	64MB	128MB
32MB	32MB	128MB	192MB
32MB	64MB	8MB	104MB
32MB	64MB	16MB	112MB
32MB	64MB	32MB	128MB
32MB	64MB	64MB	160MB
32MB	64MB	128MB	224MB
32MB	128MB	8MB	168MB
32MB	128MB	16MB	176MB
32MB	128MB	32MB	192MB
32MB	128MB	64MB	224MB
32MB	128MB	128MB	288MB

**64MB SDRAM installed on Bank0**

Bank0	Bank1	Bank2	Total Memory
64MB	----	----	64MB
64MB	----	8MB	72MB
64MB	----	16MB	80MB
64MB	----	32MB	96MB
64MB	----	64MB	128MB
64MB	----	128MB	192MB
64MB	8MB	8MB	80MB
64MB	8MB	16MB	88MB
64MB	8MB	32MB	104MB
64MB	8MB	64MB	136MB
64MB	8MB	128MB	200MB
64MB	16MB	8MB	88MB
64MB	16MB	16MB	96MB
64MB	16MB	32MB	112MB
64MB	16MB	64MB	144MB
64MB	16MB	128MB	208MB

Bank0	Bank1	Bank2	Total Memory
64MB	32MB	8MB	104MB
64MB	32MB	16MB	112MB
64MB	32MB	32MB	128MB
64MB	32MB	64MB	160MB
64MB	32MB	128MB	224MB
64MB	64MB	8MB	136MB
64MB	64MB	16MB	144MB
64MB	64MB	32MB	160MB
64MB	64MB	64MB	192MB
64MB	64MB	128MB	256MB
64MB	128MB	8MB	200MB
64MB	128MB	16MB	208MB
64MB	128MB	32MB	224MB
64MB	128MB	64MB	256MB
64MB	128MB	128MB	320MB

**128MB SDRAM installed on Bank0**

Bank0	Bank1	Bank2	Total Memory
128MB	----	----	128MB
128MB	----	8MB	156MB
128MB	----	16MB	144MB
128MB	----	32MB	160MB
128MB	----	64MB	192MB
128MB	----	128MB	256MB
128MB	8MB	8MB	144MB
128MB	8MB	16MB	152MB
128MB	8MB	32MB	168MB
128MB	8MB	64MB	200MB
128MB	8MB	128MB	264MB

Bank0	Bank1	Bank2	Total Memory
128MB	32MB	8MB	168MB
128MB	32MB	16MB	176MB
128MB	32MB	32MB	192MB
128MB	32MB	64MB	224MB
128MB	32MB	128MB	288MB
128MB	64MB	8MB	200MB
128MB	64MB	16MB	208MB
128MB	64MB	32MB	224MB
128MB	64MB	64MB	256MB
128MB	64MB	128MB	320MB
128MB	128MB	8MB	264MB

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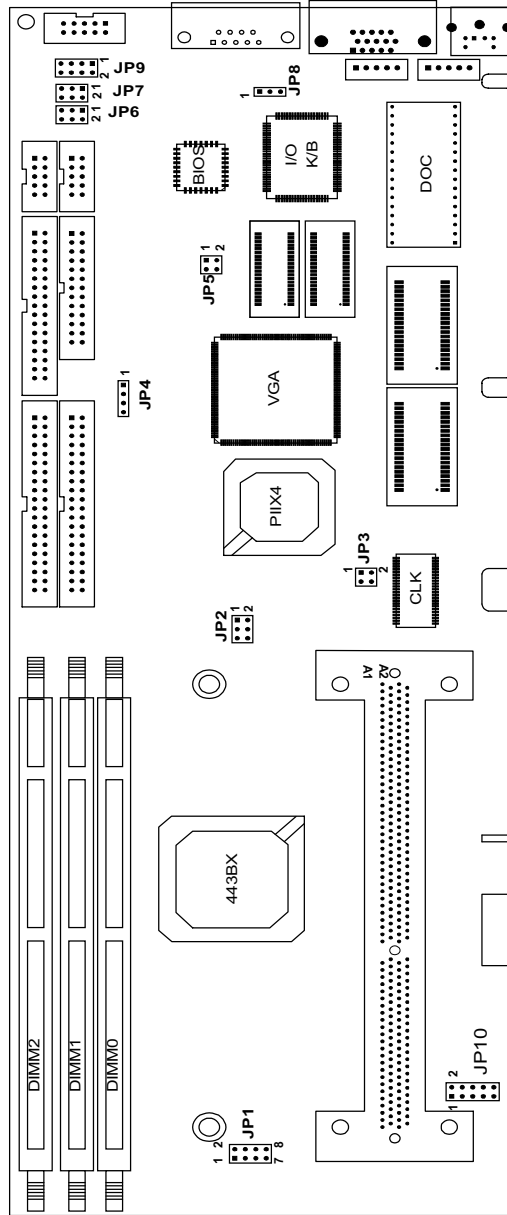
Bank0	Bank1	Bank2	Total Memory	Bank0	Bank1	Bank2	Total Memory
128MB	16MB	8MB	152MB	128MB	128MB	16MB	272MB
128MB	16MB	16MB	160MB	128MB	128MB	32MB	288MB
128MB	16MB	32MB	176MB	128MB	128MB	64MB	320MB
128MB	16MB	64MB	208MB	128MB	128MB	128MB	384MB
128MB	16MB	128MB	272MB				

## 2.3 Jumpers

The jumpers on the **SBC8173** allow you to configure your CPU card according to the needs of your applications. If you have doubts about the best jumper configuration for your needs, contact your dealer or sales representative. The following table lists the connectors on **SBC8173** and their respective functions.

Jumper	Default Setting	Jumper Setting
<b>JP1</b>	CPU Frequency Selector	
<b>JP2</b>	AT or ATX Power Supply Selector: AT	Short 3-5, 4-6
<b>JP3</b>	Reserved	Short 1-2
<b>JP4</b>	Battery and Clear CMOS Jumper: Internal Battery	Short 2-3
<b>JP5</b>	DiskOnChip BIOS Expansion Address Select: D0000-D1FFF	Short 1-2, 3-4
<b>JP6</b>	RS232/422/485 (COM2) Selection: RS-232	Short 3-5, 4-6
<b>JP7</b>	RS232/422/485 (COM2) Selection: RS-232	Short 3-5, 4-6
<b>JP9</b>	RS232/422/485 (COM2) Selection: RS-232	Short 1-2

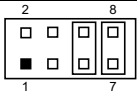
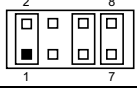
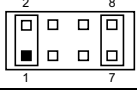
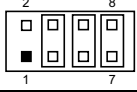
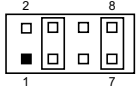
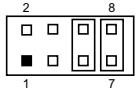
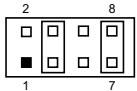
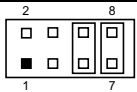
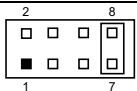
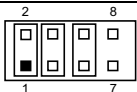

**NOTE:** Jumpers **JP8** (Short 1-2 default) and **JP10** (All open default) are for manufacturer testing use only.



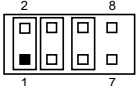
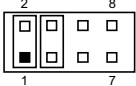
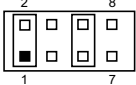
SBC8173 Jumper Locations

### 2.3.1 CPU Frequency Selector: JP1

The table below shows the correct setting to match the CPU frequency.

