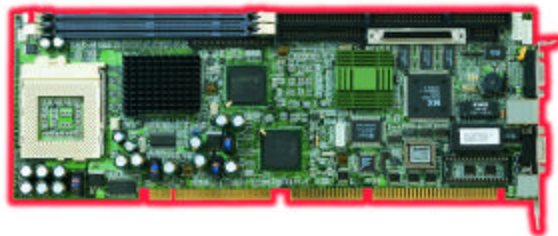


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# TigerRay Single Board Computer

## User's Guide



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#095-00010-00 Rev. A

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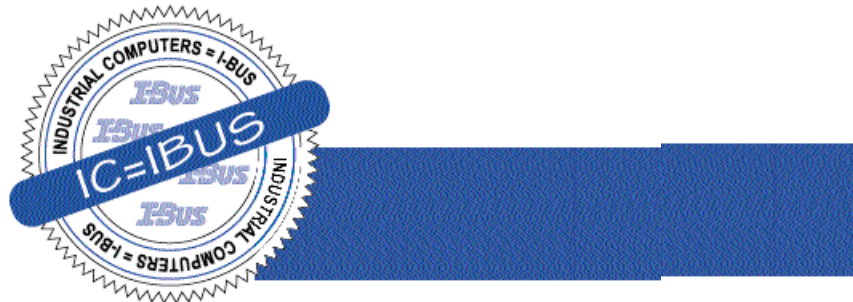
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## ***Chapter 1 - Introduction***

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Welcome to the I-Bus family of fault resilient computers. This manual provides information needed to set up and maintain the TigerRay

The TigerRay is a new generation of proven technologies. It is built with a high performance, cost effective Celeron socket 370 CPU, up to 500 MHz, high performance PCI Bus and I/O's, huge memory support (256MB), and complied with the PICMG standard. This is the most versatile socket 370 SBC designed with all advanced features on board. It is excellent to the system integrators, VARs, or turn-key vendor demanding high performance computing, high performance I/O, high data availability, and great system expandability.

The TigerRay can run with Intel Celeron Socket 370 processor up to 366 MHz, and 500+ MHz in the near future, memory support up to 256 MB SDRAM. This generates great computing power. The on-board enhanced PCI IDE interface can support up to mode 4 PIO and Mode 2 DMA master also support the Ultra DMA 33. The on-board Initio 1060P is the high performance PCI SCSI master with ultra wide and ultra 2 SCSI interfaces, providing very high value at a reasonable cost.

The Ultra 2 SCSI supports 80MB/s data rate. It is the highest rate at present for the most mass storage access. The new C&T 69000 VGA Controller with 2MB embedded SDRAM could supports both CRT and Panel displays. The MXIC's single chip Ethernet Controller supports 10 Base T/ 100 Base TX, full Duplex. To support this high performance on-board PCI Device, the Intel 21152 PCI Bridge Controller is used. The TigerRay is an all-in-one, single board server.

The Winbond 83977 super I/O chip integrates the floppy controller, two serial ports, one parallel port, and keyboard/mouse controller. The two on-chip UARTs are compatible with NS 16C550, and the parallel port support EPP/ECP.

The PICMG standard enables the TigerRay to work with the legacy ISA as well as the brand new PCI slots. The system monitoring features, like the voltage levels, the FAN speeds, and the temperatures can be shown on screen, then monitored by the system manager. The flash ROM is used to make the BIOS update easier, the additional keyboard connector is reserved for connecting to the keyboard connector on the back plane. The Universal Serial Bus (USB) is also supported for flexible connections. The high precision real time clock/calendar is built in for accurate scheduling and the watch dog timer is also the standard feature.

## ***Chapter 1 - Introduction***

---

### ***How to Use This Manual***

The manual describes how to arrange various settings on the Celeron/Socket 370 CPU board to meet your requirements.

- ***Chapter 1 Introduction***

Introduces this manual and gives an overview of the product's specifications. It also tells what is included in the product package.

- ***Chapter 2 Switches and Connectors***

Discusses the definitions and positions of Switches and Connectors that may be configured and set up per requirement.

- ***Chapter 3 Capability Expanding***

Describes how to change or expand the CPU Board by changing the system memory, cache memory, and to get more power out from the CPU board.

- ***Chapter 4 Award BIOS Setup***

Describes how to use the advanced PCI/Green BIOS to control almost every feature of the TigerRay, including the on-board SCSI and watchdog timer.

- ***Appendix 1 Watch Dog Timer***

Describes how to set up the Watch Dog Timer (WDT) and gives programming examples.

- ***Appendix 2 Memory Mapping***

Describes the memory mapping of the TigerRay for reference in add-on card or programming.

- ***Appendix 3 Glossary of Terms***

- ***Appendix 4 Limited Warranty***

- ***Appendix 5 FCC Information***

- ***Appendix 6 Declaration of Conformity***

---

## **Chapter 1 - Introduction**

### ***What is included with this package***

In addition to this manual, the TigerRay package includes:

- TigerRay single board computer x 1
- SIO+PIO cable x 1
- FDC cable x 1
- IDE cable x 1
- 5 pin to 5 pin keyboard cable x 1 (for DIN keyboard connector)
- Wide SCSI cable x 1
- Initio SCSI Drivers Diskettes x 3
- VGA Driver diskette x 1
- LAN Driver diskette x 1
- System Monitor Driver diskette x 2

If any of these items is missed or damaged, please contact I-Bus technical support.

### ***Preparing the System***

#### ***Unpacking the TigerRay Single Board Computer***

- Unpack the backplane at a static-free workstation while observing proper Electrostatic Discharge (ESD) practices.
- I-Bus reserves the right to refuse warranty service on units not properly packaged to protect against ESD damage.

## ***Chapter 1 - Introduction***

---

### ***Specifications***

#### ***· System architecture***

Intel Brand New Socket 370 Pentium II CPU architecture,  
66/100 MHz external BUS  
All in one with VGA, 100 Base TX, Ultra 2 SCSI.  
PCI V2.1 complied  
PICMG 2.0 complied  
Full size SBC with ISA/PCI Gold finger

#### ***· CPU Support***

Brand New Socket 370 CPU Bus running at 66/100 MHz  
Intel Pentium II for Socket 370 up to 366 MHz/66, or 450 MHz/100

#### ***· Cache Memory***

128KB/256KB Level 2 cache (pipeline burst SRAM) on CPU

#### ***· Main Memory***

Support SDRAM or EDO RAM  
64Mb SDRAM support  
8MB up to 512MB (Max.)  
168pin DIMM socket x 2  
ECC support (single bit error correction/ multiple bit errors reporting)

#### ***· BIOS***

Award System BIOS with PC'97 support  
2M bit flash ROM  
C&T VGA BIOS  
Initio SCSI BIOS

#### ***· Chipset***

Intel 82440BX PCI set  
2nd generation P II Chip Set with MMX support

## Chapter 1 - Introduction

---

Fully comply with PC'97  
PCI V2.1 Concurrent PCI  
Optimized SDRAM support

### · **VGA**

C&T 69000 VGA controller for AGP interface  
2MB SDRAM embedded.  
CRT & Panel support.  
Panel: Support Single-Panel, Single-Driver(SS), Dual-Panel, Dual-Driver(DD), STN, TFT/MIM LCD and EL panel  
Drivers Support: window 95/98, Window NT 4.0/5.0

Max. Res.	Color	Refresh rate
800 x 600	True color	85Hz
1024x768	64K color	85Hz
1280x1024	256 color	60Hz

### · **SCSI**

Initio 1060P SCSI Controller  
Brand New Ultra 2 SCSI support.  
80MB/S (max.) transfer rate, 12 meter cable support  
Backward compatible with Ultra Wide SCSI, SCSI II, etc.  
Driver support windows95/98, windows NT 4.0/5.0, Netware, SCO Open Server 5.0

### · **LAN**

MXIC MX98725 Single Chip Ethernet Controller  
10 Base T/100 Base TX support, full Duplex.  
Complied with PCI V2.1, IEEE 802.3, IEEE 802.3U  
Driver support:  
Dos/Windows, Netware, Windows95/98, Windows NT 4.0/5.0, SCO Open Server 5.0

## **Chapter 1 - Introduction**

---

### **· On-board I/O**

Winbond 83977 Super I/O on-board

SIOx2, with 2x16C550 UARTs, 9 pin D-type x 1, 10 Pin connector x 1

PIOx1, Bi-directional, EPP/ECP support, 20 pin x 1

Floppy Disk controller: 5 1/4" 360K/1.2MB, 3 1/2" 720K/1.2MB/1.44MB/2.88MB support, 26 pin x 1

PCI IDE Hard Disk Interfaces: Support up to four enhanced IDE devices up to mode 4 PIO and mode 2 DMAMaster, also support Ultra DMA 33.

On chip Keyboard, mouse controller

PS/2 Keyboard, 6 pin mini DIN x 1 ,5 pin header x 1 for 635, 635V, 635VS

(Optional: PS/2, 6 pin min DIN x1 for keyboard/mouse only for 635A, 635VL, and 635SL)

PS/2 mouse, 6 pin mini DIN x 1for 635, 635V, 635VS

on-board buzzer x 1

on-board USB port x 2 with 6 pin header x1

on-board 2 pin header for reset sw, 4 pin for speaker, 5 pin for keylock

5 pin header (keyboard)

### **· On-board RTC**

High precision clock/calendar with battery back up

### **· On-board solid state Disk**

Socket reserved for M-systems' DiskOnChip (DOC)

Memory size up to 72MB single chip

Drivers support DOS, Windows, Win 95 and NT

### **· System monitor feature**

Four voltage values (For +5V, +12V, +3.3V and Vcore)

One Fan speed (For CPU)

One temperature

All values shown on screen (under Windows95, Windows NT 4.0)

## **Chapter 1 - Introduction**

---

- **ISA MAX Support**

Maximize ISA signals to support ISA cards up to 20

- **Watchdog timer**

1, 2, 4, 8, 16, 32, 64 second time-out interval

- **Dimensions**

338mm(D) x 122mm(W)

- **Power requirements**

+5V: 10A(Max)

+/-12V: 20mA(Max)

- **Environments**

Operating temperatures: 0°C to 60°C

Storage temperatures: -20°C to 80°C

Relative humidity: 10% to 90% (Non-condensing)

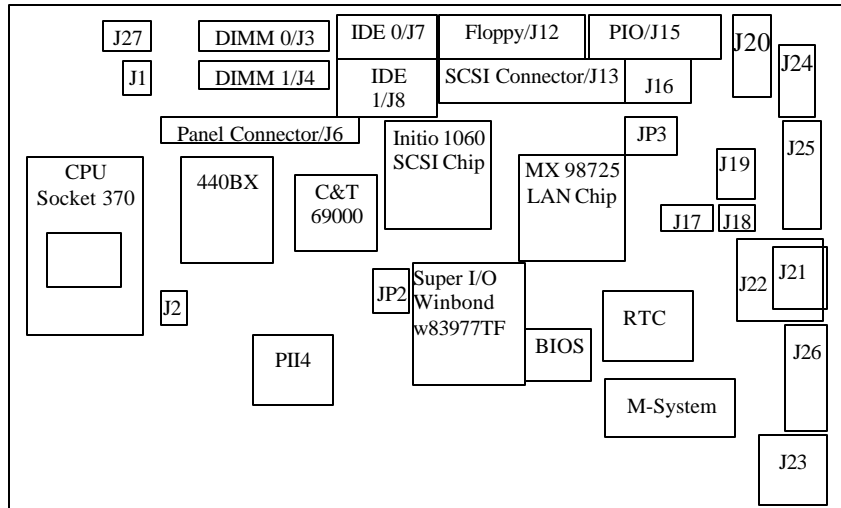
## ***Chapter 1 - Introduction***

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## Chapter 2 - Switches and Connectors

This chapter gives definitions and shows the positions of switches and connectors. Switches on the CPU board are used to select options for different functions used. The switch-on or off is to accommodate the variations of the following table (see figure 2-1 for switch positions). Factory default settings are noted with an asterisk (\*).



