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**Hawkfish™**  
Single Board Computer

**User's Guide**



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

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Welcome to the Hawkfish Pentium/Socket 7 single board computer.

The Hawkfish is a brand new generation of proven technologies. It is built with a high performance, cost effective Pentium/Socket 7 CPU with up to 233 MHz, high performance PCI Bus and I/O's, large memory support (256MB), and complies with the new PICMG standard. Furthermore, this is the first Pentium/Socket 7 SBC designed with all advanced features on one SBC.

The Hawkfish can run with a Intel Pentium MMX processor up to 266 MHz, and memory support up to 256 MB SDRAM. The on board enhanced PCI IDE interface can support up to mode 4 PIO and Mode 2 DMA master which also supports Ultra DMA 33. The on board Adaptec AIC 7880 is the popular high performance PCI SCSI master with ultra and ultra wide SCSI interfaces.

The ultra wide SCSI now supports 40MB/s data rate that is high enough for mass storage access. The new C&T 69000 VGA Controller with 2MB embedded SDRAM can support both CRT and panel displays. The Intel single chip 82558 Ethernet Controller supports 10 Base T/ 100 Base TX, full Duplex. An On board PCI Device, the Intel 21152 PCI Bridge Controller is used.

The SMC 37C932 integrates the floppy controller, two serial ports, one parallel port, and keyboard/mouse controller. The two on-chip UARTs are compatible with the NS 16C550, and the parallel port supports EPP/ECP.

The PICMG standard ensures the Hawkfish works with the ISA and PCI backplanes. The system monitor can check voltage levels, fan speeds and temperatures. The flash ROM is used to make the BIOS update easier. An additional keyboard connector is reserved for the keyboard connector on the back plane. The Universal Serial Bus (USB) is also available for flexible connections. The high precision real-time clock/calendar provides accurate scheduling. The watch dog timer is also a standard feature.

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

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### *What you'll have from the package*

In addition to this manual, the Hawkfish series package includes the following items:

- Hawkfish series single board computer x 1
- SIO+PIO cable x1
- 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
- Adaptec SCSI Drivers Diskettes x 3
- Manuals for Adaptec SCSI drivers x 2
- VGA Driver diskette x 1
- LAN Driver diskette x 1
- System Monitor Driver diskette x 2

If any of these items are missing or damaged, please contact I-Bus.

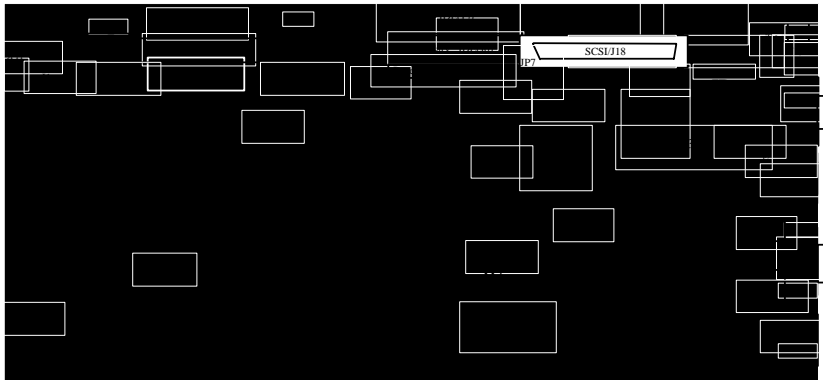
## ***Chapter 2 - Switches and Connectors***

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This chapter gives the definitions and locations of the switches and connectors.

### ***Switches***

Switches on the CPU board are used to select options for different functions. The switch-on or off is to accommodate the variations on the following table.



***Figure 2-1 Switch Positions***

## Chapter 2 - Switches and Connectors

<b>VCORE Voltage</b>	1.9V	2.2V	*2.8V	2.9V	3.2V	3.3V	3.5V
	P266/P166	K6/K6-2 266	P55C	K6-166	K6-233	WINCHIP	
	(0.25micron)	K6/K6-2 300		K6-200	P54C		
	K6-2 333						
SW1.1	ON	OFF	OFF	OFF	OFF	OFF	OFF
SW1.2	ON	OFF	ON	ON	ON	ON	ON
SW1.3	ON	OFF	OFF	OFF	ON	ON	ON
SW1.4	OFF	ON	OFF	OFF	OFF	OFF	ON
SW1.5	OFF	OFF	OFF	ON	OFF	ON	ON