CPU Type	CPU Frequency	JP1 Setting
<b>Deschutes 66MHz Host Clock CPU</b>	5x 66.6MHz 333MHz	
	3 x 100MHz 300MHz	
<b>PII Deschutes 100MHz Host Clock CPU</b>	3.5 x 100MHz 350MHz	
	4 x 100MHz 400MHz	
	4.5 x 100MHz 450MHz	
	5 x 100MHz 500MHz	
	4.5 x 100MHz 450MHz	
<b>PIII Katmai 100MHz Host Clock CPU</b>	5.0 x 100MHz 500MHz	
	5.5 x 100MHz 550MHz	
	6.0 x 100MHz 600MHz	
	6.0 x 100MHz 600MHz	

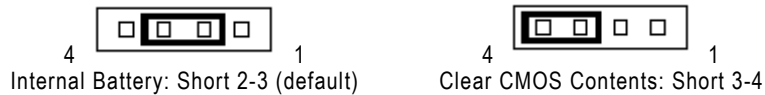
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CPU Type	CPU Frequency	JP1 Setting
PIII Coppermine 100MHz Host Clock CPU	6.0 x 100MHz 600E	
	6.5 x 100MHz 650E	
	7.0 x 100MHz 700E	

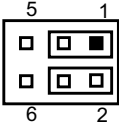
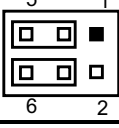
**NOTE:** Most CPUs currently out on the market have locked CPU frequency settings. When using such type of CPUs, you may ignore and skip configuring JP1.

### 2.3.2 Battery and Clear CMOS Jumper: JP4

This 4-pin connector allows the user to connect an external battery to maintain the information stored in the CMOS RAM in case the built-in battery malfunctions.



### 2.3.3 AT or ATX Power Supply Selector: JP2

JP2	Setting	Function
	Short 1-3, 2-4	ATX Power
	Short 3-5, 4-6	AT Power (default)

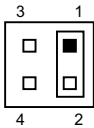
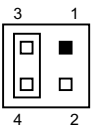
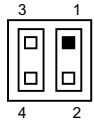
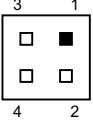
**NOTE:** When JP2 is configured for ATX power supply, your system must have a special backplane that supports an ATX power supply.

For **Rev. A2 PCB**: Set JP2 to **Short 1-3** only when using an ATX power supply. (more)

When using an ATX power supply on the **Rev. A2 PCB**, the system power is ON when 5V<sub>SB</sub> is available.

For **Rev. A3 PCB and later**, the system power enters the standby mode (5V<sub>SB</sub>) when system is shut down. Toggling the switch (**Short 4-5 of CN14**) starts up the system. See Section 2.4.8 for pin assignments of CN14.

### 2.3.4 DiskOnChip™ BIOS Expansion Address Select: JP5

JP5	Address	JP5	Address
	D6000-D7FFF		D4000-D5FFF
	D0000-D1FFF (default)		DC000-DDFFF

### 2.3.5 RS232/422/485 (COM2) Selection: JP6, JP7, JP9

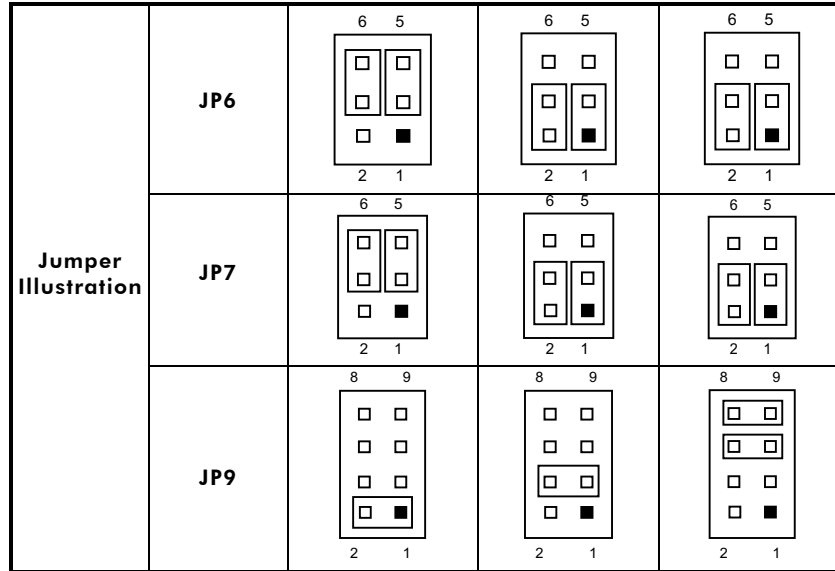
*COM1 is fixed for RS-232 use only.*

*COM2 is selectable for RS232, RS-422 and RS-485.*

*The following table describes the jumper settings for this connector.*

Jumpers	COM2 Function		
	RS-232	RS-422	RS-485
<b>JP6</b>	Short 3-5, 4-6	Short 1-3, 2-4	Short 1-3, 2-4
<b>JP7</b>	Short 3-5, 4-6	Short 1-3, 2-4	Short 1-3, 2-4
<b>JP9</b>	Short 1-2	Short 3-4	Short 5-6, 7-8

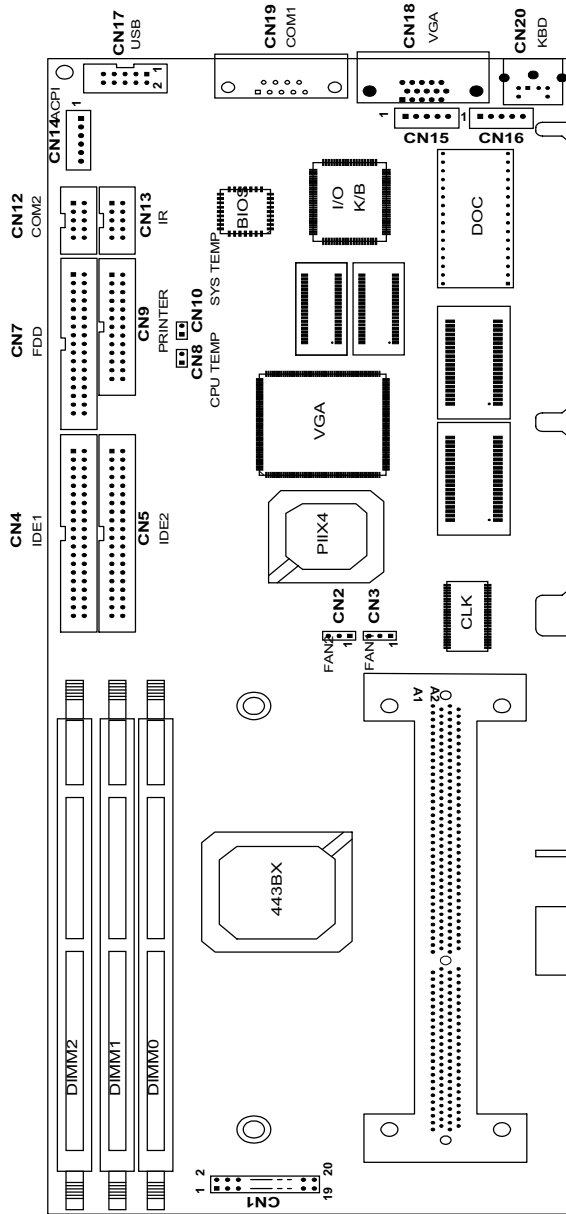
Continued . . . . .



## 2.4 Connectors

The connectors on the **SBC8173** allow you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on **SBC8173** and their respective functions.