**Figure 2-1: Switch positions**

### Switch Setting

Pipdloc	*Enabled	Disabled
SW1: 1	OFF	ON
RTC-Clear	RTC CLR enabled	RTC CLR disabled *
SW1: 2	ON	OFF
CPU Base Clock	*66 MHz	100 MHz
SW1: 3	ON	OFF
4	ON	OFF

## Chapter 2 - Switches and Connectors

### SW2

1	1024 x 768 Dual Scan STN Color Panel	ON	ON	ON	ON
2	1280 x 1024 TFT Color Panel	OFF	ON	ON	ON
3	640 x 480 Dual Scan STN Color Panel	ON	OFF	ON	ON
4	800 x 600 Dual Scan STN Color Panel	OFF	OFF	ON	ON
5	640 x 480 Sharp TFT Color Panel	ON	ON	OFF	ON
6	640 x 480 13-bit TFT Color Panel	OFF	ON	OFF	ON
7	1024 x 768 TFT Color Panel	ON	OFF	OFF	ON
8	800 x 600 TFT Color Panel	OFF	OFF	OFF	ON
9	800 x 600 TFT Color Panel (Large BIOS only)	ON	ON	ON	OFF
10	800 x 600 TFT Color Panel (Large BIOS only)	OFF	ON	ON	OFF
11	800 x 600 Dual Scan STN Color Panel (Large BIOS only)	ON	OFF	ON	OFF
12	800 x 600 Dual Scan STN Color Panel (Large BIOS only)	OFF	OFF	ON	OFF
13	1024 x 768 TFT Color Panel (Large BIOS only)	ON	ON	OFF	OFF
14	1280 x 1024 Dual Scan STN Color Panel (Large BIOS only)	OFF	ON	OFF	OFF
15	1024 x 600 Dual Scan STN Color Panel (Large BIOS only)	ON	OFF	OFF	OFF
16	1024 x 600 TFT Color Panel (Large BIOS only)	OFF	OFF	OFF	OFF

SW3	PCR TO J6 39 Conn	M to J6 39 <sup>1</sup>
1	ON	OFF
2	OFF	ON

SW3	M TO J6 2 Conn	LP to J6 2 <sup>1</sup>
1	ON	OFF
2	OFF	ON

#### • M-SYSTEM

SW4	Disabled <sup>1</sup>	C000	C800	D000	D800
1	OFF	ON	ON	ON	ON
2	X	ON	ON	OFF	OFF
3	X	ON	OFF	ON	OFF

#### • BIOS Refresh

SW4	Enabled	Disabled <sup>1</sup>
4	ON	OFF

## Chapter 2 - Switches and Connectors

### Connectors

Connectors on the CPU Boards provide interfaces to other devices.

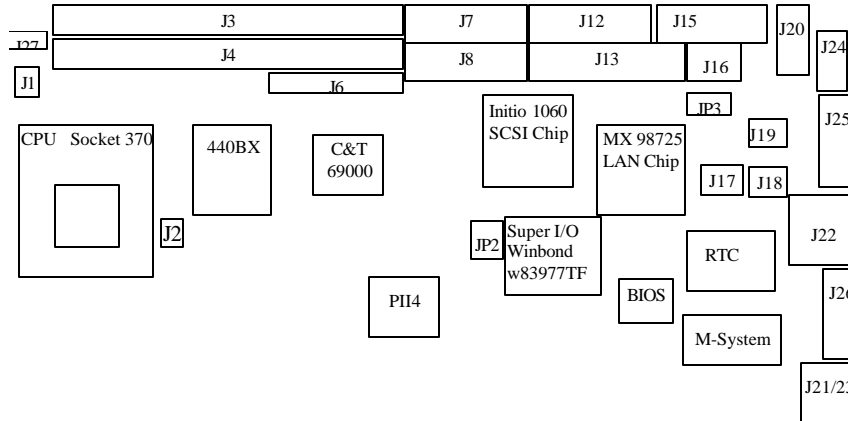


Figure 2-2: Connector Positions

### Pin Definitions of Connectors

Connector	Function	Remark
J1	CPU Temperature sensor pin	
J2	FAN Connector	
J3	DIMM0	
J4	DIMM1	
J6	Panel Connector	
J7	IDE0	
J8	IDE1	
J11	Reset	
J12	Floppy	
J13	SCSI Connector	
J15	PIO	
J16	COM2	
J17	Speaker	
J18	IDE LED	
J19	Wake-up Lan	
J20	USB	
J21	Mouse PS/2	
J22	RJ45 (Lan Connector)	
J23	Keyboard PS/2	
J24	Keyboard	
J25	CRT	
J26	COM 1	
J27	SM BUS Connector	
JP2	IR-Connector	
JP3	Key-lock	

Table 2-1: Connector Functions

## Chapter 2 - Switches and Connectors

---

- J2, CPU Fan Power Connector

PIN No.	Description
1	GND
2	+12V
3	Sense

Table 2-2: J2, CPU Fan Power Connector

- J6, PANEL Connector

PIN No.	Description	PIN No.	Description
1	ENABKL	2	+12V SAFE
3	LP	4	DE
5	SHFCLK	6	FLM
7	PO	8	VDDSAFE
9	P2	10	P1
11	P4	12	P3
13	P6	14	P5
15	P8	16	P7
17	P10	18	P9
19	P12	20	VDDSAFE
2	P14	22	P11
23	GND	24	P13
25	P16	26	P15
27	P18	28	P17
29	P20	30	ENAVEE
31	P22	32	P19
33	GND	34	P21
35	P24	36	P23
37	P26	38	P25
39	M/PCLK	40	GND
41	P28	42	P27
43	P30	44	P29
45	P32	46	P31
47	P34	48	P33
49	GND	50	P35

Table 2-3: J6, Panel Connector

## Chapter 2 - Switches and Connectors

- J7/J8, IDE Interface Connector

<b>PIN No.</b>	<b>Description</b>	<b>PIN No.</b>	<b>Description</b>
1	Reset#	2	Ground
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Ground	20	N/C
21	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOF#	26	Ground
27	IOCHRDY	28	N/C
29	DMA ACK	30	Ground
31	Interrupt	32	IOCS16#
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

Table 2-4: J7/J8, IDE Interface Connector

- J11, Reset

<b>PIN No.</b>	<b>Description</b>
1	Reset
2	Ground

Table 2-5: J11, Reset

## Chapter 2 - Switches and Connectors

---

- J12, FDC Connector

<b>PIN No.</b>	<b>Description</b>	<b>PIN No.</b>	<b>Description</b>
1	Ground	2	Density Select
3	Ground	4	N/C
5	Ground	6	N/C
7	Ground	8	Index#
9	Ground	10	Motor Enable A#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor Enable B#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	N/C	30	Read Data#
31	Ground	32	Head Side Select#
33	N/C	34	Disk Change#

Table 2-6: J12, FDC Connector

- J15, Parallel Port Connector

<b>PIN No.</b>	<b>Description</b>	<b>PIN No.</b>	<b>Description</b>
1	Strobe#	2	Data 0
3	Data 1	4	Data 2
5	Data 3	6	Data 4
7	Data 5	8	Data 6
9	Data 7	10	Acknowledge
11	Busy	12	Paper Empty
13	Printer Select	14	Auto Form Feed#
15	Error#	16	Initialize
17	Printer Select IN#	18	Ground
19	Ground	20	Ground
21	Ground	22	Ground
23	Ground	24	Ground
25	Ground	26	GND

Table 2-7: J15, Parallel Port Connector

## Chapter 2 - Switches and Connectors

- J16/J26, Serial Port Connector (D-sub 9-pin)

<b>PIN No.</b>	<b>Description</b>
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)

Table 2-8: J16/J26, Serial Port Connector (D-Sub 9-pin)

- J17, Speaker

<b>PIN No.</b>	<b>Description</b>
1	Speaker Signal
2	GND
3	GND
4	+5V

Table 2-9: J17, Speaker

- J18, IDE LED Connector

<b>PIN No.</b>	<b>Description</b>
1	+5V
2	HDD Active #

Table 2-10: J18, IDE LED Connector

- J19, Wake up (for ATX Power)

<b>PIN No.</b>	<b>Description</b>
1	5VSB
2	5VSB
3	Wake-up-
4	Button-In
5	GND

Table 2-11: J19, Wake up (for ATX Power)

## Chapter 2 - Switches and Connectors

---

- J20, USB Connector

<b>PIN No.</b>	<b>Description</b>
1	VCC
2	SBD0-
3	SBD0+
4	SBD1-
5	SBD1+
6	Ground

*Table 2-12: J20, USB Connector*

- J21, Mouse Connector

<b>PIN No.</b>	<b>Description</b>
1	Mouse Data
2	N/C
3	Ground
4	+5V
5	Mouse Clock
6	N/C

*Table 2-13: J21, Mouse Connector*

- J22, LAN Connector

<b>PIN No.</b>	<b>Description</b>
1	TD+
2	TD-
3	RD+
4	TERMPANE
5	TERMPANE
6	RD-
7	TERMPANE
8	TERMPANE
9	NC
10	NC
11	GND
12	GND

*Table 2-14: J22, LAN Connector*

## Chapter 2 - Switches and Connectors

- J23, PS/2 Keyboard/Mouse Connector

<b>PIN No.</b>	<b>Description</b>
1	Keyboard DATA
2	Mouse DATA (for 630A,630VL, 630SL)
3	Gnd
4	+5V
5	Keyboard CLK
6	NC/Mouse CLK(for 630A, 630VL, 630SL)

*Table 2-15: J23, PS/2 Keyboard/Mouse Connector*

- J24, Keyboard Connector

<b>PIN No.</b>	<b>Description</b>
1	Keyboard Clock
2	Keyboard Data
3	N/C
4	Ground
5	+5V

*Table 2-16: J24, Keyboard Connector*

- J25, CRT Connector

<b>PIN No.</b>	<b>Description</b>
1	RED
2	Green
3	Blue
4	NC
5	GND
6	GND
7	GND
8	GND
9	+5
10	GND
11	NC
12	Display Data channel data
13	Horizontal Sync
14	Vertical Sync
15	Display Data Channel CLK

*Table 2-17: J25, CRT Connector*

## Chapter 2 - Switches and Connectors

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- J27, I<sup>2</sup>C Connector

- ◆ J27: I<sup>2</sup>C connector

<b>PIN No.</b>	<b>Description</b>
1	I <sup>2</sup> C clock

Table 2-18 J27, I<sup>2</sup>C Connector

- JP3, Keylock

<b>PIN No.</b>	<b>Description</b>
1	+5V
2	N/C
3	Ground
4	Keylock
5	Ground

Table 2-19: JP3, Keylock

---

## Chapter 3 - Capability Expanding

This chapter explains how to the expand capability of the CPU board in such aspects as system memory, cache memory, and CPU.