**Table 2-1: VCORE Voltage**

<b>Sensor SMI</b>	Enable	*Disable
SW1.6	ON	OFF

**Table 2-2: Sensor SMI**

<b>For INTEL Processor</b>								
SW2.1	SW2.2	SW2.3	SW2.4	SW2.5	SW2.6	SW2.7	SW2.8	Core/Bus Ratio
ON	OFF	ON	OFF	-	-	-	-	1.5x
OFF	ON	ON	OFF	OFF	ON	-	-	2.0x
OFF	ON	OFF	ON	OFF	ON	-	-	2.5x
ON	OFF	OFF	ON	OFF	ON	-	-	3.0x
ON	OFF	ON	OFF	OFF	ON	-	-	*3.5x
OFF	ON	OFF	ON	ON	OFF	-	-	4.0x

**Table 2-3: Intel Processor**

<b>VCC3 Voltage</b>	*3.3V	3.45V
SW3.1	ON	OFF
SW3.2	OFF	ON

**Table 2-4: VCC3 Voltage**

<b>CPUVIO Voltage</b>	2.5V	*3.3V	3.45V
SW3.3	ON	OFF	OFF
SW3.4	OFF	ON	OFF
SW3.5	OFF	OFF	ON
SW3.6	ON	OFF	OFF
SW4.4	OFF	ON	ON
SW4.5	ON	OFF	OFF

**Table 2-5: CPUVIO Voltage**

## Chapter 2 - Switches and Connectors

<b>CPU CLK(MHz)</b>	50.0	75.0	83.3	68.5	83.3	75.0	60.0	*66.8
<b>PCI CLK</b>	25.0	32.0	41.65	34.25	33.3	37.5	30.0	33.4
SW4.1	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW4.2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW4.3	ON	OFF	ON	OFF	ON	OFF	ON	OFF

**Table 2-6: CPU CLK (Mhz)**

<b>SDRAM Refresh Rate(MHz)</b>	*66	60
SW4.6	ON	OFF

**Table 2-7: SDRAM Refresh Rate(MHz)**

<b>About PANEL</b>	Default	Reserved
SW5.1	*OFF	ON
SW5.2	*ON	OFF
SW5.3	-	
SW5.4	-	

**Table 2-8: About Panel**

<b>PANEL Types</b>	1	2	3	4	5	6	7	8	9	*10	11	12	13	14	15	16
SW5.5	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW5.6	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW5.7	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW5.8	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

**Table 2-9: Panel Type Settings**

<b>PANEL Types</b>	
1	1024x768 Dual Scan STN Color Panel
2	1280x1024 TFT Color Panel
3	640x480 Dual Scan STN Color Panel
4	800x600 Dual Scan STN Color Panel
5	640x480 Sharp TFT Color Panel
6	640x480 18-bit TFT Color Panel
7	1024x768 TFT Color Panel
8	800x600 TFT Color Panel
9	800x600 TFT Color Panel (Large BIOS only)
10	800x600 TFT Color Panel (Large BIOS only)
11	800x600 Dual Scan STN Color Panel (Large BIOS only)
12	800x600 Dual Scan STN Color Panel (Large BIOS only)
13	1024x768 TFT Color Panel (Large BIOS only)
14	1280x1024 Dual Scan STN Color Panel (Large BIOS only)
15	1024x600 Dual Scan STN Color Panel (Large BIOS only)
16	1024x600 TFT Color Panel (Large BIOS only)