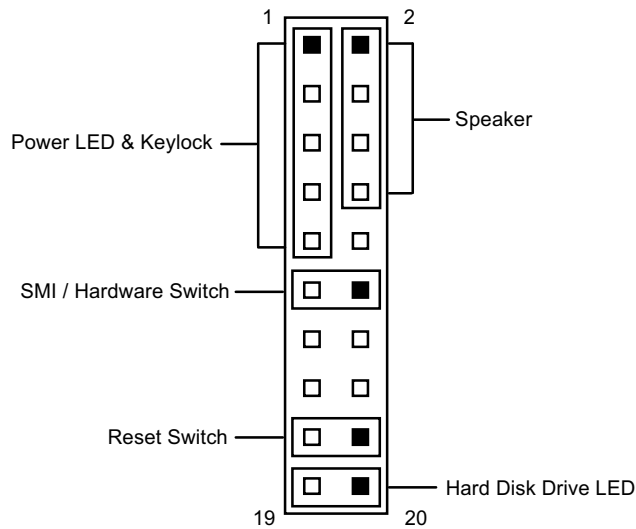
<b>Connectors</b>	<b>Label</b>	<b>Connectors</b>	<b>Label</b>
<b>Front Bezel Connector</b>	CN1	<b>IrDA Connector</b>	CN13
<b>Fan2 Connector</b>	CN2	<b>External ATX Power</b>	CN14
<b>Fan1 Connector</b>	CN3	<b>Internal Keyboard</b>	CN15
<b>EIDE Connectors</b>	CN4, CN5	<b>Internal PS/2 Mouse Connector</b>	CN16
<b>Floppy Drive Connector</b>	CN7	<b>USB Connectors</b>	CN17
<b>Thermistor connector for CPU temperature</b>	CN8	<b>VGA CRT Connector</b>	CN18
<b>Parallel Port Connector</b>	CN9	<b>COM1 Serial Port</b>	CN19
<b>Thermistor connector for System temperature</b>	CN10	<b>External PS/2 Keyboard/Mouse Connector</b>	CN20
<b>COM2 Serial Port</b>	CN12		



SBC8173 Connector Locations

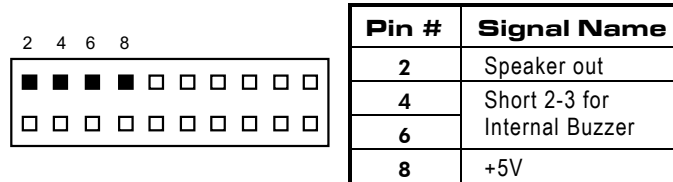
### 2.4.1 Front Bezel Connector: CN1

The front bezel of the case has a control panel that provides light indication of the computer activities and switches to change the computer status. **CN1** is a 20-pin header that provides interfaces for the following functions.



#### Speaker: Pins 2, 4, 6, 8

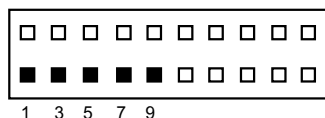
This connector provides an interface to a speaker for audio tone generation. An 8-ohm speaker is recommended.





**Power LED and Keylock: Pins 1, 3, 5, 7, 9**

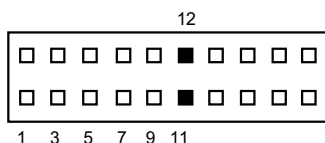
The power LED indicates the status of the main power switch. The keylock switch, when closed, will disable the keyboard function.



Pin #	Signal Name
1	Power LED (+)
3	No connector
5	Ground
7	Keylock
9	Ground

**SMI/Hardware Switch: Pins 11 and 12**

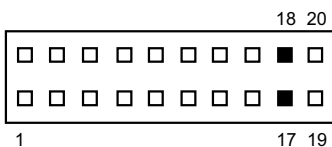
This connector supports the "Green Switch" from the control panel, which, when pressed, will force the system into the power-saving mode immediately.



Pin #	Signal Name
11	Ground
12	Sleep

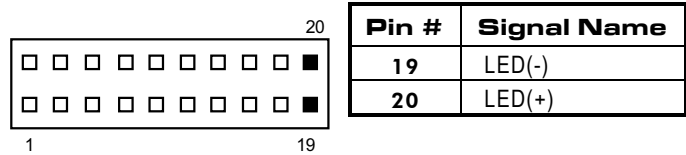
**Reset Switch: Pins 17 and 18**

The reset switch allows the user to reset the system without turning the main power switch OFF and then ON. Orientation is not required when making a connection to this header.



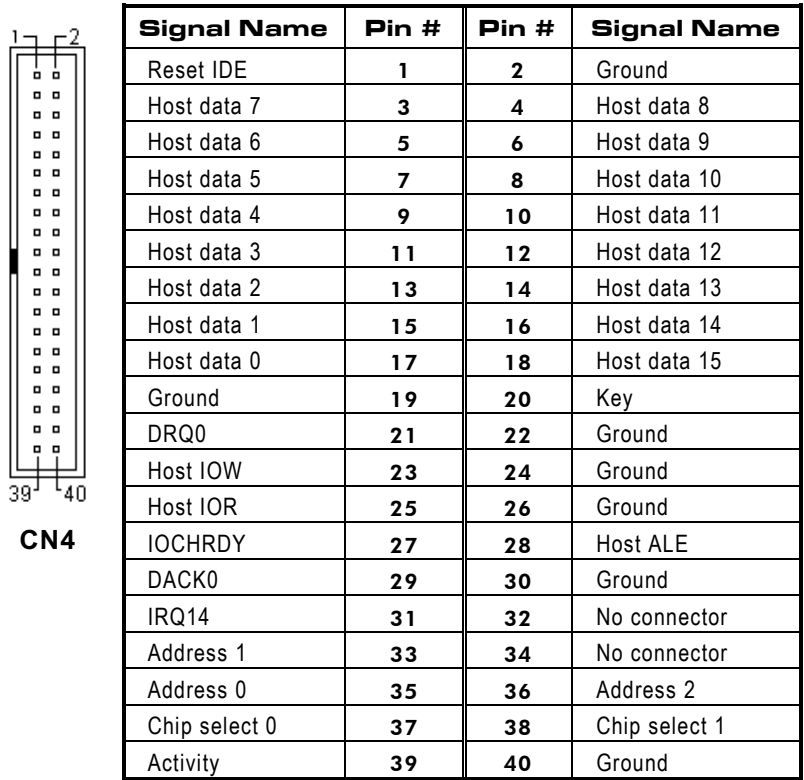
**Hard Disk Drive LED Connector: Pins 19 and 20**

This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

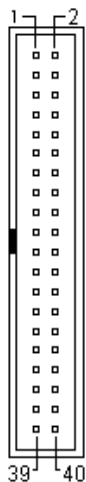


**2.4.2 EIDE Connectors: CN4, CN5**

**CN4: Primary IDE Connector**



**CN5: Secondary IDE Connector**

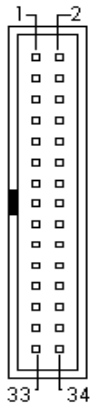


**CN5**

Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	Key
DRQ1	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK1	29	30	Ground
IRQ15	31	32	No connector
Address 1	33	34	No connector
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground

### 2.4.3 Floppy Drive Connector: CN7

CN7 is a 34-pin header and supports disk drives of up to 2.88MB.

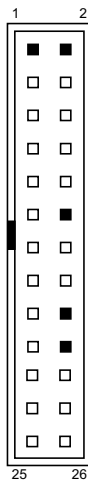


**CN7**

Signal Name	Pin #	Pin #	Signal Name
Ground	1	2	RM/LC
Ground	3	4	No connector
Ground	5	6	No connector
Ground	7	8	Index
Ground	9	10	Motor enable 0
Ground	11	12	Drive select 1
Ground	13	14	Drive select 0
Ground	15	16	Motor enable 1
Ground	17	18	Direction
Ground	19	20	Step
Ground	21	22	Write data
Ground	23	24	Write gate
Ground	25	26	Track 00
Ground	27	28	Write protect
Ground	29	30	Read data
Ground	31	32	Side 1 select
Ground	33	34	Diskette change

### 2.4.4 Parallel Port Connector: CN9

The following table describes the pin out assignments of this connector.



**CN9**

Signal Name	Pin #	Pin #	Signal Name
Line printer strobe	1	2	AutoFeed
PD0, parallel data 0	3	4	Error
PD1, parallel data 1	5	6	Initialize
PD2, parallel data 2	7	8	Select
PD3, parallel data 3	9	10	Ground
PD4, parallel data 4	11	12	Ground
PD5, parallel data 5	13	14	Ground
PD6, parallel data 6	15	16	Ground
PD7, parallel data 7	17	18	Ground
ACK, acknowledge	19	20	Ground
Busy	21	22	Ground
Paper empty	23	24	Ground
Select	25	26	Ground

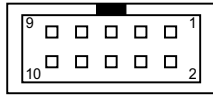
### 2.4.5 COM1 Serial Port: CN19

**CN19**, a DB-9 connector, is an onboard serial port of the **SBC8173**. The following table shows the pin assignments of this connector.