### *System Memory*

The system memory is provided by DIMM's (Dual In-line Memory Modules) on the CPU board. The CPU board contains two memory banks: Bank 0, 1, corresponds to connector DIMM0 and DIMM1.

The table below shows possible DIMM configurations for the memory banks and the figure helps you correctly install the DIMM modules. The TigerRay series supports both EDO memory and SDRAM.

<b>DIMM 0</b>	<b>DIMM 1</b>	<b>Total Memory</b>
16 MB	Empty	16 MB
16 MB	16 MB	32 MB
32 MB	Empty	32 MB
32 MB	16 MB	48 MB
32 MB	32 MB	64 MB
64 MB	Empty	64 MB
64 MB	32 MB	96 MB
64 MB	64 MB	128 MB
128 MB	Empty	128 MB
128 MB	64 MB	192 MB
128 MB	128 MB	256 MB
256MB	Empty	256MB
256MB	256MB	512MB

*Figure 3-1: DIMM Configurations for Memory Banks*

The TigerRay also support the ECC at the main memory. Turn on the ECC through BIOS setting, but make sure the DIMMS are parity check built in.

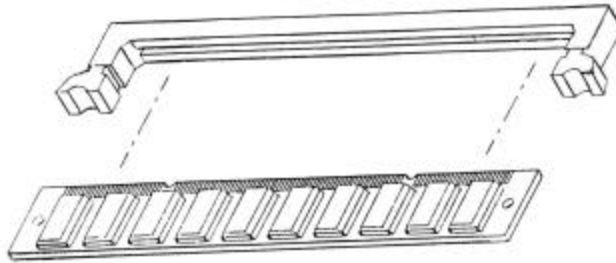
## **Chapter 3 - Capability Expanding**

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### ***Installing DIMM***

*To install the DIMM's*

1. Make sure the two handles of the DIMM socket are in the "open" position, i.e. the handles stay outward.
2. Slide the DIMM modules slowly along the plastic guides in the both ends of the socket.
3. Press the DIMM module down right into the socket, until a click sound is heard.



**Figure 3-2: Installing DIMM**

Note: That means the two handles automatically locked the memory modules into the right position of the DIMM socket as Figure 3-1 shows. To take away the memory module, just push the both handles outward, the memory module will be ejected by the mechanism in the socket.

### ***Cache Memory***

The level 2 cache of the TigerRay is built in the Celeron CPU. The current Celerons have 128KB on die L2 Cache which is very fast because it's running at the CPU speed. Future Celerons might be upgraded to 256KB L2 Cache.

## Chapter 3 - Capability Expanding

### Removing the CPU

To remove or change the CPU

1. Pull the handling bar of the socket upward to the other end to loosen the socket's openings.



Figure 3-3: Removing the CPU

2. Carefully lift the existing CPU up to remove it from the socket.
3. Place the new CPU on the middle of the socket, orienting its beveled corner to line up with the socket's beveled corner.

Note: Make sure the pins of the CPU fit evenly to the socket openings.

4. Replace the handling bar to fasten the CPU to the socket.

Note: Be sure to re-arrange the jumper setting for the correct external clock (66MHz or 100MHz) by (SW1.3) (SW1.4).

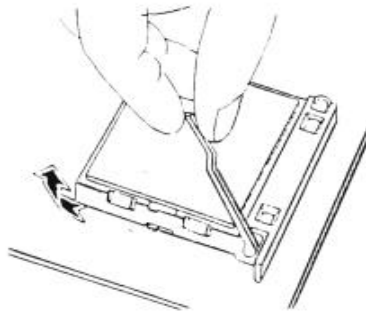


Figure 3-4: Installing the CPU

## ***Chapter 3 - Capability Expanding***

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## ***Chapter 4 - BIOS Setup Information***

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

### ***Entering Setup***

#### ***To Enter Setup***

1. Power on the computer
2. Press <Del> immediately to enter Setup.

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

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

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to,

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

## Chapter 4 - BIOS Setup Information

---

### Control Keys

Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item in the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu -- Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
PgUp / "+" key	Increase the numeric value or make changes
PgDn / "-" key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
(Shift)F2 key	Change color from total 16 colors. F2 to select color forward, (Shift)F2 to select color backward
F3 key	Reserved
F4 key	Reserved
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key	Load the default CMOS value from BIOS default table, only for Option Page Setup Menu
F7 key	Load the Setup default, only for Option Page Setup Menu
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

Table 4-1: Control Keys

### 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 open a 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>.



## ***Chapter 4 - BIOS Setup Information***

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### ***Chipset features setup***

This setup page includes all the items of chipset special features. See Page 4-15 to 4-18 for details.

### ***Power Management setup***

This category determines how much power consumption for system after selecting below items. Default value is Disable. See Page 4-19 to Page 4-22 for details.

### ***PNP/PCI Configuration***

This category specifies the assignment of all the IRQ's and DMA's. See Page 4-23 to Page 4-24 for details.

### ***Load BIOS defaults***

BIOS defaults indicates the most appropriate value of the system parameter which the system would be in minimum performance. The OEM manufacturer may change the defaults through MODBIN before the binary image burn into the ROM.

### ***Load setup defaults***

Chipset defaults indicates the values required by the system for the maximum performance. The OEM manufacturer may change to defaults through MODBIN before the binary image burn into the ROM.

### ***Integrated Peripherals***

This category allows you to set up all the on-board I/O controllers like IDE, SCSI, FDC, etc.,. See Page 4-25 to Page 4-27.

### ***Supervisor/User Password***

Change, set, or disable password of supervisor or user. It allows you to limit access to the system and Setup, or just to Setup. See Page 4-28 for details.

### ***IDE HDD auto detection***

Automatically configure hard disk parameters. See Page 4-29 to Page 4-31 for details.

## Chapter 4 - BIOS Setup Information

### *HDD Low Level Format*

Hard disk low level format utility. See Page 4-32 to Page 4-33 for details.

### *Save & exit setup*

Save CMOS value changes to CMOS and exit setup.

### *Exit without save*

Abandon all CMOS value changes and exit setup.

### *Standard CMOS Setup Menu*

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes none, 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.

Date (mm:dd:yy) : Fri, Apr 7 1995									
Time (hh:mm:ss) : 00:00:00									
<b>HARD DISKS      TYPE   SIZE   CYLS   HEAD   PRECOMP   LANDE   SECTOR   MODE</b>									
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 , 3.5 in.									
Drive B : None									
Floppy 3 Mode Support : Disabled									
LCD&CRT : Both									
Halt On : All Errors									
Base Memory : 640K									
Extended Memory : 15360K									
Other Memory : 384K									
Total Memory : 16384K									
ESC : Quit									
F1 : Help									
↑ ↓ → ← : Select Item									
PU / PD / + / - : Modify									
(Shift) F2 : Change Color									

**Figure 4-2: Standard CMOS Setup Menu**

### *Date*

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

## Chapter 4 - BIOS Setup Information

---

### *Time*

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

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

### *Primary Master/Primary Slave/Secondary Master/Secondary Slave*

The categories identify the types of 2 channels that have been installed in the computer. There are 45 predefined types and 4 user definable types for the 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>. The specifications of your drive must match with the drive table. The hard disk will not work properly if incorrect information is entered. If the hard disk drive type is not matched or listed, use Type User to define drive type manually.

If Type User is selected, related information is asked about to the following items. Enter the information directly from the keyboard and press <Enter>. This information should be provided in the documentation from the hard disk vendor or the system manufacturer.

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

If the controller of HDD interface is SCSI, the selection shall be "None".

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

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

## **Chapter 4 - BIOS Setup Information**

### **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.

CYLS	number of cylinders
HEADS	number of heads
PRECOMP	wire position
LAMBDA	loading zone
E	
SECTORS	number of sectors
MODE	HDD access mode

### **Floppy 3 Mode Support**

The category determines whether the floppy 3 mode support is enabled or not.

Mode	No floppy drive installed
360K, 5 1/4 in	5 1/4 inch PC-type standard drive, 360 kilobyte capacity
1 2M, 5 1/4 in	5 1/4 inch AT-type high-density drive, 1 2 megabyte capacity
720K, 3 1/2 in	3 1/2 inch double-sided drive, 720 kilobyte capacity
1 44M, 3 1/2 in	3 1/2 inch double-sided drive, 1 44 megabyte capacity
2 88M, 3 1/2 in	3 1/2 inch double-sided drive, 2 88 megabyte capacity

### **LCD&CRT**

on-board VGA select display type.

### **Error halt**

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

Type	Description
CRT	Boot from CRT only
LCD	Boot on LCD only
BOTH	Boot both LCD and CRT
AUTO	Boot on CRT or LCD

## **Chapter 4 - BIOS Setup Information**

---

### **Memory**

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

No Errors	Whenever the BIOS detects a non-fatal error the system will be stopped and you will be prompted.
All Errors	The system boot will not be stopped for any error that may be detected.
All, But Keyboard	The system boot will not 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.

### **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.

## Chapter 4 - BIOS Setup Information

### BIOS Features Setup Menu

ROM PCI/ISA BIOS (TigerRay)

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 : Disabled	D4000-D7FFF Shadow : Disabled
	D8000-DBFFF Shadow : Disabled
Boot Sequence : A,C,SCSI	DC000-DFFFF Shadow : Disabled
Swap Floppy Drive : Disabled	
Boot up Floppy Seek : Enabled	
Boot up Numlock Status : ON	
Gate A20 Option : Fast	
Typematic Rate Setting : Disabled	
Typematic Rate (Chars/Sec) : 6	ESC : Quit      ↑ ↓ ← → : Select Item
Typematic Delay (Msec) : 250	F1 : Help      PU/PD/+/-:Modify
Security Option : Setup	F5 : Old Values      (Shift) F2: Color
PCI/VGA Palette Snoop : Disabled	F6 : Load BIOS Default
OS Select For DRAM 64MB : Non-OS2	F7 : Load Setup Default

**Figure 4-3: BIOS Features Setup Menu**

#### Virus Warning

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

**! WARNING !**

*Disk boot sector is to be modified*

**Type "Y" to accept write or "N" to abort write**

*Award Software, Inc.*

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

Enabled	Warns automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message to appear when anything attempts to access the boot sector or hard disk partition table.

## Chapter 4 - BIOS Setup Information

---

### *CPU Internal Cache/External Cache*

These two categories speed up memory access. However, it depends on CPU/chipset design. The default value is Enabled. If your CPU has no Internal Cache then this item "CPU Internal Cache" will not be shown.

ENABLED	ENABLE CACHE
Disabled	Disable cache

### *CPU L2 Cache ECC Checking*

This category could turn on the ECC of Pentium II L 2 Cache or just disable it.

ENABLED	ENABLE L2 ECC
Disabled	Disable L2 ECC

### *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 A,C.

A, C, SCSI	Default
C, A, SCSI	
C, CDROM, A	
CDROM, C, A	
D, A, SCSI	
E, A, SCSI	
F, A, SCSI	
SCSI, A, C	
SCSI, C, A	
C only	
LS/ZIP, C	

## Chapter 4 - BIOS Setup Information

### Swap Floppy Drive

This item allows you to determine whether enable the swap floppy drive or not. The choices are: Enabled/Disabled.

### Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K type is 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

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

### Boot Up NumLock Status

The default value is On.