**Table 2-10: Panel Types**

## Chapter 2 - Switches and Connectors

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### Switch Settings

M-SYSTEM ADDRESS	*Disable	C0000	C8000	D0000	D8000
SW6.1	OFF	ON	ON	ON	ON
SW6.2	-	ON	ON	OFF	OFF
SW6.3	-	ON	OFF	ON	OFF

**Table 2-11: M-SYSTEM ADDRESS**

BIOS Refresh	Enable	*Disable
SW6.4	ON	OFF

**Table 2-12: BIOS refresh**

SCSI Terminator	*Enable	Disable
SW6.5	ON	OFF

**Table 2-13: SCSI Terminator**

8/16 Bit SCSI	*16 Bit	8 Bit
SW6.6	ON	OFF

**Table 2-14: 8/16 Bit SCSI**

CMOS RAM	Clear	*Normal
SW6.7	ON	OFF

**Table 2-15: CMOS RAM**

ATX Power	*No USE	Use
SW6.8	ON	OFF
J9	NC	1-2

**Table 2-16: ATX Power**

PANEL Voltage	*3.3V	5V
JP2	2-3	1-2

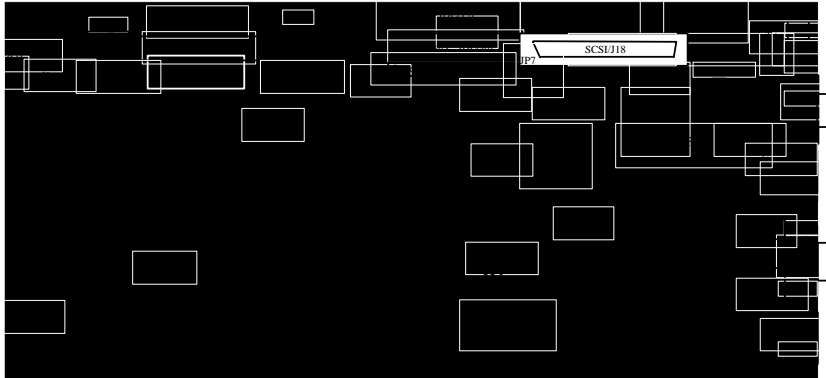
**Table 2-17: Panel Voltage**

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

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### *Connectors*

Connectors on the CPU Board provide interfaces to other devices.



***Figure 2-2: Connector Positions***

## Chapter 2 - Switches and Connectors

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### Connectors Functions

Connector	Function	Remark
J1	FAN Conn.	
J2	DIMM 0	
J3	DIMM 1	
J5	Primary IDE	
J6	Secondary IDE	
J7	PANEL Conn.	
J9	IDE LED Conn.	
J10	Reset	
J12	Floppy	
J14	PIO	
J15	COM2	
J16	USB Conn.	
J17	Speaker	
J18	Keylock	
J19	Keyboard.	
J20	VGA Conn.	CRT
J21	PS/2 Mouse	
J22	COM1	
J23	PS/2 Keyboard	
JP1	CPU Temperature Sensor Pin	
JP2	Panel Voltage	3.3V/5V
JP3	SPEED LED	For LAN
JP4	ACTIVE LED	For LAN
JP5	LINK LED	For LAN
JP6	SCSI LED	
JP7	Ultra Wide SCSI	
JP8	ATX Controller	
JP9	ATX Button-in	
JP10	IR	
JP11	SM BUS	
P2	LAN Connector	

**Table 2-18: Connector Functions**

## Chapter 2 - Switches and Connectors

### Pin Definitions

· J1: Fan Connector

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

**Table 2-19: J1 Fan Connector**

· J5 /J6: IDE Interface Connector

Pin No.	Description	Pin No.	Description
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	IOR#	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 2-20: J5/J6 IDE Interface Connector**

## Chapter 2 - Switches and Connectors

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### · J7: 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
21	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 2-21: J7 Panel Connector**

## Chapter 2 - Switches and Connectors

Description Table	
ENABKL	Backlight enabled control pin (Active high)
+12V SAFE	Backlight power +12V
LP	Latch Pulse/HSYNC Single
DE	Display Enable
SHFCLK	Shift Clock/Pixel Clock
FLM	First Line Marker/VSYNC
P0 – P35	Digital R.G.B. Signal Pixel Data
VDDSAFE	Panel Power
GND	Ground Pin
ENAVEE	Panel Bias Voltage
M/PCLK	Display Enable/Video in port PCLK output

**Table 2-22: Description Table**

· J9: IDE LED Connector

Pin No.	Description
1	+5V
2	HDD Active #

**Table 2-23: J9 LED Connector**

· J10: Reset

Pin No.	Description
1	Reset
2	Ground

**Table 2-24: J10 Reset**

## Chapter 2 - Switches and Connectors

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### · J12: FDC Connector

Pin No.	Description	Pin No.	Description
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 2-25: J12 FDC Connector**

### · J14: Parallel Port Connector

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

**Table 2-26: J14 Parallel Port Connector**

## Chapter 2 - Switches and Connectors

· J15/J22: COM2/COM1 (D-Sub 9 pin)