Pin #	Signal Name
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator

### 2.4.6 COM2 Serial Port: CN12

**CN12**, a 10-pin header connector, is the onboard COM2 serial port of the **SBC8173**. The following table shows its pin assignments.

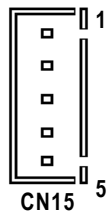


**CN12**

Pin #	Signal Name		
	RS-232	R2-422	RS-485
1	DCD	TX-	DATA-
2	DSR	No connector	No connector
3	RX	TX+	DATA+
4	RTS	No connector	No connector
5	TX	RX+	No connector
6	CTS	No connector	No connector
7	DTR	RX	No connector
8	RI	No connector	No connector
9	GND	GND	GND
10	No connector	No connector	No connector

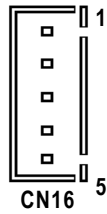
### 2.4.7 Internal Keyboard Connector: CN15

#### Internal Mouse Connector: CN16



**CN15**

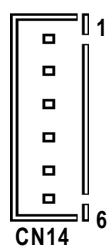
Pin #	Signal Name
1	Keyboard clock
2	Keyboard data
3	PG
4	GND
5	Vcc



**CN16**

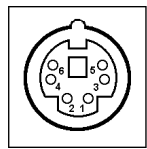
Pin #	Signal Name
1	Mouse clock
2	Mouse data
3	PG
4	GND
5	Vcc

### 2.4.8 External ATX Power Connector: CN14



Pin #	Signal Name
1	SMI
2	GND
3	ATX Power Button
4	GND
5	PS-ON (soft ON/OFF); to ATX power supply
6	5V SB (standby +5V); from ATX power supply

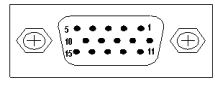
### 2.4.9 External PS/2 Keyboard and Mouse Connector: CN20



Pin #	Signal Name
1	Keyboard data
2	Mouse clock
3	GND
4	5V
5	Keyboard clock
6	Mouse data

### 2.4.10 VGA CRT Connector: CN18

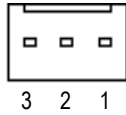
The pin assignments of **CN18** VGA CRT connector are as follows:



Signal Name	Pin	Pin	Signal Name
Red	1	2	Green
Blue	3	4	No connector
GND	5	6	GND
GND	7	8	GND
No connector	9	10	GND
No connector	11	12	No connector
HSYNC	13	14	VSYNC
No connector	15		

### 2.4.11 Fan1 Fan Power Connector: CN3

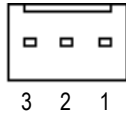
**CN3** is a 3-pin header for the CPU fan. The fan must be a 12V fan.



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation

### 2.4.12 Fan2 Fan Power Connector: CN2

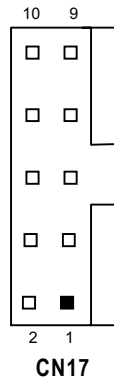
**CN2** is a 3-pin header for the chassis fan. The fan must be a 12V fan.



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation

### 2.4.13 USB Connector: CN17

The following table shows the pin outs of the USB connector.

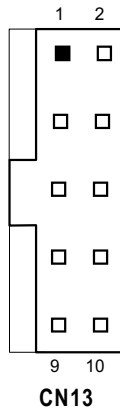


CN17 Pin #	Signal Name
1, 2	USB Vcc
3	USB0-
4	USB1-
5	USB0+
6	USB1+
7, 8	USBGND
9, 10	Reserved



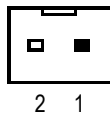
### 2.4.14 IrDA Connector: CN13

This connector is used for an IrDA connection for wireless communication.



Pin #	Signal Name
1	+5V
2	No connector
3	Flr RX
4	Clr RX
5	Ir RX
6	5VSB
7	GND
8	No connector
9	Ir TX
10	No connector

### 2.4.15 Thermistor Connectors: CN8, CN10



Pin1: GND  
Pin2: Thermistor

Connector	Function
CN8	Thermistor connector for CPU temperature
CN10	Thermistor connector for system temperature

**NOTE:** The SBC8173 can use any thermistor with  $10k\Omega \pm 2.5\%$  and  $B(25/85)$  value equal to  $3435k \pm 2\%$ .

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## **Chapter 3**

### **VGA Driver Installation**

This chapter describes the VGA driver installation procedure for the onboard Cirrus Logic GD5446. This chapter includes Cirrus Logic GD5446 driver installation procedures for Windows 95, Windows 98, and Windows NT.

#### **3.1 VGA Drivers**

The VGA interface for **SBC8173** supports CRT VGA display.

Four Driver Utility Diskettes are bundled with this CPU card for installation of drivers to different operating systems.

-  Utilities Disk#1 ..... DOS Driver V1.31
-  Utilities Disk#2 ..... Win95 V1.40  
Winnt3.5 V1.40  
Winnt4.0 V1.40
-  Utilities Disk#3 ..... Windows 3.1 V1.31
-  Utilities Disk#4 ..... OS/2 Warp V1.40

Before changing any setup for VGA and system BIOS, install the utility disk first and then create a sub-directory on your hard disk.

## **3.2 VGA Driver Installation for PCI**

### **3.2.1 DOS Operating System**

Under DOS mode, insert Utilities Disk#1 into Drive A: then run the Install.exe file. Follow the instructions of the program guiding you for the proper installation of the DOS VGA driver.

### **3.2.2 Windows 3.1**

- (a) Under the Win3.1 system, insert Utilities Disk#2 into Drive A: and proceed to the Win3.1 directory of Utilities Disk#2. This is the location of the Win3.1 VGA driver.
- (b) Run Install.exe file for instant VGA driver installation. Follow the instruction on the screen and complete the installation process.
- (c) Upon finishing the installation, shut-down the system then restart it to allow changes to take effect.

### **3.2.3 Win95**

- (a) Boot your system using Win95. Click the Start button and proceed to the Setup → Control Panel selection.
- (b) On the Control Panel window, select the Display icon and double click it. Choose the Settings tab of the Display Properties window.
- (c) In the Change Display Type window, click the Change button. This will bring up the Select Device window.
- (d) Insert Utilities Disk#3 into Drive A: . In the Select Device window, enter the source directory A:\Win95 inside Utilities Disk#3. This is the location of your Win95 VGA driver.
- (e) Press Enter and the name of the VGA driver will appear.
- (f) Click on the driver file and finish the installation process.

Once the installation completes, shut down your system and restart.

### **3.2.4 Winnt 3.5/4.0**

- (a) Insert Utilities Disk#3 into Drive A:.
- (b) Enter the Control Panel of Winnt system and proceed to the Settings window of the Display Properties.
- (c) Click on the Change Display Type and follow the instructions on the screen until you complete the installation process.

Once the installation completes, shut down your system and restart.

### **3.2.5 OS/2 Warp Operating System**

- (a) Preliminary Steps:
  - OS/2 DOS Support must be installed.
  - If you previously installed SVGA support, you must reset the system to VGA mode.
  - To restore VGA mode, use Selective Install and select VGA for Primary Display. For more information on this procedure, see the section on Changing Display Adapter Support in the OS/2 User's Guide.
- (b) Start driver installation from Utilities Disk#4.
  - (i) Open an OS/2 full screen or window session.
  - (ii) Insert Utilities Disk#4 into Drive A:.. The disk contains the OS/2 VGA driver.
  - (iii) At the OS/2 command prompt, type the following commands to copy the files into the S/2 drive:
    - type A: and press Enter to make this the default drive.
    - type A: C: and press Enter.

When the setup program is completed, shut down your system and restart.

- (iv) After restarting the system, open the OS/2 System Folder first.
- (v) Proceed by opening the OS/2 System Folder.
- (vi) Open the Display Driver Install Object and select Primary Display then choose OK.