On	Keypad is number keys
Off	Keypad is arrow keys

### Gate A20 Option

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

### Typematic Rate Setting

This determines the typematic rate.

Enabled	Enable typematic rate and typematic delay programming.
Disabled	Disable typematic rate and typematic delay programming. The system BIOS will use default value of this item and the default is controlled by keyboard.

## Chapter 4 - BIOS Setup Information

---

### 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)

When holding a key, the time between the first and second character displayed.

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

### Security Option

This category allows you to limit access to the system and Setup, or just to Setup.

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

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

### PCI/VGA Palette Snoop

Enable PCI controller support PCI/VGA palette snoop or not, if enabled, VGA cycle will transfer to ISA bus. If disabled, VGA cycle only transfer to PCI bus.

---

## Chapter 4 - BIOS Setup Information

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### *OS Select for DRAM 64MB*

This segment is specifically created for OS/2 when DRAM is larger than 64MB. If your operating system is OS/2 and DRAM used is larger the 64MB, you have to select "OS 2", otherwise, non-OS2, default is NON-OS2.

### *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	Videoshadow is enabled
Disabled	Videoshadow is disabled

### *C8000 - CFFFF Shadow/D8000 - DFFFF Shadow*

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

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disabled

- Note:
1. for C8000-DFFFF option-ROM on PCI BIOS , BIOS will automatically enable the shadow RAM. User does not have to select the item.
  2. IDE second channel control:  
Enable : enable secondary IDE port and BIOS will assign IRQ15 for this port.  
Disable: disable secondary IDE port and IRQ15 is available for other device. The item is optional only for PCI BIOS.
  3. Some of the sound cards have an onboard CD-ROM controller which uses IDE Secondary Port. In order to avoid PCI IDE conflict, the IDE secondary channel control has to select "disable" then CD-ROM can work.

## Chapter 4 - BIOS Setup Information

### Chipset Features Setup Menu

Since the features in this section are related to the chipset in the CPU board and all are optimized, you are not recommended to change the default settings in the setup table, unless you know very detailed of the chipset features.

ROM PCI/ISA BIOS (TigerRay)

CHIPSET FEATURES SETUP

AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	CPU Warning Temperature	: Disabled
EDD DRAM Speed Selection	: 50ns	Current CPU Temperature	: 0 °C/32 °F
EDO CAS# MA Wait State	: 2	Current CPUFAN Speed	: 0 RPM
EDO RAS# Wait State	: 2	Current vdd (v)	: 5V
SDRAM RAS-to-CAS Delay	: 3	Current vin1 (v)	: 3.3V
SDRAM RAS Precharge Time	: 3	Current vin2 (v)	: 3 V
SDRAM CAS latency Time	: 2	Current vin3 (v)	: 2.0V
SDRAM Precharge Control	: Disabled		
DRAM Data Integrity Mode	: Non-ECC		
System BIOS Cacheable	: Disabled		
Video BIOS Cacheable	: Disabled		
Video RAM 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
Passive Release	: Enabled	F6 : Load BIOS Defaults	
Delay Transaction	: Enabled	F7 : Load Setup Defaults	
AGP Aperture Size (MB)	: 4		

Figure 4-4: Chipset Features Setup Menu

#### Auto Configuration

Auto Configuration selects predetermined optional values of chipset parameters. When Disabled, chipset parameters revert to setup information stored in CMOS. Many fields in this screen are not available when Auto Configuration is Enabled. The choices are Enabled, Disabled.

#### EDD DRAM Speed Selection

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

50ns	DRAM Timing Type
60ns	DRAM Timing Type

---

## **Chapter 4 - BIOS Setup Information**

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### ***EDO CASx# MA Wait State***

You could select the timing control type of EDO DRAM CAS MA (memory address bus). The choices are 1, 2.

### ***EDO RASx# Wait State***

You could select the timing control type of EDO DRAM RAS MA (memory address bus). The choices are 1, 2.

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

You can select RAS to CAS Delay time in HCLKs of 2/2 or 3/3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this fields unless changing specifications of the installed DRAM or the installed CPU. The choices are 2, 3.

### ***SDRAM RAS Precharge Time***

This feature defines the length of time for Row Address Strobe is allowed to precharge. The choices are 2, 3.

### ***SDRAM CAS latency Time***

You can select CAS latency time in HCLKs of 2/2 or 3/3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU.

### ***DRAM Data Integrity Mode***

Select Parity or ECC (ERROR-CORRECTING CODE), according to the type of installed DRAM.

### ***System Bios Cacheable***

Selecting Enabled allows caching of the system BIOS ROM at F000h-FFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result

### ***Video BIOS Cacheable***

Selecting Enable allows caching of the video BIOS ROM AT C0000h-F7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

## **Chapter 4 - BIOS Setup Information**

---

### ***Video RAM Cacheable***

Select Enabled allows caching of the video RAM, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

Enabled	BIOS access cached
Disabled	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 faster than the input/output bus that

Enabled	video BIOS access cached
Disabled	Video BIOS access not cached

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. The choices are from NA, 1 to 8 CPU clocks.

### ***16 Bit I/O Recovery Time***

This item allows the recovery time to be determine for the 16 bit I/O. The 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.

### ***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. The choices are Enabled, Disabled.

---

## Chapter 4 - BIOS Setup Information

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### *Delay 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

Enabled	Memory hole supported.
Disabled	Memory hole not supported.

### *AGP Aperture Size (MB)*

Select the size of the Accelerated Graphics Port (AGP) aperture. 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 choices are 4, 8, 16, 32, 64, 128, 256.

### *CPU Warning Temperature*

When the temperature is over the CPU warning temperature, then the warning signal will come on.

### *Current CPU Temperature*

This field displays the current of the CPU system temperature.

### *Current CPU FAN Speed*

These fields display the current speed of up to two CPU fans.

### *Current voltage*

These fields display the current voltage of up to four voltage.

## Chapter 4 - BIOS Setup Information

### Power Management Setup

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

ROM PCI/ISA BIOS (TigerRay)  
 POWER MANAGEMENT SETUP  
 AWARD SOFTWARE, INC.

Power Management	: User Define	<b>** Reload Global Timer Events **</b>	
PM Control by APM	: Yes	IRQ[3-7, 9-15], NMI	: Enabled
Video Off Method	: V/H SYNC+Blank	Primary IDE 0	: Disabled
Video Off After	: Stand by	Primary IDE 1	: Disabled
MODEM Use IRQ	: 3	Secondary IDE 0	: Disabled
Doze Mode	: Disabled	Secondary IDE 1	: Disabled
Standby Mode	: Disabled	Floppy Disk	: Disabled
Suspend Mode	: Disabled	Serial Port	: Disabled
HDD Power Down	: Disabled	Parallel Port	: Disabled
Throttle Duty Cycle	: 62.5%		
PCI/VGA Act-Monitor	: Disabled		
PowerOn by Ring	: Disabled		
Wake up on LAN	: Disabled		
IRQ 8 Break Suspend	: Disabled		
		ESC: Quit	↑↓→← : Select item
		F1 : Help	PU/PD/+/-: Modify
		F5 : Old Values	(Shift) F2: Color
		F6 : Load BIOS Default	
		F7 : Load Setup Default	

Figure 4-5: Power Management Setup Screen

#### Power Management

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

1. Doze Mode
2. Standby Mode
3. Suspend Mode
4. HDD Power Down

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

Disabled (default)	No power management. Disables all four modes.
Mid. Power Saving	Moderate 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 CPUs. Doze Mode - 1 min., Standby Mode - 1 min., Suspend Mode - 1 min., and HDD Power Down - 1 min.
User Define	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.

---

## Chapter 4 - BIOS Setup Information

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### *PM Control by 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.

### *Video Off After*

When enabled, this feature allows the VGA adapter to operate in a power saving mode.

NA	Monitor will remain on during power saving modes.
Suspend	Monitor blanked when the system enters the Suspend mode.
Standby	Monitor blanked when the system enters Standby mode.
Doze	Monitor blanked when the system enters any power saving mode.

### *MODEM Use IRQ*

Name the interrupt request (IRQ) line assigned to the modem (if any) on your system. Activity of the selected IRQ always awakens the system. The choices are NA, 3, 4, 5, 7, 9, 10, 11.

### *Doze Mode*

When enabled, after a specified time of system inactivity, the fixed disk drive and video will be shut off while all other devices still operate at full speed.

## Chapter 4 - BIOS Setup Information

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### *Standby Mode*

1. Disabled	System will never enter STANDBY mode
2. 1 Min 2 Min 4 Min 6 Min 8 Min 10 Min 20 Min 30 Min 40 Min 1 Hr	Defines the continuous idle time before the system enters STANDBY mode.  if any item defined in (1) is enabled & above, STANDBY timer will be reloaded.

### *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. The choices are 12.5%, 25.0%, 37.5%, 50.0%, 62.5%, 75.0%.

### *PCI/VGA Active Monitor*

When Enabled, any video activity restarts the global timer for Standby mode. The choices are Enabled, Disabled.

### *PowerOn 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. The choices are Enabled, Disabled.

### *Wake up on LAN*

This feature Enables or disables the wake-up on LAN function.

## ***Chapter 4 - BIOS Setup Information***

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### ***IRQ 8 Break Suspend***

You can Enable or Disable monitoring of IRQ8 so it does not awaken the system from Suspend mode. The choices are Enabled, Disabled.

### ***Reload Global Timer Events***

When Enabled, an event occurring on each device listed below restarts the global time for Standby mode.

IRQ[3 -7, 9-15], NMI

Primary IDE 0

Primary IDE 1

Secondary IDE 0

Secondary IDE 1

Floppy Disk

Serial Port

Parallel Port

## Chapter 4 - BIOS Setup Information

### PnP/PCI Configuration

This section describes configuring the PCI bus system. PCI, or Peripheral Component 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 (TigerRay)

PNP/PCI CONFIGURATION

AWARD SOFTWARE, INC.

PNP OS Installed	: Yes	Slot 1 use IRQ No.	: Auto
Resource Controlled By	: Manual	Slot 2 use IRQ No.	: Auto
Reset Configuration Data	: Disabled	Slot 3 use IRQ No.	: Auto
IRQ-3 assigned to	: PCI/ISA PnP	Slot 4 use IRQ No.	: Auto
IRQ-4 assigned to	: PCI/ISA PnP	Used MEM base addr	: N/A
IRQ-5 assigned to	: PCI/ISA PnP	Assign IRQ for USB	: Disabled
IRQ-7 assigned to	: PCI/ISA PnP	PCI Latency timer (CLK)	: 0
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	

Figure 4-6: PnP/PCI Configuration Setup Menu

#### PNP OS Installed

Select Yes if the system operating environment is Plug-and-Play aware (e.g. Windows 95). The choices are Yes and No.

#### Resource Controlled by

The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. If Auto is selected, all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assigns them. The choices are Auto and Manual.

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## **Chapter 4 - BIOS Setup Information**

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### ***Reset Configuration Data***

Normally, leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot. The choices are Enabled and Disabled.

### ***IRQ n Assigned to***

When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for serial port 1).

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

When resources are controlled manually, assign each system DMA channel as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific DMA channel.

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

### ***Slot 1 use IRQ No***

Assign IRQ to slot 1, 2, 3, 4 by User or Auto.

### ***Used MEM base addr***

Select a base address for the memory area used by any peripheral that requires high memory. The choices are C800, CC00, D000, D400, D800, DC00, N/A.