Pin No.	Description
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 2-27: J15/J22 COM2/COM1**

· J16: USB Connector

Pin No.	Description
1	VCC
2	SBD0-
3	SBD0+
4	SBD1-
5	SBD1+
6	Ground

**Table 2-28: J16 USB Connector**

· J17: Speaker

Pin No.	Description
1	Speaker Signal
2	GND
3	GND
4	+5V

**Table 2-29: J17 Speaker**

## Chapter 2 - Switches and Connectors

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· J18: Keylock

Pin No.	Description
1	+5V
2	N/C
3	Ground
4	Keylock
5	Ground

*Table 2-30: J18 Keylock*

· J19: Keyboard Connector

Pin No.	Description
1	Keyboard Clock
2	Keyboard Data
3	N/C
4	Ground
5	+5V

*Table 2-31: J19 Keyboard Connector*

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

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· J20: VGA Connector (CRT Mode)

<b>terminator</b>	<b>*Enable</b>	<b>Disable</b>
ON	OFF	

***Table 2-32: J20 VGA Connector***

· J21: PS/2 Mouse Connector (Mini DIN)(for 70VS)

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

***Table 2-33: J21 PS/2 Mouse Connector***

## Chapter 2 - Switches and Connectors

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· J23: PS/2 Keyboard/Mouse Connector (Mini DIN)

Pin No.	Description
1	Keyboard DATA
2	Mouse DATA (for 570A, 570VL, 570SL)
3	Gnd
4	+5V
5	Keyboard CLK
6	NC/Mouse CLK (for 570A, 570VL, 570SL)

**Table 2-34: J23 PS/2 Keyboard/Mouse Connector**

· JP3: External SPEED LED for LAN

Pin No.	Description
1	SPEEDLED
2	+5V

**Table 2-35: JP3 External SPEED LED for LAN**

· JP4: External ACTIVE LED for LAN

Pin No.	Description
1	ACTLED
2	+5V

**Table 2-36: JP4 External ACTIVE LED for LAN**

· JP5: External LINK LED for LAN

Pin No.	Description
1	LILED
2	+5V

**Table 2-37: JP5 External LINK LED for LAN**

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

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· JP6: External SCSI LED

<b>Pin No.</b>	<b>Description</b>
1	LED#
2	+5V

***Table 2-38: JP6 External SCSI LED***

## Chapter 2 - Switches and Connectors

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· JP7: Wide SCSI 68-Pin High Density Connector

1	Ground	35	SCSI Data 12
2	Ground	36	SCSI Data13
3	Ground	37	SCSI Data 14
4	Ground	38	SCSI Data 15
5	Ground	39	SCSI high Byte Parity#
6	Ground	40	SCSI Data 0
7	Ground	41	SCSI Data 1
8	Ground	42	SCSI Data 2
9	Ground	43	SCSI Data 3
10	Ground	44	SCSI Data 4
11	Ground	45	SCSI Data 5
12	Ground	46	SCSI Data 6
13	Ground	47	SCSI Data 7
14	Ground	48	SCSI Low Byte Parity#
15	Ground	49	Ground
16	Ground	50	Ground
17	Termination Power	51	Termination Power
18	Termination Power	52	Termination Power
19	N/C	53	N/C
20	Ground	54	Ground
21	Ground	55	Attention#
22	Ground	56	Ground
23	Ground	57	Busy#
24	Ground	58	Acknowledge#
25	Ground	59	Reset#
26	Ground	60	Message#
27	Ground	61	Select#
28	Ground	62	Command/ Data#
29	Ground	63	Request#
30	Ground	64	In/Out#
31	Ground	65	SCSI Data 8
32	Ground	66	SCSI Data 9
33	Ground	67	SCSI Data 10
34	Ground	68	SCSI Data 11

**Table 2-39: JP7 Wide SCSI 68-Pin High Density Connector**

## Chapter 2 - Switches and Connectors

---

· JP8: ATX Controller

Pin No.	Description
1	5VSB
2	GND
3	Wake-up

*Table 2-40: JP8 ATX Controller*

· JP9: ATX Button-in

Pin No.	Description
1	5VSB
2	Button-in

*Table 2-41: ATX Button-in*

· JP10: IR

Pin No.	Description
1	IRRX
2	IRTX
3	GND
4	IR_MODE
5	+5V

*Table 2-42: IR*

· JP11: External SMBUS Connector

Pin No.	Description
1	SMBDATA
2	SMBCLK

*Table 2-43: External SMBUS Connector*

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

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· P2: LAN Connector (for 570SL, 570A)

<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 2-44: P2 LAN Connector**

## ***Chapter 3 - Technical Specifications***

---

### *Specifications*

#### **System architecture**

Socket 7 CPU supported

All in one with VGA, 100 Base TX, Ultra Wide SCSI.