- (vii) When the Primary Display Driver List window appears, choose “GD 5446” from the list of adapter types. Select OK to install the display driver.
- (viii) Once the installation completes, shut down your system and restart.

## Chapter 4

# System Hardware Doctor

This chapter introduces System hardware Doctor that comes with the **SBC8173**. The following sections are in conjunction with the onboard hardware monitoring IC and the functions that come with the utility.

System Hardware Doctor is a utility software that monitors the system temperature, system voltage, CPU and system fan rotational speeds. If conditions become adverse, that is,, when voltages are erratic or CPU temperature exceeds the safe limits, an alarm will be sounded; thereby preventing the system from crashing and ensuring overall stability.

### 4.1 System Hardware Doctor Installation

The following section lists the steps when installing the System Hardware Doctor into your system.

- Step 1.** Under Windows operating environment, insert your System hardware Doctor Utility Disk 1 into your floppy drive. Run SETUP.EXE and follow the instructions stated in the Setup box that follows.

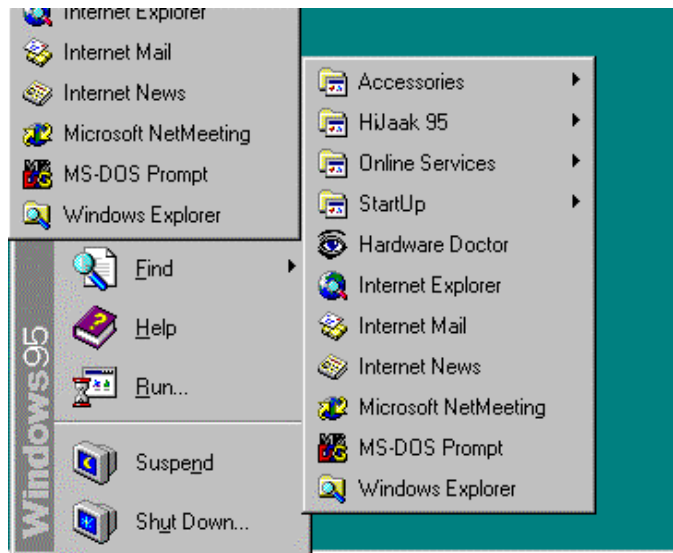


**Step 2.** By clicking on the Chang Directory box, you specify the directory where you'd like the System Hardware Doctor be installed. If you choose to install System Hardware Doctor utility to the default directory C:\Program Files\Hardware Doctor\, click on the Setup button to complete the installation process.

## 4.2 Launching the System Hardware Doctor Utility

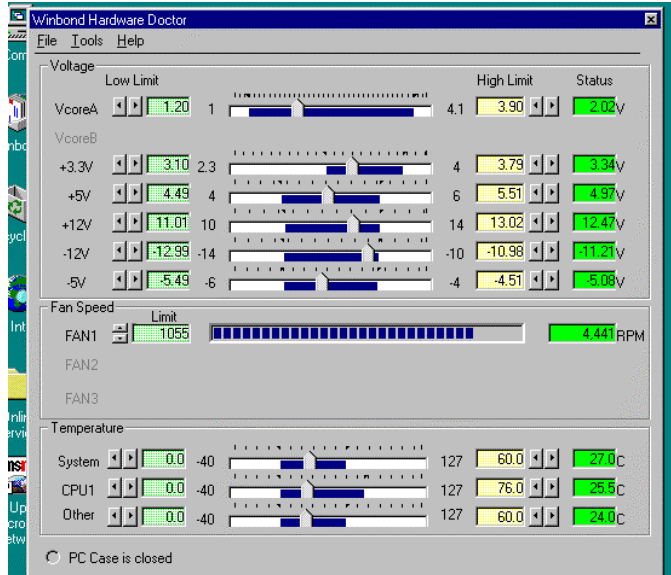
After installation is completed, you may launch the System Hardware Doctor utility by following the steps below.

**Step 1.** Press the Start button on your Windows Program Manager (located at the lower left corner of the screen). Point your cursor to Programs and a list of applications pops up as shown on the following illustration. Select Hardware Doctor.





**Step 2.** Click on Hardware Doctor and the System Hardware Doctor application window appears.



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## **Chapter 5**

### **Award BIOS Utility**

Chapter 5 describes the different settings available in the Award BIOS that comes with the **SBC8173** CPU card. Also contained here are instructions on how to set up the BIOS configuration.

#### **5.1 BIOS Introduction**

The Award BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel Pentium® II/ Pentium® III processors in a standard IBM-AT compatible I/O system. The BIOS provides critical low-level support for standard devices such as disk drives, serial and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

#### **5.2 BIOS Setup**

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn ON the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system OFF and back ON again. The following message will appear on the screen:

**Press <DEL> to Enter Setup**

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

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

<b>STANDARD CMOS SETUP</b>	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	SAVE & EXIT SETUP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Time, Date, Hard Disk Type	

The section below the setup items of the Main Menu displays the control keys for this menu. Another section located at the bottom of the Main Menu, just below the control keys section, displays information on the currently highlighted item in the list.

**NOTE:** *If you find that your computer cannot boot after making and saving system changes with Setup, the Award BIOS, via its built-in override feature, resets your system to the CMOS default settings.*

We strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability.

### 5.3 Standard CMOS Setup

“Standard CMOS Setup” allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the motherboard is already installed in a working system, you will not need to select this option. You will need to run the Standard CMOS option, however, if you change your system hardware configurations, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

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

Date (mm:dd:yy) : Wed, Mar 4 1998								
Time (hh:mm:ss) : 00 : 00 : 00								
HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master	Auto	0	0	0	0	0	0	Auto
Primary Slave	Auto	0	0	0	0	0	0	Auto
Secondary Master	Auto	0	0	0	0	0	0	Auto
Secondary Slave	Auto	0	0	0	0	0	0	Auto
Drive A	: 1.44M, 3.5in			Base Memory		: 640K		
Drive B	: None			Extended Memory		: 15360K		
Video	: EGA / VGA			Other Memory		: 384K		
Halt On	: All Errors			Total Memory		: 16384K		
ESC : Quit                    ↑ ↓ → ← : Select    Item    PU / PD / + / - : Modify								
F1 : Help                    (Shift) F2 : Change Color								

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following pages describe each item of this menu.

- **Date**

The date format is:

<b>Day</b>	The day of week, from Sun to Sat, determined by the BIOS, is read only
<b>Month</b>	The month, Jan (1) through Dec (12)
<b>Date</b>	The date, from 1 to 31 (or the maximum allowed in the month), can key in the numerical / function key
<b>Year</b>	The year, from 1994 to 2079

To set the date, highlight the "Date" field and use the PageUp/ PageDown or +/- keys to set the current time.

- **Time**

The time format is:

<b>Hour</b>	From 00 to 23
<b>Minute</b>	From 00 to 59
<b>Second</b>	From 00 to 59

To set the time, highlight the "Time" field and use the <PgUp>/ <PgDn> or +/- keys to set the current time.

- **Primary HDDs / Secondary HDDs**

The onboard PCI IDE connectors provide Primary and Secondary channels for connecting up to four IDE hard disks or other IDE devices. Each channel can support up to two hard disks; the first is the "Master" and the second is the "Slave".

To enter the specifications for a hard disk drive, you must select first a "Type". There are 45 predefined types and 4 user definable types are for Enhanced IDE BIOS. Types 1 to 45 are predefined. Type "User" is user-definable. For the Primary Master/Slave as well as Secondary Master/Slave, you can select "Auto" under the TYPE and MODE fields. This will enable auto detection of your IDE drives and CD-ROM drive during POST.