Assigning IRQ For USB

Assigning IRQ for USB: Enabled

Not assign IRQ for USB: Disabled

### ***PCI Latency Timer (CLK)***

Adjust PCI Latency Timer by users.

## Chapter 4 - BIOS Setup Information

### Integrated Peripherals

ROM PCI / ISA BIOS (TigerRay)

INTEGRATED PERIPHERALS

AWARD SOFTWARE, INC.

IDE HDD Block Mode	: Disabled	RxD, TxD Active	: Hi, Hi
IDE Primary Master PIO	: Auto	IR Transmission delay	: Disabled
IDE Primary Slave PIO	: Auto	Onboard Parallel Port	: 3BCH/IRQ7
IDE Secondary Master PIO	: Auto	Parallel Port Mode	: +EPP1.9
IDE Secondary Slave PIO	: Auto	ECP Mode Use DMA	: 3
IDE Primary Master UDMA	: Auto	EPP Mode Select	: EPP1.9
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		
On board PCI SCSI Chip	: Enabled		
USB Keyboard Support	: Disabled		
Init Display First	: PCI Slot		
KBC input clock	: 6MHz	ESC : Quit	↑ ↓ → ← : Select Item
Onboard FDD Controller	: Enable	F1 : Help	PU/PD/+/- : Modify
Onboard Serial Port 1	: Auto	F5 : Old Values	(Shift) F2 : Color
Onboard Serial Port 2	: Auto	F6 : Load BIOS Defaults	
UART Mode Select	: Standard	F7 : Load Setup Defaults	

Figure 4-7: Integrated Peripherals Setup Menu

#### 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.

#### IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields allows the user to set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide increased performance. In Auto mode, the system automatically determines the best mode for each device.

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## **Chapter 4 - BIOS Setup Information**

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### ***IDE Primary/Secondary Master/Slave UDMA***

Ultra DMA/33 implementation is possible only if the IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support. The choices are Auto, 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.

### ***Onboard PCI SCSI Chip***

This item allows you to determine whether onboard PCI SCSI chip is enabled or not.

### ***USB Keyboard support***

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard. The choices are Enabled, Disabled.

### ***Init Display First***

For user to select to init AGP or PCI VGA first.

### ***KBC input clock***

Set the frequency for the keyboard controller input clock.

### ***Onboard FDD Controller***

This should be enabled if your system has a floppy disk drive (FDD) installed on the system board and you wish to use it. Even when so equipped, if you add a higher performance controller, you will need to disable this feature. The Choice: Enabled, Disabled.

### ***Onboard Serial Port 1/Port 2***

This item allows you to determine access onboard serial port 1/port 2 controller with which I/O address. The choices are 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

## ***Chapter 4 - BIOS Setup Information***

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### ***UART Mode Select***

This item allows you to determine which Infra Red (IR) function of onboard I/O chip. The choices are IrDA 1.0, Standard, ASKIR, HPSIR.

### ***RxD, TxD Active***

This item allows you to determine the active of RxD, TxD. The choices are "Hi,Hi", "Lo, Lo", "Lo, Hi", "Hi, Lo."

### ***IR Transmission delay***

This item allows you to enable/disable IR transmission delay. The choices are Enabled, Disabled.

### ***Onboard Parallel Port***

This item allows you to determine access onboard parallel port controller with which I/O address. The choices are 378H/IRQ7, 278H/IRQ5, 3BCH/IRQ7, Disabled.

### ***Parallel Port Mode***

Select an operating mode for the onboard parallel port. Select Compatible or Extended unless you are certain both your hardware and software support EPP or ECP mode. The choices are SPP, ECP+EPP1.7, EPP1.7+SPP, EPP1.9+SPP, ECP, ECP+EPP1.9, and Normal.

### ***ECP Mode Use DMA***

Select a DMA channel for the port. The choices are 3, 1.

### ***EPP Mode Select***

Select EPP port type 1.7 or 1.9. The choices are EPP1.7, 1.9.

---

## ***Chapter 4 - BIOS Setup Information***

### ***Supervisor/User Password Setting***

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

- supervisor password : can enter and change the options of the setup menus.
- user password : just can enter but do not have the right to change the options of the setup menus.

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

ENTER PASSWORD:

1. Type the password, up to eight characters in length
2. Press <Enter>.

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

PASSWORD DISABLED.

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

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

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

## Chapter 4 - BIOS Setup Information

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### IDE HDD Auto Detection

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

#### 1. Setup Changes

<I> Auto-detection

BIOS setup will display all possible modes that 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 which is appropriate for them.

ROM/PCI/ISA BOPS (TigerRay)

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	

**Figure 4-8: IDE HDD Auto Detection Setup Screen**

<II> Standard CMOS Setup

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

		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

## ***Chapter 4 - BIOS Setup Information***

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### ***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 set his HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater.

#### ***LBA (Logical Block Addressing) mode***

A new HDD accessing method to overcome the 528 Megabyte bottleneck. The number of cylinders, heads & sectors shown in setup may not be the number physically contained in the HDD.

During HDD accessing, the IDE controller will transform the logical address described by sector, head & cylinder number into its own physical address inside the HDD.

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

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

## ***Chapter 4 - BIOS Setup Information***

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### ***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 do not want LBA). The Award BIOS provides another alternative to support these kinds of HDD. Example of LARGE mode:

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

BIOS tricks DOS (or other OS) that the number of cylinders is less than 1024 by dividing it by 2. At the same time, 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 the right HDD address:

Maximum HDD size:

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

### ***3. Remarks***

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

## Chapter 4 - BIOS Setup Information

### Hard Disk Low Level Format Utility

This Award Low-Level-Format Utility is designed as a tool to save your time formatting the hard disk. The Utility automatically looks for the necessary information of the drive selected. The Utility also searches for bad tracks and lists them for reference. Shown below is the Main Menu after you enter into the Award Low-Level-Format Utility.

Hard Disk Low Level Format Utility		NO. CYLS HEAD						
SELECT DRIVE BAD TRACK LIST PREFORMAT								
Current select drive is: C								
DRIVE: C CYLINDER: D HEAD: D								
		Size	Cyls	Head	Precode	Lands	Sector	Mode
Primary Master	.	D	D	D	D	D	D	AUTO
Primary Slave	.	D	D	D	65535	65535	D	AUTO
Secondary Master	.	D	D	D	D	D	D	AUTO
Secondary Slave	.	D	D	D	D	65780	D	AUTO
Up/Down- Select item      ENTER- Accept      ESC- End/Abort Copyright (C) Award Software, Inc. 1992-98 All Rights Reserved.								

Figure 4-9: Hard Disk Low Level Format Utility

#### 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. List at the bottom of the screen is the drive automatically detected by the utility.

#### Bad Track List

- Auto scan bad track.

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

## ***Chapter 4 - BIOS Setup Information***

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- Add bad track

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

- Modify bad track

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

- Delete bad track

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

- Clear bad track table

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

### ***Preformat***

- Interleave

Select the interleave number of the hard disk drive 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.

---

## **Chapter 4 - BIOS Setup Information**

### ***Power-On Boot***

After all the changes to CMOS values have been made and the system cannot boot with the CMOS values selected in Setup, restart the system by turning it OFF then ON or Pressing the "RESET" button on the system case. You may also restart by simultaneously press <Ctrl>, <Alt>, and <Delete> keys. Upon restart the system, immediately press <Insert> to load BIOS default CMOS value for boot up.

### ***BIOS Reference - POST Message***

During the Power On Self Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message. If a message is displayed, it will be accompanied by:

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

#### ***POST Beep***

Currently there is only one beep code in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps.

#### ***Error Messages***

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.

#### ***CMOS BATTERY HAS FAILED***

CMOS battery is no longer functional. It should be replaced.

#### ***CMOS CHECKSUM ERROR***

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

#### ***DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER***

No boot device was found. This could mean that either a boot drive was not

## ***Chapter 4 - BIOS Setup Information***

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detected or the drive does not contain proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.

### ***DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP***

Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

### ***DISPLAY SWITCH IS SET INCORRECTLY***

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

### ***DISPLAY TYPE HAS CHANGED SINCE LAST BOOT***

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

### ***EISA Configuration Checksum Error***

PLEASE RUN EISA CONFIGURATION UTILITY

The EISA non-volatile RAM checksum is incorrect or cannot correctly read the EISA slot. This can indicate either the EISA non-volatile memory has become corrupt or the slot has been configured incorrectly. Also be sure the card is installed firmly in the slot.

### ***EISA Configuration Is Not Complete***

PLEASE RUN EISA CONFIGURATION UTILITY

The slot configuration information stored in the EISA non-volatile memory is incomplete.

Note: When either of these errors appear, the system will boot in ISA mode, which allowing the EISA Configuration Utility to be run.

### ***ERROR ENCOUNTERED INITIALIZING HARD DRIVE***

Hard drive cannot be initialized. Be sure the adapter is installed correctly and

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## ***Chapter 4 - BIOS Setup Information***

all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

### ***ERROR INITIALIZING HARD DISK CONTROLLER***

Cannot initialize controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.

### ***FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT***

Cannot find or initialize the floppy drive controller. make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

### ***Invalid EISA Configuration***

#### **PLEASE RUN EISA CONFIGURATION UTILITY**

The non-volatile memory containing EISA configuration information was programmed incorrectly or has become corrupt. Re-run EISA configuration utility to correctly program the memory.

Note: When this error appears, the system will boot in ISA mode, which allowing the EISA Configuration Utility to be run.

### ***KEYBOARD ERROR OR NO KEYBOARD PRESENT***

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot. If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

### ***Memory Address Error at ...***

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

### ***Memory parity Error at ...***

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

## ***Chapter 4 - BIOS Setup Information***

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### ***MEMORY SIZE HAS CHANGED SINCE LAST BOOT***

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

### ***Memory Verify Error at ...***

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

### ***OFFENDING ADDRESS NOT FOUND***

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

### ***OFFENDING SEGMENT:***

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

### ***PRESS A KEY TO REBOOT***

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

### ***PRESS F1 TO DISABLE NMI, F2 TO REBOOT***

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

### ***RAM PARITY ERROR - CHECKING FOR SEGMENT ...***

Indicates a parity error in Random Access Memory.

### ***Should Be Empty But EISA Board Found***

PLEASE RUN EISA CONFIGURATION UTILITY

A valid board ID was found in a slot that was configured as having no board ID.

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## ***Chapter 4 - BIOS Setup Information***

Note: When this error appears, the system will boot in ISA mode, which allowing the EISA Configuration Utility to be run.

### ***Should Have EISA Board But Not Found***

PLEASE RUN EISA CONFIGURATION UTILITY

The board installed is not responding to the ID request, or no board ID has been found in the indicated slot.

Note: When this error appears, the system will boot in ISA mode, which allowing the EISA Configuration Utility to be run.

### ***Slot Not Empty***

Indicates that a slot designated as empty by the EISA Configuration Utility actually contains a board.

Note: When this error appears, the system will boot in ISA mode, which allowing the EISA Configuration Utility to be run.

### ***SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...***

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

### ***Wrong Board In Slot***

PLEASE RUN EISA CONFIGURATION UTILITY

The board ID does not match the ID stored in the EISA non-volatile memory.

Note: When this error appears, the system will boot in ISA mode, which allowing the EISA Configuration Utility to be run.