PC'97 fully complied

PCI V2.1 complied

PICMG 2.0 complied

Full size SBC with ISA/PCI Gold finger

#### **CPU support**

Intel Pentium MMX CPU up to 266 MHz (Low power CPU support)

66 MHz CPU clock

#### **Cache memory**

512KB Level 2 cache standard

Pipeline Burst SRAM only

#### **Main memory**

EDO/SDRAM support

64MB SDRAM support

8MB up to 256MB(MAX)

168pin DIMM socket x 2

#### **BIOS**

Award System BIOS with PC'97 support

2M bit flash ROM

C&T VGA BIOS

Adaptec SCSI BIOS

Intel LAN BIOS

## ***Chapter 3 - Technical Specifications***

---

### **Chipset**

Intel 82430TX PCI set

3rd generation Pentium Chip Set with MMX support

Fully comply with PC'97

PCI V2.1 Concurrent PCI

Optimized SDRAM support

### **VGA**

C&T 69000 VGA controller

2MB SDRAM embedded.

CRT & Panel support.

Max. Resolution	Color	Refresh Rate
-----------------	-------	--------------

800 x 600	true color	85 Hz
-----------	------------	-------

1024 x 768	64K color	85 Hz
------------	-----------	-------

1280 x 1024	256 color	60 Hz
-------------	-----------	-------

Drivers Support: window 95/98, Window NT 4.0/5.0

15 pin D-type connector x 1

50 pin panel connector x 1

### **SCSI**

Adaptec AIC 7880 RISC SCSI Controller

Ultra wide SCSI up to 40 MB/S data Transfer rate.

Backward compatible with wide SCSI, SCSI II...etc.

10 Base T/100 Base TX support, full Duplex.

Driver support Windows 95/98, Windows NT 4.0/5.0, SCO Open server, Novell, Netware

68 pin wide SCSI connector

## ***Chapter 3 - Technical Specifications***

---

### **LAN**

Intel 82558 Single Ethernet Controller

10 Base T/100 Base TX support, full Duplex

Complied with PCI V2.1, IEEE 802.3 IEEE 802.3U

Backward compatible with 82557 Ethernet controller netbased modules

Driver support:

Dos/Windows, Netware, Windows95/98, Windows NT 4.0/5.0, SCO

Open Server 5.0

RJ45x1

### **On Board PCI Bridge**

Intel 21152 PCI bridge controller

Controls on board devices

4 PCI slots provides full loading support

### **On Board I/O**

SMC 37C932 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, 26 Pin connector x 1

Floppy Disk controller: 5 1/4" 360K/1.2MB, 3 1/2"

720K/1.2MB/1.44MB/2.88MB support, 34 Pin connector x 1

PCI IDE Hard Disk Interfaces: Support up to four enhanced IDE devices up to mode 4 PIO and mode 2 DMA

Master also supports Ultra DMA 33

On chip Keyboard, mouse controller

On Board 5 pin header x 1 for keyboard

PS/2 Keyboard, 6 pin mini DIN x 1 for 570, 570V, 570VS

(Optional: PS/2 6 pin mini DIN x1 for keyboard/mouse only for 570A, 570VL, and 570SL)

PS/2 mouse, 6 pin mini DIN x 1 for 570, 570V, and 570VS

## ***Chapter 3 - Technical Specifications***

---

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

On Board IR, 5 pin header x 1

### **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 (Bootable)

### **On Board ISA MAX**

ISA MAX circuit for 20 ISA slot support

### **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 Windows95/98, Windows NT 4.0)

### **Watchdog timer**

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

### **Dimensions**

Dimensions: 338mm(D) x 122mm(W)

### **Power requirements**

+5V: 10A(Max)

+/-12V: 20mA(Max)

---

## *Environmental Specifications*

Operating temperatures: 0°C to 60°C

Storage temperatures: -20°C to 80°C

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

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## Chapter 4 - CPU Board

---

This chapter explains how you can expand the system memory and cache memory capabilities on your CPU Board

### *System Memory*

Your system memory provides DIMM (Dual In-line Memory Modules) sockets on the CPU board. The CPU board contains two memory banks: Bank 0 and 1 which corresponds to connector DIMM0 and DIMM1.