Press <PgUp>/<PgDn> to select a numbered hard disk type or type the number and press the <Enter> key. The hard disk will not work properly if you enter incorrect information for this field. 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, the utility will ask you to enter the following information:

<b>CYLS</b>	number of cylinders
<b>HEAD</b>	number of read/write heads
<b>PRECOMP</b>	write precompensation
<b>LANDZ</b>	landing zone
<b>SECTOR</b>	number of sectors
<b>SIZE</b>	Automatically adjust according to the configuration
<b>MODE (for IDE HDD only):</b>	Auto Normal (HD < 528MB) Large (for MS-DOS only) (HD > 528MB and supports Logical Block Addressing)

**NOTE:** *The specifications of your drive must match with the drive table. The hard disk will not work properly if you enter incorrect information in these fields. If your hard disk drive type is not matched or listed, you can use Type User to define your own drive type manually.*

- **Drive A / Drive B**

These fields identify the types of floppy disk drive A or drive B that has been installed in the computer. The available specifications are:

<b>360K, 5.25 in</b>	5.25 inch PC-type standard drive; 360Kb capacity
<b>1.2M, 5.25 in</b>	5.25 inch AT-type high-density drive; 1.2MB capacity
<b>720K, 3.5 in</b>	3.5 inch double-sided drive; 720Kb capacity
<b>1.44M, 3.5 in</b>	3.5 inch double-sided drive; 1.44MB capacity
<b>2.88M, 3.5 in</b>	3.5 inch double-sided drive; 2.88MB capacity

- **Video**

This field selects the type of video display card installed in your system. You can choose the following video display cards:

<b>EGA/VGA</b>	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default)
<b>CGA 40</b>	Color Graphics Adapter, power up in 40 column mode
<b>CGA 80</b>	Color Graphics Adapter, power up in 80 column mode
<b>MONO</b>	For Hercules or MDS adapters, includes high resolution monochrome adapters

● **Halt On**

This field determines whether the system will halt if an error is detected during power up.

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

## 5.4 BIOS Features Setup

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

**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
CPU L2 Cache ECC Checking	: Enabled	D0000-D3FFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	D4000-D7FFF Shadow	: Disabled
Boot Sequence	: A, C, SCSI	D8000-DBFFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	DC000-DFFF Shadow	: Disabled
Boot Up Floppy Drive	: Enabled		
Boot Up Numlock Status	: On		
Gate A20 Option	: Fast		
Typematic Rate Setting	: Disabled		
Typematic Rate (chars/Sec)	: 6		
Typematic Delay (Msec)	: 250		
Security Option	: Setup		
PCI /VGA Palette Snoop	: Disabled		
OS Select For DRAM>64MB	: Non-OS2	ESC : Quit	↑ ↓ → ← : Select Item
Report No FDD For WIN 95	: No	F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values (Shift) F2 : Color	
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	



● **Virus Warning**

This item protects the boot sector and partition table of your hard disk against accidental modifications. If an attempt is made, the BIOS will halt the system and display a warning message. If this occurs, you can either allow the operation to continue or run an anti-virus program to locate and remove the problem.

**NOTE:** *Many disk diagnostic programs, which attempt to access the boot sector table, can cause the virus warning. If you will run such a program, disable the Virus Warning feature.*

● **CPU Internal Cache / External Cache**

Cache memory is additional memory that is much faster than conventional DRAM (system memory). CPUs from 486-type on up contain internal cache memory, and most, but not all, modern PCs have additional (external) cache memory. When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. These items allow you to enable (speed up memory access) or disable the cache function. By default, these items are **Enabled**.

● **CPU L2 Cache ECC Checking**

When enabled, this allows ECC checking of the CPU's L2 cache. By default, this field is **Enabled**.

● **Quick Power On Self Test**

When enabled, this field speeds up the Power On Self Test (POST) after the system is turned ON. If it is set to **Enabled**, BIOS will skip some items.

● **Boot Sequence**

This field determines the drive that the system searches first for an operating system. The options are :A, C, SCSI

- |               |              |
|---------------|--------------|
| ■ C, A, SCSI  | ■ E, A, SCSI |
| ■ C, CDROM, A | ■ C only     |
| ■ CDROM, C, A | ■ F, A, SCSI |
| ■ D, A, SCSI  | ■ LS/ZIP, C  |
| ■ SCSI, C, A  | ■ SCSI, A, C |

The default value is **A, C, SCSI**.

- **Swap Floppy Drive**  
This allows you to determine whether to enable Swap Floppy Drive or not. When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A. By default, this field is set to **Disabled**.
- **Boot Up Floppy Seek**  
When enabled, the BIOS will seek whether or not the floppy drive installed has 40 or 80 tracks. 360K type has 40 tracks while 760K, 1.2M and 1.44M all have 80 tracks. By default, this field is set to **Enabled**.
- **Boot Up NumLock Status**  
This allows you to activate the NumLock function after you power up the system. By default, the system boots up with **NumLock ON**.
- **Boot Up System Speed**  
This has no function and selects the default system speed (**High**).
- **Gate A20 Option**  
This you to select how Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB. The default setting is **Fast**.
- **Typematic Rate Setting**  
When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to **Disabled**.
- **Typematic Rate (Chars/Sec)**  
When the typematic rate is enabled, the system registers repeated keystrokes speeds. You can select speed range from 6 to 30 characters per second. By default, this item is set to **6**.
- **Typematic Delay (Msec)**  
When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to **250msec**.
- **Security Option**  
This field allows you to limit access to the System and Setup. The default value is **Setup**. When you select **System**, the system prompts for the User Password every time you boot up. When you select **Setup**, the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.

- **PCI/VGA Palette Snoop**  
Some non-standard VGA display cards may not show colors properly. This field allows you to set whether MPEG ISA/VESA VGA Cards can work with PCI/VGA or not. When this field is enabled, a PCI/VGA can work with a MPEG ISA/VESA VGA card. When this field is disabled, a PCI/VGA cannot work with a MPEG ISA/VESA Card.
- **OS Select for DRAM > 64MB**  
This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is **Non-OS/2**.
- **Report No FDD For WIN 95**  
This option allows Windows 95 to share IRQ6 (assigned to a floppy disk drive) with other peripherals in case the drive is not existing. The default setting is **No**.
- **Video BIOS Shadow**  
This item allows you to change the Video BIOS location from ROM to RAM. Video Shadow will increase the video speed.
- **C8000 - CBFFF Shadow/DC000 - DFFFF Shadow**  
Shadowing a ROM reduces the memory available between 640KB to 1024KB. These fields determine whether optional ROM will be copied to RAM or not.

## 5.5 Chipset Features Setup

This Setup menu controls the configuration of the motherboard chipset.

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

Auto Configuration	: Enabled	CPU Warning Temperature	: 66°C/151°F
SDRAM RAS-to-CAS Delay	3	Current CPU Block Temp.	: 41°C/ 105°F
SDRAM RAS Precharge Time	3	Current CPU/Chips Temp.	: 27°C/ 80°F
SDRAM CAS Latency Time	3	Current System Temp.	: 34°C/ 93°F
DRAM Integrity Mode	Non-ECC	Current CPU Fan Speed	: 2789 RPM
System BIOS Cacheable	: Disabled	Current Chassis Fan Speed	: 2045 RPM
Video BIOS Cacheable	: Enabled	VCCP (V)	: 1.98 V VTT (V) : 1.50 V
Video RAM Cacheable	: Disabled	VCC3 (V)	: 3.45 V + 5 V : 4.99 V
8 Bit I/O Recovery Time	: 3	+12 V	: 12.46 V -12 V : -12.54V
16 Bit I/O Recovery Time	: 2	-5V	: - 5.21 V
Memory Hole At 15MB-16MB	: Disabled	ESC : Quit	↑ ↓ → ← : Select Item
Passive Release	: Disabled	F1 : Help	PU/PD/+/- : Modify
Delayed Transaction	: Disabled	F5 : Old Values	(Shift) F2 : Color
AGP Aperture Size (MB)	: 64	F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

- **Auto Configuration**

This predefines values for DRAM, cache timing according to CPU type and system clock. When enabled, the predefined items will become read-only.

- **SDRAM RAS-to-CAS Delay**

During DRAM refresh, both rows and columns are addressed separately. This field allows you to determine the timing of transition from Row Address Strobe (RAS) to Column Address Strobe (CAS). The default setting is **3**.