## Chapter 4 - BIOS Setup Information

### BIOS Reference - POST Codes

Note: EISA POST codes are typically output to port address 300h.  
ISA POST codes are output to port address 80h.

POST (hex)	Description
C0	<ol style="list-style-type: none"> <li>1. Turn off OEM specific cache, shadow...</li> <li>2. Initialize all the standard devices with default values standard devices include: <ul style="list-style-type: none"> <li>- DMA controller (8237)</li> <li>- Programmable Interrupt Controller (8259)</li> <li>- Programmable Interval Timer (8254)</li> <li>- RTC chip</li> </ul> </li> </ol>
C1	Auto-detect of onboard DRAM & Cache
C2	<ol style="list-style-type: none"> <li>1. Test system BIOS checksum</li> <li>2. Test the first 256K DRAM</li> <li>3. Expand the compressed codes into temporary DRAM area including the compressed System BIOS &amp; Option ROMs</li> </ol>
C3	Copy the BIOS from ROM into E0000-FFFF shadow RAM so that POST will go faster
D1-D2	Reserved
D3	Initialize EISA registers (EISA BIOS only)
D4	Reserved
D5	<ol style="list-style-type: none"> <li>1. Keyboard Controller Self-Test</li> <li>2. Enable Keyboard Interface</li> </ol>
D6	Reserved
D7	Verifies CMOS's basic R/W functionality
BE	Program default values into chipset according to the MODBI/Nable Chipset Default Table
D9	<ol style="list-style-type: none"> <li>1. Program the configuration register of Cynix CPU according to the MODBI/Nable Cynix Register Table</li> <li>2. OEM specific cache initialization (if needed)</li> </ol>
DA	<ol style="list-style-type: none"> <li>1. Initialize the first 32 interrupt vectors with corresponding interrupt handlers <ul style="list-style-type: none"> <li>Initialize INT 00 from 00-17D with Dummy(Suprnous) Interrupt Handler</li> </ul> </li> <li>2. Issue CPUID instruction to identify CPU type</li> <li>3. Early Power Management initialization (OEM specific)</li> </ol>

Table 4-2: BIOS Reference - Post Codes

## Chapter 4 - BIOS Setup Information

This POST code is for boot block

POST (hex)	Description
CD	1. Turn off OEM specific cache, shadow... 2. Initialize all the standard devices with default values Standard devices includes: - DMA controller (3237) - Programmable Interrupt Controller (3239) - Programmable Interval Timer (3234) - RTC chip
CI	Auto-detects of onboard DRAM & Cache
CB	Checking checksum of compressed code
CA	Copy the BIOS from ROM into E0000-FFFF shadow RAM so that POST will go faster
D1	Clear base memory D-640K
DC	Initial interrupt vector 00-1FH
DD	Initial ISA VGA
41H	Enable FDD and detect media type
FFH	Boot from FDD

*Table 4-3: Boot Block Post Code*

This page is for Non-Compressed Version only

D1-D2	Reserved
CD	Turn off OEM specific cache, shadow...
D0	1. Initialize BIOS registers (BIOS BIOS only) 2. Initialize all the standard devices with default values Standard devices includes: - DMA controller (3237) - Programmable Interrupt Controller (3239) - Programmable Interval Timer (3234) - RTC chip
D4	Reserved
D3	1. Keyboard Controller Self-Test 2. Enable Keyboard interface
D6	Reserved
D7	Verifies CMOS's basic R/W functionality
BE	Program default values into chipset according to the MODBINable Chipset Default Table
CI	Auto-detects of onboard DRAM & Cache
CA	Copy the BIOS from ROM into E0000-FFFF shadow RAM so that POST will go faster
D8	Test the first 256K DRAM
D9	1. Program the configuration register of Cynx CPU according to the MODBINable Cynx Register Table 2. OEM specific cache initialization (if needed)
DA	1. Initialize the first 32 interrupt vectors with corresponding interrupt handlers Initialize INT 00 from 03-17D with Dummy (Spurious) Interrupt Handler 2. Issue CPUID instruction to identify CPU type 3. Early Power Management initialization (OEM specific)

*Table 4-4: Non-Compressed Version Only*

## Chapter 4 - BIOS Setup Information

The following POST Codes are for all of Compress Version & Non-Compress Version

POST (Hex)	Description
DE	<ol style="list-style-type: none"> <li>1. Verify the RTC base is valid or not</li> <li>2. Detect bad battery</li> <li>3. Read CMOS data into BIOS stack area</li> <li>4. PdP initialization including (PdP BIOS only) <ul style="list-style-type: none"> <li>-Assign CSN to PdP ISA card</li> <li>-Create resource map from ESCD</li> </ul> </li> <li>5. Assign IO &amp; Memory for PCI devices (PCI BIOS only)</li> </ol>
DC	Initialization of the BIOS Data Area (4D.00-4D.FF)
DD	<ol style="list-style-type: none"> <li>1. Program code of the Chipset's value according to Setup. (Barty Setup Value Program)</li> <li>2. Measure CPU speed for display &amp; decide the system clock speed</li> <li>3. Video initialization including Microchrome, CGA, EGA/VGA If no display device found, the speaker will beep which consists of one single long beep followed by two short beeps.</li> </ol>
DE	<ol style="list-style-type: none"> <li>1. Initialize the APIC (Multi-Processor BIOS only)</li> <li>2. Test video RAM (If Microchrome display device found)</li> <li>3. Show messages including: <ul style="list-style-type: none"> <li>-Award Logo, Copyright string, BIOS Date code &amp; Part No.</li> <li>-OEM specific string of messages</li> <li>-Energy Star Logo (Green BIOS ONLY)</li> <li>-CPU brand, type &amp; speed</li> <li>-Test system BIOS checksum (Non-Compress Version only)</li> </ul> </li> </ol>
DF	DMA channel 0 test
1D	DMA channel 1 test
1E	DMA page registers test
12-13	Reserved
14	Test 8254 Timer/Counter 2.
15	Test 8259 interrupt mask bits for channel 1
16	Test 8259 interrupt mask bits for channel 2
17	Reserved
19	Test 8259 functionality
1A-1D	Reserved
1E	If EISA NVM checksum is good, execute EISA initialization (EISA BIOS only)
1F-2D	Reserved
3D	Detect Base Memory & Extended Memory Size
3E	<ol style="list-style-type: none"> <li>1. Test Base Memory from 256K to 640K</li> <li>2. Test Extended Memory from 1M to the top of memory</li> </ol>
3F	<ol style="list-style-type: none"> <li>1. Display the Award Plug &amp; Play BIOS Extended message (PdP BIOS only)</li> <li>2. Program all onboard super I/O chips (if any) including COM ports, LPT ports, FDD port... according to setup value</li> </ol>
33-3B	Reserved
3C	Set flag to allow users to enter CMOS Setup Utility
3D	<ol style="list-style-type: none"> <li>1. Initialize Keyboard</li> <li>2. Install PS2 mouse</li> </ol>

Table 4-5: Post Code for all of Compress Version and Non-Compress Version

## Chapter 4 - BIOS Setup Information

POST (hex)	Description
3E	Try to turn on Level 2 cache Note: Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST61h
3E	Try to turn on Level 2 cache Note: Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST61h
BF	1. Program the rest of the Chipset's value according to Setup. (Laser Setup Value Program) 2. If auto-configuration is enabled, programmed the chipset with pre-defined values in the MODBI/Nable Auto-Table
41	Initialize floppy disk drive controller
42	Initialize Hard drive controller
43	If it is a PaP BIOS, initialize serial & parallel ports
44	Reserved
45	Initialize math coprocessor.
46-4D	Reserved
4E	If there is any error detected (such as mtdetb...), show all the error message on the screen & wait for user to press < F1 > key
4F	1. If passwords needed, ask for password. 2. Clear the Energy Star Logo (Green BIOS only)
5D	Write all CMOS values currently in the BIOS stack area back into the CMOS
51	Reserved
52	1. Initialize all ISA ROMs 2. Laser PCI initialization (PCI BIOS only) - assign IRQ to PCI devices - initialize all PCI ROMs 3. PaP initialization (PaP BIOS only) - assign IO, Memory, IRQ & DMA to PaP ISA devices - initialize all PaP ISA ROMs 4. Program shadow RAM according to Setup smemg 5. Program parity according to Setup smemg 6. Power Management initialization - Enable/Disable global PM - A PM interface initialization
53	1. If it is NOT a PaP BIOS, initialize serial & parallel ports 2. Initialize base value in BIOS data area by translate the RTC base value into a user tick value
6D	Setup Virus Protection (Boot Sector Protection) functionality according to Setup smem

**Table 4-5: Post Code for all of Compress Version and Non-Compress Version  
con't**

## Chapter 4 - BIOS Setup Information

### BIOS Default Drive Table

This is a current list of the drive type table contained in Setup.

Type	Size (MB)	Cylinders	Heads	Sectors	Write Precomp	Lead Zone	Example Model
1	10	306	4	17	128	305	TEAC SD310, MMI 112, 3412
2	20	613	4	17	300	613	Seagate ST223, ST4026
3	30	613	6	17	300	613	
4	62	940	8	17	312	940	
5	46	940	6	17	312	940	
6	20	613	4	17	None	613	Seagate ST123, Tandoc TM262
7	30	462	8	17	236	311	
8	30	733	5	17	None	733	Tandoc TM 703
9	112	900	13	17	None	901	
10	20	820	3	17	None	820	
11	33	833	5	17	None	833	
12	49	833	7	17	None	833	
13	20	306	8	17	128	319	Diacoel 326, MMI M123
14	42	733	7	17	None	733	
15		Reserved					
16	20	612	4	17	0	663	Microceace HH723, Syquest 3230, 3423
17	40	977	5	17	300	977	
18	36	977	7	17	None	977	
19	39	1024	7	17	312	1023	
20	30	733	5	17	300	733	
21	42	733	7	17	300	733	
22	30	306	5	17	300	733	Seagate ST4008
23	10	977	4	17	0	336	
24	40	1024	5	17	None	976	Seagate ST4051
25	76	1224	9	17	None	1023	Seagate ST4096
26	71	1224	7	17	None	1223	Maxtor 2083
27	111	1224	11	17	None	1223	Maxtor 2140, Presto S14
28	132	1024	13	17	None	1223	Maxtor 2190, Presto S19
29	68	1024	8	17	None	1023	Maxtor 1083, Microplota 1223
30	93	918	11	17	None	1023	Maxtor 1103 1120, 4780
31	83	923	11	17	None	1023	Maxtor 1170
32	69	1024	9	17	None	926	CDC 9413

Table 4-6: BIOS Default Drive Table

## Chapter 4 - BIOS Setup Information

33	33	1024	10	17	None	1023	
34	102	1024	12	17	None	1023	
35	110	1024	13	17	None	1023	
36	119	1024	14	17	None	1023	
37	17	1024	2	17	None	1023	
38	136	1024	16	17	None	1023	
39	114	913	13	17	None	1023	Maxtor 1140, 4320
40	40	320	6	17	None	320	Seagate ST331
41	42	1024	3	17	None	1023	Seagate 4033 Miracube 3033/6033
42	63	1024	3	26	None	1023	Miracube 3033/6033 RLL
43	40	309	6	17	None	332	Miracube 363D
44	61	309	6	26	None	332	Miracube 3673 RLL
45	100	776	3	33	None	773	Codder CP31D4
46	200	624	16	33	None	623	Codder CP32D4
User							

*Table 4-6: BIOS Default Drive Table Con't*

## ***Chapter 4 - BIOS Setup Information***

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## Appendix 1 - Watch Dog Timer

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### Watch Dog Timer

#### Watch Dog Timer Working Procedure

The Watch Dog Timer (WDT) is the special hardware device. The WDT function is to monitor the computer system whether work normally, otherwise, it will have some measures to fix up the system.