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

DIMM 0	DIMM 1	Total Memory
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

**Table 4-1: DIMM Configurations**

## Chapter 4 - CPU Board

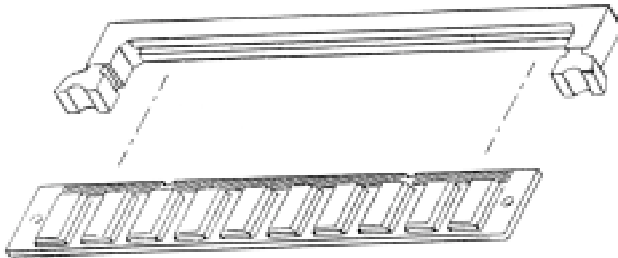
---

### *Installing DIMM*

To install the DIMM:

1. Make sure the two handles of the DIMM socket are in the "open" position, i.e. the handles stay outward.
2. Slowly slide the DIMM along the plastic guides on both ends of the socket.
3. Press the DIMM down into the socket until a click sound is heard. This means the two handles have automatically locked the memory modules into the right position of the DIMM socket as Figure 4-1 shows.

Note: To remove the memory module, push both handles outward. The memory module will eject from the mechanism on the socket.



**Figure 4-1: Installing DIMM**

### *Cache Memory*

The Hawkfish only supports high speed pipeline burst SRAM. The standard configuration is 64K x 64 for 512KB.

### *Changing the CPU*

To change the CPU:

1. Pull the handling bar of the socket upward to the other end to loosen the sockets openings.
2. Carefully lift the existing CPU up to remove it from the socket.



**Figure 4-2: Changing the CPU**

## ***Chapter 4 - CPU Board***

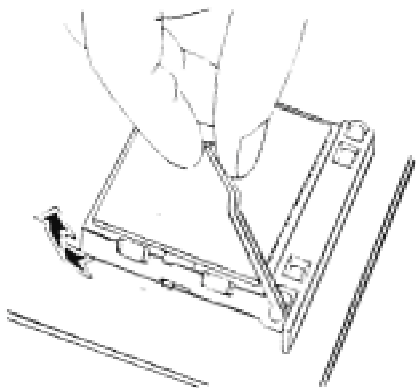
---

### *Installing the CPU*

To install the CPU:

1. Place the new CPU in the middle of the socket, adjusting it beveled corner to line up with the sockets beveled corner.
2. Make sure the pins of the CPU fit evenly into the socket openings.
3. Replace the handling bar to fasten the CPU into the socket.

Note: Be sure to rearrange the jumper setting for the correct clock (SW4.1, SW4.2, SW4.3) and Core/Bus ratio (SW4).



***Figure 4-3: Installing the CPU***

## ***Chapter 5 - Award BIOS Setup***

---

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

### ***Entering Setup***

To enter Setup:

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

Note: Another way to enter setup is to wait until the below message appears 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 set-up.

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

If the message disappears before you are able to respond and you still wish to enter Setup, restart the system by turning it OFF then ON, or press 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 5 - Award BIOS Setup

---

### Control Keys

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

**Table 5-1: 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 pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <F1> or <Esc>.

## Chapter 5 - Award BIOS Setup

---

### The Main Menu

Once you enter Award BIOS CMOS Setup Utility, the Main Menu (Figure 5-1) will appear on the screen. The Main Menu allows you to select from ten setup functions and two exit choices. Use the arrow keys to select the items and press <Enter> to accept or enter the sub-menu.

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

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS	SAVE & EXIT SETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
Esc : Quit	fl fi ◀ : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color

**Figure 5-1: Main Menu**

### Standard CMOS Setup

This setup page includes all the items in a standard compatible BIOS. See Page 5-6 to Page 5-8 for details.

### BIOS Features Setup

This setup page includes all the items of Award special enhanced features. See Page 5-10 to Page 5-15 for details.

### Chipset Features Setup

This setup page includes all the items of the chipset's special features. See Page 5-16 to 5-20 for details.