- **SDRAM RAS Precharge Time**

The precharge time is the number of cycles for the RAS to accumulate its charge before DRAM refreshes. If time is insufficient, refresh may be incomplete and the DRAM may fail to retain data. The default setting is **3**.

- **SDRAM CAS Latency Time**  
When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. Do not reset this field from the default value specified by the system designer. The default setting is **3**.
- **DRAM Data Integrity Mode**  
This option sets the data integrity mode of the DRAM installed in the system. The default setting is **Non-ECC**.
- **System BIOS Cacheable**  
When enabled, access to the system BIOS ROM addressed at F0000H-FFFFFH is cached, provided that the cache controller is disabled.
- **Video BIOS Cacheable**  
When enabled, access to video BIOS addressed at C0000H to C7FFFH is cached, provided that the cache controller is disabled.
- **Video RAM Cacheable**  
Selecting *Enabled* allows caching of the video BIOS ROM at C0000h to C7FFFh, resulting in better video performance. However, if any program writes to this memory area, a memory access error may result.
- **8 Bit I/O Recovery Time**  
This option specifies the length of the delay (in sysclks) inserted between consecutive 8-bit I/O operations. The settings are 1, 2, 3, 4, 5, 6, 7, or 8. The default setting is **3**.
- **16 Bit I/O Recovery Time**  
This option specifies the length of the delay (in sysclks) inserted between consecutive 16-bit I/O operations. The settings are 1, 2, 3, 4, 5, 6, 7, or 8. The default setting is **2**.
- **Memory Hole at 15MB - 16MB**  
In order to improve performance, certain space in memory can be reserved for ISA cards. This field allows you to reserve 15MB to 16MB memory address space to ISA expansion cards. This makes memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB. By default, this field is set to **Disabled**.
- **Passive Release**  
When enabled, CPU to PCI bus accesses are allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM.

- **Delayed Transaction**  
The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select *Enabled* to support compliance with PCI specification version 2.1. The default setting is **Disabled**.
- **AGP Aperture Size (MB)**  
The field sets aperture size of the graphics. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The options available are 4M, 8M, 16M, 32M, 64M, 128M and 256M. The default setting is **64M**.
- **CPU Warning Temperature**  
This field sets the threshold temperature at which an alert is sounded through the system's speaker. An onboard thermal sensor monitors the CPU temperature to prevent CPU overheating.
- **Current System/CPU Temp.**  
These read-only fields reflect the functions of the hardware thermal sensor that monitors the chip blocks and system temperatures to ensure the system is stable.
- **Current CPU Fan1/CPU Fan2 Speed**  
These optional and read-only fields show the current speeds in RPM (revolution per minute) for the CPU fan and chassis fan as monitored by the hardware monitoring IC.
- **VCCP / VTT / VCC3**  
These optional and read-only fields show the current voltages in the voltage regulators and power supply as monitored by the hardware monitoring IC.

## 5.6 Power Management Setup

The Power Management Setup allows you to save energy of your system effectively. It will shut down the hard disk and turn OFF video display after a period of inactivity.

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

Power Management	: User Define	** Reload Global Timer Events **	
PM Control by APM	: Yes	IRQ3 (3-7, 9-15), NMI	: Disabled
Video Off Method	: V/H SYNC +Blank	Primary IDE 0	: Enabled
Video Off After	: Standby	Primary IDE 1	: Enabled
MODEM Use IRQ	: 3	Secondary IDE 0	: Disabled
		Secondary IDE 1	: Disabled
Doze Mode	: Disabled	Floppy Disk	: Disabled
Standby Mode	: Disabled	Serial Port	: Enabled
Suspend Mode	: Disabled	Parallel Port	: Disabled
HDD Power Down	: Disabled		
Throttle Duty Cycle	: 62.5%		
VGA Active Monitor	: Enabled		
Soft-Off by PWR-BTTN	: Instant-Off		
Resume by Ring	: Disabled		
Resume by Alarm	: Disabled		
IRQ 8 Break Suspend	: Disabled	ESC : Quit	↑ ↓ → ← : Select Item
		F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(Shift) F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

- **Power Management**

This field allows you to select the type of power saving management modes. There are four selections for Power Management.

<b>Min. Power Saving</b>	Minimum power management
<b>Max. Power Saving</b>	Maximum power management. Only available for SL CPU
<b>User Define</b>	Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min. (Default)

**NOTE:** *In order to enable the CPU overheat protection feature, the Power Management field should not be set to Disabled.*

- **PM Control by APM**

This field allows you to use the Advanced Power Management device to enhance the Max. Power Saving mode and stop the CPU's internal clock. If the Max. Power Saving is not enabled, this will be preset to NO.

- **Video Off Method**

This field defines the Video Off features. There are three options.

<b>V/H SYNC + Blank</b>	Default setting, blank the screen and turn OFF vertical and horizontal scanning
<b>DPMS</b>	Allows the BIOS to control the video display card if it supports the DPMS feature
<b>Blank Screen</b>	This option only writes blanks to the video buffer

- **Video Off After**

As the system moves from lesser to greater power-saving modes, select the mode in which you want the monitor to blank.

- **Modem Use IRQ**

This field names the interrupt request (IRQ) line assigned to the modem (if any) on your system. Activity of the selected IRQ always awakens the system. By default, the IRQ is set to 3.

- **Doze Mode**

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

- **Standby Mode**

After the selected period of system inactivity, the fixed disk drive and the video 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.

- **Throttle Duty Cycle**

When the system enters Doze mode, the CPU clock runs only part of the time. You may select the percent of time that the clock runs.



- **VGA Active Monitor**  
When enabled, any video activity restarts the global timer for Standby mode. The default setting is **Enabled**.
- **Soft-Off by PWR-BTTN**  
This field defines the power-OFF mode when using an ATX power supply. The Instant-Off mode allows powering OFF immediately upon pressing the power button. In the Delay 4 Sec mode, the following happen:
  - The system powers OFF when the power button is pressed for more than four seconds, setting the system in a very low-power-usage state, with only enough circuitry receiving power to detect power button activity
  - Resume by Ring activity (see next field) when pressed for less than 4 seconds.The default value is **Instant-Off**.
- **Resume by Ring**  
An input signal on the serial Ring Indicator (RI) line (in other words, an incoming call on the modem) awakens the system from a soft OFF state.
- **Resume by Alarm**  
This allows a computer to be turned ON automatically through the timer set in the BIOS to make the system more schedule-configured. By default, this field is set to **Disabled**.
- **IRQ 8 Break Suspend**  
You can enable or disable the monitoring of IRQ 8 (Real Time Clock) so it does not awaken the system from Suspend mode.
- **Reload Global Timer Events**  
This section determines the reloading of the 'timers' after entering the Full On. You can enable or disable the monitoring of IRQ 8 (Real Time Clock) so it does not awaken the system from Suspend mode.

## 5.7 PNP/PCI Configuration

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

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

PNP OS Installed	: No	Used MEM base addr	: N/A
Resources Controlled by	: Manual		
Reset Configuration Data	: Disabled		
IRQ-3 assigned to	: Legacy ISA		
IRQ-4 assigned to	: Legacy ISA		
IRQ-5 assigned to	: PCI/ISA PnP		
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	: PCI/ISA PnP		
IRQ-15 assigned to	: PCI/ISA PnP		
DMA-0 assigned to	: PCI/ISA PnP		
DMA-1 assigned to	: PCI/ISA PnP	ESC : Quit	↑ ↓ ← : Select Item
DMA-3 assigned to	: PCI/ISA PnP	F1 : Help	PU/PD/+/- : Modify
DMA-5 assigned to	: PCI/ISA PnP	F5 : Old Values	(Shift) F2 : Color
DMA-6 assigned to	: PCI/ISA PnP	F6 : Load BIOS Defaults	
DMA-7 assigned to	: PCI/ISA PnP	F7 : Load Setup Defaults	

- **PNP OS Installed**

This field allows you to specify if the operating system installed in your system is plug and play aware.