It contains a receivable SQW signal from RTC, and could set time and can clear the counter function. When time is up, WDT can send Reset or NMI signal.

Operator has to write a value into WDT Configuration Register (Write the control value to the Configuration Port), and clear WDT counter (read the Configuration Port).

#### Watch Dog Timer character and function

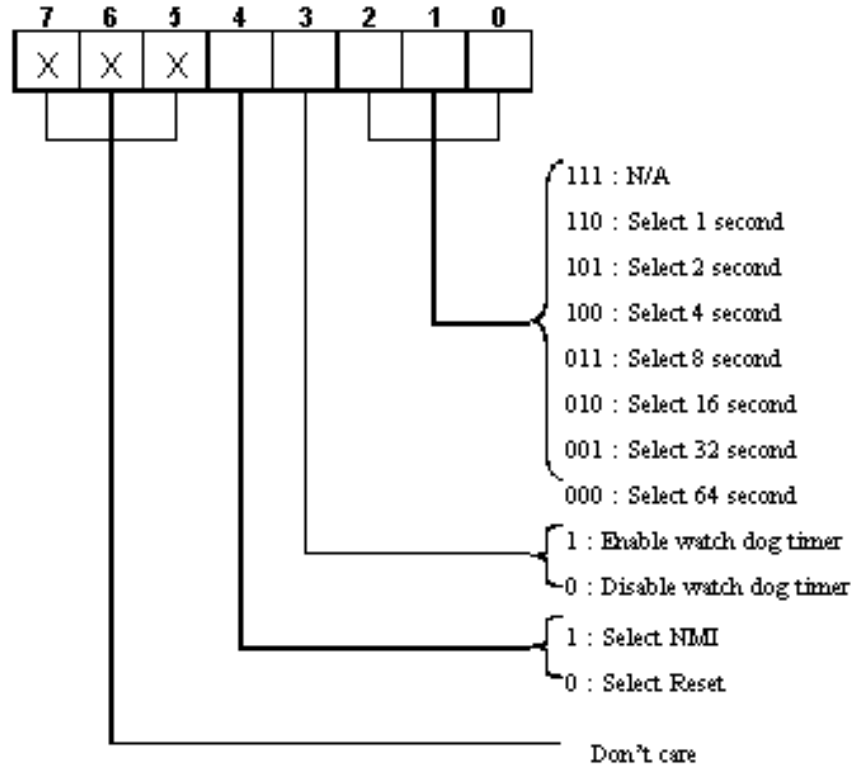
WDT Configuration port	F2	Default at F2
Watch Dog Timer	Disabled	1. Default at disabled
	Enabled	2. Enabled for user's programming
WDT Time out action for	Reset	Default at Reset
	NMI	
WDT Action Time	1 sec	Default at 64 sec
	2 sec	
	4 sec	
	8 sec	
	16 sec	
	32 sec	
	64 sec	

## ***Appendix 1 - Watch Dog Timer***

---

### ***Watch Dog Timer Control Register***

The Watch Dog Timer Control Register is to control the WDT working mode. You can write the value to WDT Configuration Port. The following is the Control Register bit definition.



## Appendix 1 - Watch Dog Timer

### Watch Dog Timer Programming Procedure

#### Power on or reset the system

The initial value of WDT Control Register (D4~D0) is zero, when power is on or reset the system. The following means the initial value of WDT (00000000b):

Bit	Value	Mean
4	0	Select Reset
3	0	Disable watch dog timer
2, 1, 0	000	Select 64 second

#### Initialize the SQW of RTC (set SQW output period=0.5 second)

To initialize the SQW of RTC processor is to set the SQW signal which is out-put period=0.5 second. It offers the basic frequency of the WDT counter.

The following is an example of initializing the SQW signal program in Intel 8086 assembly language.

```
; (Generate SQW = 0.5 Sec.)
Mov     dx, 70h
  Mov   ax, 0Ah
  Out   dx, al           ; Out port 70h = 0Ah
  Mov   dx, 71h
  Mov   ax, 2Fh
  Out   dx, al           ; Out port 71h = 2Fh
; (enable the SQW output)
Mov     dx, 70h
  Mov   ax, 0Bh
  Out   dx, al           ; Out port 70h = 0Bh
  Mov   dx, 71h
  Mov   ax, 0Ah
  Out   dx, al           ; Out port 71h = 0Ah
```

## ***Appendix 1 - Watch Dog Timer***

---

### ***Clear the WDT***

Repeatedly read WDT Configuration Port and the interval cannot be longer than the preset time, otherwise, the WDT will generate NMI or Reset signal for the system.

The following is an example of clear the WDT program in Intel 8086 assembly language.

```
; ( Clear the WDT)
Mov dx, F2h ;Setting the WDT configuration port
In  al, dx
```

Note: Before running WDT, you must clear the WDT. It means to make sure the initial value is zero before enabling the WDT.

### ***WDT Control Register (Write to WDT configuration port)***

Set the WDT Control Register to control the WDT working mode. The initial value of the WDT Control Register is as the following.

```
; (Setting the WDT Control Register as AL)
Mov  al, 0h ; Setting initial value = 0 for the WDT Control Register
```

Plan the option of following:

1. Select NMI or Reset: decide D4 value in F2.

```
i.e. Setting D4 = 0, then it select Reset
AND      al, 11101111b ; Select Reset
i.e. Setting D4 = 1, then it select NMI
OR  al, 00010000b ; Select NMI
```

## ***Appendix 1 - Watch Dog Timer***

---

2. Select the time-out intervals of WDT (decide the values of D2, D1, D0 in F2)

Example: D2~D0 = 0, the time-out interval will be 64 sec.

```
AND    al, 11111000b ; Setting the time-out interval as 64 sec.
```

3. Enable or Disable the WDT ( decide D3 value in F2)

i.e. D3=0, Disable the WDT

```
AND    al, 11110111b ; Disable the WDT
```

i.e. D3=1, Enable the WDT

```
OR     al, 00001000b ; Enable the WDT
```

After finishing the above setting, you must be output for the Control Register's value to the WDT Configuration Port. Then WDT will start according to the above setting.

```
MOV    dx, F2h ; Setting WDT Configuration Port
OUT    dx, al ; Output the Control Register Value
```

Build in a mechanism in the program to continue to read the WDT

Configuration Port for clearing WDT before the time out.

## ***Appendix 1 - Watch Dog Timer***

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## Appendix 2 - Memory Mapping

### Memory Mapping

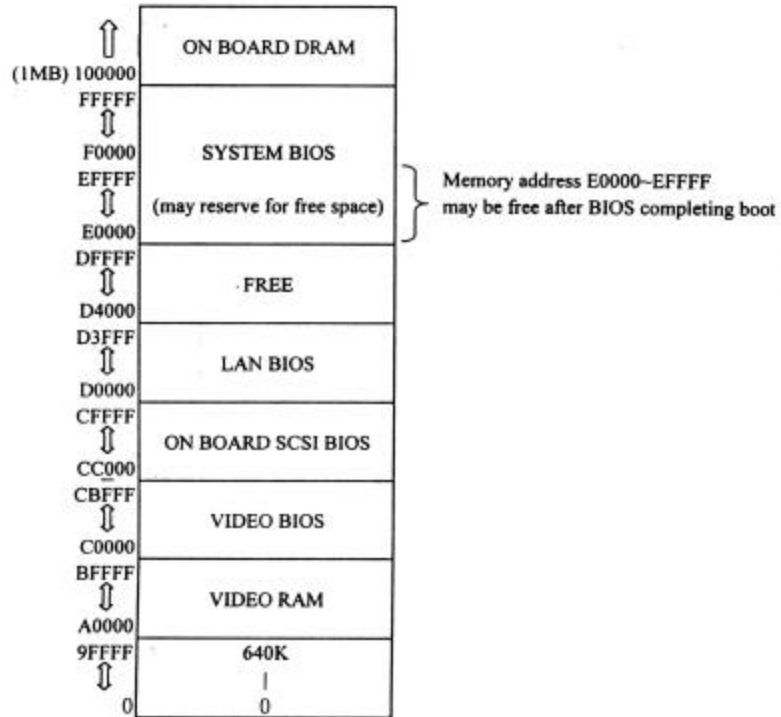


Figure A2-1: Memory Mapping

## ***Appendix 2 - Memory Mapping***

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## ***Appendix 3 - Glossary of Terms***

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### ***B***

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**backplane:** A device inside the chassis that contains slots, or sockets, for plugging in I/O cards or cables.

**bus:** One or more electrical conductors that transmit power or binary data to the various sections of a computer or any common pathway between hardware devices. A computer bus connects the CPU to its main memory and the memory banks that reside on the control units of the peripheral devices. It is made up of two parts. Addresses are sent over the address bus to signal a memory location, and the data is transferred over the data bus to that location.

### ***C***

---

**card cage:** A cabinet or metal frame that holds printed circuit cards.

**control panel:** The panel on the front of the computer that usually contains the power switch, reset switch, LEDs and the keyboard connector.

### ***D***

---

**DAT:** Digital Audio Tape. Storage medium.

**disk access LED:** The LED located on the front control panel that indicates when the hard disk drive is active.

**drive bay:** Area in the chassis where drives are mounted.

### ***E***

---

**electrostatic discharge (ESD):** High voltage, low current discharges caused by static electricity buildup on a surface or object. ESD can be prevented by wearing a wrist strap attached to a ground post on a static mat.

**EMI (ElectroMagnetic Interference):** Noise generated by the switching action of the power supply and other system components. Conducted EMI is interference generally conducted into the power line, and is normally controlled with a line filter. Radiated EMI is that portion that radiates into free space, one way to suppress it is by enclosing circuitry in a metal case.

**expansion card:** (I/O add-in card.) A printed circuit board that plugs into an expansion slot.

### ***F***

---

**floppy drive:** A device for reading the information contained on external, portable computer disks called floppy disks.

## ***Appendix 3 - Glossary of Terms***

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### ***H***

---

**hard drive:** Data storage devices. Hard drives magnetically store computer data on spinning internal disks.

**hold down bar:** A metal bar located in the I/O bay of the chassis. It is used to keep I/O cards firmly seated in their slots.

### ***I***

---

**IDE (Integrated Drive Electronics):** A standard of signalling an communicating with a device.

**I/O slot:** A slot for plugging in additional I/O cards to expand the capability of a computer.

**ISA (Industry Standard Architecture):** A 16-bit expansion bus commonly used in PCs.

### ***K***

---

**keyboard connector:** Located on the front control or I/O panel.

**kilobyte (KB):** 1,024 bytes.

### ***L***

---

**LED:** Light Emitting Diode. Long-lasting light emitters usually used as indicators.

**load board:** A board having specific resistance to current flow.

### ***P***

---

**parallel port:** I/O connector used to hook up a printer or other parallel interface device. The parallel port is usually a 25-pin female DB25 connector.

**PCI (Peripheral Component Interconnect):** An optional slot standard for plug-in boards

**port:** Ports are used to connect peripheral devices such as external drives and printers to your computer.

**power good:** Signal used to prevent the computer from starting until the power has stabilized. The power good line switches from 0 to +5 volts within one tenth to one half second after the power supply reaches normal voltage levels. Whenever low input voltage causes the output voltage to fall below operating levels, the power good signal goes back to zero.

## ***Appendix 3 - Glossary of Terms***

---

**power ON/diagnostic LED:** The LED located on the front control panel that indicates that power is present in the computer.

**power supply:** Electrical system that converts AC current from the wall outlet into the DC currents required by the computer circuitry. In a personal computer, +5, -5, +12 and -12 voltages are generated.

**power switch:** Located on the front control panel, the power switch turns power ON to the computer.

### **R**

---

**RAID (Redundant Arrays of Independent Disks):** A storage technology using an array of two or more disks to redundantly store information. If one disk fails in a RAID array, the unit continues to function without loss of data.

**real-time clock (RTC):** A periodic interrupt used to derive local time.

**reset switch:** Button or key that reboots the computer. All current activities are stopped cold and any data in memory is lost.

**retaining bracket:** The bracket on the back of the chassis that holds connectors from the board, usually a DB9 for serial port, a DB25 for parallel port, and mini-DIN connectors for keyboard and mouse.

### **S**

---

**SCSI (Small Computer System Interface):** A high speed, general purpose interface to storage devices.

**serial port:** A two-channel port, one channel used for "In" transmissions and one for "Out" transmissions.

## ***Appendix 3 - Glossary of Terms***

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## ***Appendix 4 - Limited Warranty***

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### **LIMITED WARRANTY**

I-Bus warrants this product to be free of defects in material and workmanship for an initial period of two (2) years from date of delivery to the original purchaser from I-Bus.

During this period, I-Bus will, at its option, repair or replace this product at no additional charge to the purchaser, except as set forth in this warranty agreement.

I-Bus will, at its option, repair or replace this product at no additional charge to the purchaser, if the defect is related to the I-Bus manufactured product, such as power supply, backplanes, other chassis components, or CPUs. I-Bus is not liable for any defects in material or workmanship of any peripherals, products or parts which I-Bus does not design or manufacture. However, I-Bus will honor the original manufacturer's warranty for these products.

I-Bus will analyze the defective component and the customer will be charged in the following instances:

- No problem found: \$75 (U.S. dollars).
- Damage: parts and labor at \$75 per hour with a \$100 minimum charge (U.S. dollars). Receipt of damaged goods voids the I-Bus warranty.

Repair parts and replacement products will be furnished on an exchange basis and will be either new or reconditioned. All replacement parts and products shall become the property of I-Bus, if such parts or products are provided under this warranty agreement. In the event a defect is not related to the I-Bus manufactured product, I-Bus shall repair or replace the defective parts at purchaser's cost and deliver the defective parts to the purchaser.

**This Limited Warranty shall not apply if the product has been misused, carelessly handled, defaced, modified or altered, or if unauthorized repairs have been attempted by others.**

The above warranty is the only warranty authorized by I-Bus and is in lieu of any implied warranties, including implied warranty of merchantability and fitness for a particular purpose.

**In no event will I-Bus be liable for any such damage as lost business, lost profits, lost savings, downtime or delay, labor, repair or material cost, injury to person or property or any similar or dissimilar consequential loss or damage incurred by purchaser, even if I-Bus has been advised of the possibility of such losses or damages.**

In order to obtain warranty service, the product must be delivered to the I-Bus facility, or to an authorized I-Bus service representative, with all included parts and accessories as originally shipped, along with proof of purchase and a Returned Merchandise Authorization (RMA) number.

**The RMA number is obtained, in advance, from I-Bus Customer Service Department and is valid for 30 days. The RMA number must be clearly marked on the exterior of the original shipping container or equivalent. Purchaser will be responsible and liable for any missing or damaged parts. Purchaser agrees to pay shipping charges one way, and to either insure the product or assume the liability for loss or damage during transit. Ship to:**

I-Bus

ATTENTION: RMA REPAIR DEPT.

RMA #####

9174 Sky Park Court

San Diego, CA 92123

I-Bus may issue, at its own discretion, an advanced replacement (AR) on a product if it fails within fifteen (15) days from the date of delivery from I-Bus.

## ***Appendix 5 - FCC Information***

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This CPU board has been tested and is compliant with EU EMC Directive 89/336/EEC when installed in an I-Bus enclosure. If the enclosure is other than I-Bus manufacture, retesting may be required to assure compliance.

OR

This enclosure has been tested and is compliant with EU EMC Directive 89/336/EEC with an I-Bus CPU board installed. If the CPU board is other than I-Bus manufacture, retesting may be required to assure compliance. If multiple cards of the same type, working synchronously, are installed, the system will have to be requalified. Only CE certified boards can be added to the system without retesting.

## ***Appendix 6 - Declaration of Conformity***

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### **DECLARATION OF CONFORMITY**

**Manufacturer:** I-Bus, Inc., A Maxwell Technologies Company  
9174 Sky Park Court  
San Diego, CA 92123  
Telephone (619) 974-8400  
Fax (619) 268-7863

**declares that the products:**

38XXX-YYYY where “X” may be any number from 0-9, and “Y” may be any number from 0-9 with any of the following CPU boards:

Tigershark™ PCI/Pentium 75/90/100/120/133/150/166/200MHz  
Shark™ PCI/Pentium 75/90/100/120/133MHz  
Shark II™ PCI/Pentium 100/120/133/150/166/200MHz  
Orca™ ISA/486 33/50/66/100MHz  
Barracuda™ PCI/486 50/66/100MHz  
I486™ 25/33/50/66MHz  
Leopardshark™ 100/133/166/200/233MHz  
Mako™ 100/133/166/200/233MHz  
Thresher™180/200MHz  
Nautilus™266/333MHz  
StingRay™266/450MHz  
MantaRay™266/450MHz  
Triumph530™166/233MHz  
Hawkfish 233MHz  
BatRay 600MHz  
ThornbackRay 600MHz  
TigerRay 500MHz

46XXX-YYYY where “X” may be any number from 0-9, and “Y” may be any number from 0-9 with any of the following CPU boards:

Tigershark™ PCI/Pentium 75/90/100/120/133/150/166/200MHz  
Shark™ PCI/Pentium 75/90/100/120/133MHz  
Shark II™ PCI/Pentium 100/120/133/150/166/200MHz  
Orca™ ISA/486 33/50/66/100MHz  
Barracuda™ PCI/486 50/66/100MHz  
I486™ 25/33/50/66MHz  
Leopardshark™ 100/133/166/200/233MHz  
Mako™ 100/133/166/200/233MHz  
Thresher™180/200MHz  
Nautilus™266/333MHz  
StingRay™266/450MHz  
MantaRay™266/450MHz  
Triumph530™166/233MHz  
Hawkfish 233MHz  
BatRay 600MHz  
ThornbackRay 600MHz  
TigerRay 500MHz

48XXX-YYYY where “X” may be any number from 0-9, and “Y” may be any number from 0-9 with any of the following CPU boards:

Tigershark™ PCI/Pentium 75/90/100/120/133/150/166/200MHz  
Shark™ PCI/Pentium 75/90/100/120/133MHz  
Shark II™ PCI/Pentium 100/120/133/150/166/200MHz  
Orca™ ISA/486 33/50/66/100MHz  
Barracuda™ PCI/486 50/66/100MHz  
I486™ 25/33/50/66MHz  
Leopardshark™ 100/133/166/200/233MHz

## ***Appendix 6 - Declaration of Conformity***

---

Mako™100/133/166/200/233MHz  
Thresher™180/200MHz  
Nautilus™266/333MHz  
StingRay™266/450MHz  
MantaRay™266/450MHz  
Triumph530™166/233MHz  
Hawkfish 233MHz  
BatRay 600MHz  
ThornbackRay 600MHz  
TigerRay 500MHz

4820-YYYY where “Y” may be any number from 0-9 or any letter with any of the following CPU boards:

Tigershark™ PCI/Pentium 75/90/100/120/133/150/166/200MHz  
Shark™ PCI/Pentium 75/90/100/133MHz  
Shark II™ PCI/Pentium 100/120/133/150/166/200MHz  
Orca™ ISA/486 33/66/100MHz  
Barracuda™ PCI/486 50/66/100MHz  
I486™ 25/33/50/66MHz  
Leopardshark™ 100/133/166/200/233MHz  
Mako™ 100/133/166/200/233MHz  
Thresher™180/200MHz  
Nautilus™266/333MHz  
StingRay™266/450MHz  
MantaRay™266/450MHz  
Triumph530™166/233MHz  
Hawkfish 233MHz  
BatRay 600MHz  
ThornbackRay 600MHz  
TigerRay 500MHz

IFTA-YYYY where “Y” may be any number from 0-9 or any letter with any of the following CPU boards:

Tigershark™ PCI/Pentium 75/90/100/120/133/150/166/200MHz  
Shark™ PCI/Pentium 75/90/100/120/133MHz  
Shark II™ PCI/Pentium 100/120/133/150/166/200MHz  
Orca™ ISA/486 33/50/66/100MHz  
Barracuda™ PCI/486 50/66/100MHz  
I486™ 25/33/50/66MHz  
Leopardshark™ 100/133/166/200/233MHz  
Mako™ 100/133/166/200/233MHz  
Thresher™180/200MHz  
Nautilus™266/333MHz  
StingRay™266/450MHz  
MantaRay™266/450MHz  
Triumph530™166/233MHz  
Hawkfish 233MHz  
BatRay 600MHz  
ThornbackRay 600MHz  
TigerRay 500MHz

SFTA-YYYY where “Y” may be any number from 0-9 or any letter with any of the following CPU boards:

Tigershark™ PCI/Pentium 75/90/100/120/133/150/166/200MHz  
Shark™ PCI/Pentium 75/90/100/133MHz  
Shark II™ PCI/Pentium 100/120/133/150/166/200MHz  
Orca™ ISA/486 33/66/100MHz

## ***Appendix 6 - Declaration of Conformity***

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I486™ 25/33/50/66MHz  
Leopardshark™ 100/133/166/200/233MHz  
Mako™ 100/133/166/200/233MHz  
Thresher™ 180/200MHz  
Nautilus™ 266/333MHz  
StingRay™ 266/450MHz  
MantaRay™ 266/450MHz  
Triumph530™ 166/233MHz  
Hawkfish 233MHz  
BatRay 600MHz  
ThornbackRay 600MHz  
TigerRay 500MHz

**Conforms to the following product specifications:**

Safety: IEC 950 (1991)  
EN60950  
AMI:1993  
AM2:1993  
AM3:1995  
EMC: EN50082 & EN55022 (1988)

*The undersigned hereby declares, on behalf of I-Bus, Inc., A Maxwell Technologies Company, San Diego, CA, that the above referenced products to which this declaration relates, is in conformity with the provision of:*

Council Directive 93/68/EEC (July 22, 1993) when used in accordance with the accompanying user, maintenance and installation instructions.

The Technical Construction File required by this Directive is maintained at the corporate headquarters of I-Bus, Inc., A Maxwell Technologies Company, 9174 Sky Park Court, San Diego, CA 92123.

**Supplementary Information:**

The products herewith comply with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC. The products were tested in a typical configuration.



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Vice President, Engineering Services