**NOTE:** *Operating systems such as DOS, OS/2, and Windows 3.x do not use PnP*

- **Resources Controlled by**

This PnP BIOS can configure all of the boot and compatible devices automatically. However, this capability needs you to use a PnP operating system such as Windows 95. The default value is **Manual**.

- **Reset Configuration Data**

This field allows you to determine whether to reset the configuration data or not. The default value is **Disabled**.

- **IRQ3/4/5/7/9/10/11/12/14/15, DMA0/1/3/5/6/7 assigned to**  
These fields allow you to determine the IRQ/DMA assigned to the ISA bus and is not available to any PCI slot.
- **Used MEM base addr**  
Select a base address for the memory area used by any peripheral that requires high memory. The default setting is *N/A*.

## 5.8 Load BIOS Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

**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 MANAGE	DETECTION
PNP/PCI CONFIG	LOAD BIOS Defaults (Y/N)? N
LOAD BIOS DEF	SAVING
LOAD SETUP DEFAULTS	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Load BIOS Defaults except Standard CMOS Setup	

To load BIOS defaults value to CMOS SRAM, enter “Y”. If not, enter “N”.

## 5.9 Load Setup Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

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 DETECTION	
PNP/PCI CONFIGURATION SETUP	
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
<b>LOAD SETUP DEFAULTS</b>	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Load BIOS Defaults except Standard CMOS Setup	

To load SETUP defaults value to CMOS SRAM, enter “Y”. If not, enter “N”.

## 5.10 Integrated Peripherals

This option sets your hard disk configuration, mode and port.

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

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

- **IDE HDD Block Mode**  
This field allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive.
- **IDE Primary/Secondary Master/Slave PIO**  
These fields allow your system hard disk controller to work faster. Rather than have the BIOS issue a series of commands that transfer to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly. The 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.
- **IDE Primary/Secondary Master/Slave UDMA**  
These fields allow your system to improve disk I/O throughput to 33Mb/sec with the Ultra DMA/33 feature. The options are *Auto* and *Disabled*.

- **On-Chip Primary/Secondary PCI IDE**  
The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.
- **USB Keyboard Support**  
Select *Enabled* if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.
- **Init AGP Display First**  
This field allows the system to initialize first the VGA card in the AGP slot on the motherboard when system is turned ON.
- **Onboard FDC Controller**  
Select *Enabled* if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install an add-in FDC or the system has no floppy drive, select *Disabled* in this field. This option allows you to select the onboard FDD port.
- **Onboard Serial/Parallel Port**  
These fields allow you to select the onboard serial and parallel ports and their addresses. The default values for these ports are:

Serial Port 1	3F8/IRQ4
Serial Port 2	2F8/IRQ3
Parallel Port	378H/IRQ7

- **UART Mode Select**  
This field determines the UART mode in your computer. The settings are *Normal*, *IrDA* and *ASKIR*. The default value is **Normal**.
- **Parallel Port Mode**  
This field allows you to determine parallel port mode function.

SPP	Normal Parallel Port
EPP	Enhanced Capabilities Port
ECP	Extended Capabilities Port

## 5.11 Supervisor / User Password

These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The Enter Password: message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

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

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

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	<b>SUPERVISOR PASSWORD</b>
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT	DETECTION
PNP/PCI CONFIGURATION	EL FORMAT
LOAD BIOS DEFAULTS	ETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Change / Set / Disable Password	

## 5.12 IDE HDD Auto Detection

This option detects the parameters of an IDE hard disk drive, and automatically enters them into the Standard CMOS Setup screen.

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

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary								
Master:								
Select Primary Master Option (N=SKIP) : N								
OPTIONS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
1 (Y)	0	0	0	0	0	0	0	NORMAL
NOTE: Some OSes (like SCO-UNIX) must use "NORMAL" for installation								
<b>ESC: SKIP</b>								

Up to four IDE drives can be detected, with parameters for each appearing in sequence inside a box. To accept the displayed entries, press the "Y" key; to skip to the next drive, press the "N" key. If you accept the values, the parameters will appear listed beside the drive letter on the screen.



### 5.13 Save & Exit Setup

This option allows you to determine whether to accept the modifications or not. If you type “Y”, you will quit the setup utility and save all changes into the CMOS memory. If you type “N”, you will return to Setup utility.

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	DETECTION
PNP/PCI CONFIGURATION	SETUP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Save Data to CMOS & Exit Setup	

## 5.14 Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing “Y” will quit the Setup utility without saving the modifications. Typing “N” will return you to Setup utility.

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	DETECTION
PNP/PCI CONFIGURATION	SETUP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Abandon all Data & Exit Setup	

## Appendix A

### Watchdog Timer

#### Using the Watchdog Function

The function of the watchdog timer is to reset the system automatically. To enable the watchdog timer and allow the system to reset, write I/O port 131H with 0EH. To disable the timer, write I/O port 130H for the system to stop the watchdog function. The timer has a tolerance of 20% for its intervals.

The following describes how the timer should be programmed.

##### Enabling Watchdog:

```
MOV    AX, 0007H (Choose the values from 0)
MOV    DX, 130H
OUT    DX, AX    :Set Timer
MOV    AL, 0EH
MOV    DX, 131H
OUT    DX, AL    :Enable Timer
```

##### Disabling Watchdog

```
MOV    DX, 130H
IN     DX
```

#### Watchdog Timer Control Table

Level	Value	Time/sec
7	7	64
6	6	32
5	5	16
4	4	8
3	3	4
2	2	2
1	1	1

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## Appendix B

### I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. There are a total of 1K port address spaces available. The following table lists the I/O port addresses used on the Industrial CPU Card.

<b>Address</b>	<b>Device Description</b>
<b>000h - 01Fh</b>	DMA Controller #1
<b>020h - 03Fh</b>	Interrupt Controller #1
<b>040h - 05Fh</b>	Timer
<b>060h - 06Fh</b>	Keyboard Controller
<b>070h - 07Fh</b>	Real Time Clock, NMI
<b>080h - 09Fh</b>	DMA Page Register
<b>0A0h - 0BFh</b>	Interrupt Controller #2
<b>0C0h - 0DFh</b>	DMA Controller #2
<b>0F0h</b>	Clear Math Coprocessor Busy Signal
<b>0F1h</b>	Reset Math Coprocessor
<b>1F0h - 1F7h</b>	IDE Interface
<b>278 - 27F</b>	Parallel Port #2(LPT2)
<b>290 - 297</b>	LM78
<b>2F8h - 2FFh</b>	Serial Port #2(COM2)
<b>2B0 - 2DF</b>	Graphics Adapter Controller
<b>378h - 3FFh</b>	Parallel Port #1(LPT1)
<b>360 - 36F</b>	Network Ports
<b>3B0 - 3BF</b>	Monochrome & Printer adapter
<b>3C0 - 3CF</b>	EGA adapter
<b>3D0 - 3DF</b>	CGA adapter
<b>3F0h - 3F7h</b>	Floppy Disk Controller
<b>3F8h - 3FFh</b>	Serial Port #1(COM1)

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

## Appendix C

### Interrupt Request Lines (IRQ)

There are a total of 15 IRQ lines available on the Industrial CPU Card. Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on the Industrial CPU Card.

<b>Level</b>	<b>Function</b>
<b>IRQ0</b>	System Timer Output
<b>IRQ1</b>	Keyboard
<b>IRQ2</b>	Interrupt Cascade
<b>IRQ3</b>	Serial Port #2
<b>IRQ4</b>	Serial Port #1
<b>IRQ5</b>	Parallel Port #2
<b>IRQ6</b>	Floppy Disk Controller
<b>IRQ7</b>	Parallel Port #1
<b>IRQ8</b>	Real Time Clock
<b>IRQ9</b>	Software Redirected to Int 0Ah
<b>IRQ10</b>	Reserved
<b>IRQ11</b>	Reserved
<b>IRQ12</b>	Reserved
<b>IRQ13</b>	80287
<b>IRQ14</b>	Primary IDE
<b>IRQ15</b>	Secondary IDE

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