## ***Chapter 5 - Award BIOS Setup***

---

### **Power Management Setup**

This category determines how much power consumption is used on the system after selecting below items. Default value is Disable. See Page 5-21 to Page 5-24 for details.

### **PNP/PCI Configuration**

This category specifies the assignment of all the IRQ's and DMA's. See Page 5-25 to Page 5-28 for details.

### **Load BIOS Defaults**

BIOS defaults indicate the most appropriate values of the system parameter in which the system would operate in minimum performance. The OEM manufacturer may change the defaults through MODBIN before the binary image is burned 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 5-26 to Page 5-28

### **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 5-29 for details.

### **IDE HDD Auto Detection**

Automatically configure hard disk parameters. See Page 5-30 to Page 5-33 for details.

## Chapter 5 - Award BIOS Setup

### HDD Low Level Format

Hard disk low level format utility. See Page 5-34 to Page 5-35 for details.

### Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

### Exit Without Saving

Abandon all CMOS value changes and exit setup.

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

Date (mm:dd:yy) : Mon, Dec 14 1998								
Time (hh:mm:ss) : 17:58: 3								
HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	
<u>MODE</u>								
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								
640K								
LCD&CRT : Auto								
261120K								
Halt On : All , But keyboard								
384K								
262144K								
Base Memory:								
Extended Memory:								
Other Memory:								
Total Memory:								
ESC : Quit								
F1 : Help								
fl fi < : Select Item								
(Shift) F2 : Change Color								
PU / PD / + / - : Modify								

**Figure 5-2: Standard CMOS Setup Menu**

## ***Chapter 5 - Award BIOS Setup***

---

### ***Standard CMOS Setup Menu***

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes zero, one, or more than one setup items. Use the arrow key to highlight an item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

#### **Date**

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

day	The day of week, Sun through Sat, is determined by the BIOS, and is read only
date	The date, 1 through 31 can be key in with the numerical or function keys
month	The month, from Jan. through Dec.
year	The year, depends on the year of BIOS

#### **Time**

The time format is <hour> <minute> <second>, can be set with either the function key or the numerical key. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

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

These categories identify the 2 types of channels that have been installed in the computer. There are 45 predefined types and 4 user definable types for enhanced IDE BIOS. Type 1 to Type 45 are predefined. Type User is user-definable.

Press PgUp/<+> or PgDn/<-> to select a numbered hard drive type or type the number and press <Enter>. Note that the specifications of your drive must match with the drive table. The hard drive will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use Type User to define your own drive type manually.

## Chapter 5 - Award BIOS Setup

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If you select *Type User*, related information is asked to be entered to the following items. Enter the information directly from the keyboard and press <Enter>. This information should be provided in the documentation from your hard drive vendor or the system manufacturer.

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

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

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

CYLS.            number of cylinders

HEADS          number of heads

PRECOMP       write precom

LANDZONE      landing zone

SECTORS        number of sectors

MODE HDD      access mode

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

### Drive A Type/Drive B Type

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

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

### **Floppy 3 Mode Support:**

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

### **LCD&CRT:**

On board VGA select display type.

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

### **Error Halt On**

This category determines whether the computer will stop or not if an error is detected during power up.

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

## Chapter 5 - Award BIOS Setup

### BIOS Features Setup Menu

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

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CBFFF Shadow	: Disabled
External Cache	: Enabled	CC000-CFFFF Shadow	: Disabled
Quick Power on self test	: Disabled	D0000-D3FFF Shadow	: Disabled
Boot From LAN First	: Disabled	D4000-D7FFF Shadow	: Disabled
Boot Sequence	: A,C,SCSI	D8000-DBFFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	DC000-DFFFF Shadow	: Disabled
Boot up Floppy Seek	: Enabled		
Boot up Numlock Status	: On		
Boot up System Speed	: High		
Gate A20 Option	: Normal		
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 Defaults	
OS Select For DRAM > 64MB	: Non-OS2	F7 : Load Setup Defaults	

Figure 5-3: 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**

Enabled      Warning message appears automatically when system boots up if any attempts are made to access the boot sector or hard drive partition table.

Disabled      (Default) No warning message appears when attempts are made to access the boot sector or hard drive partition table.

## ***Chapter 5 - Award BIOS Setup***

---

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

### **CPU Internal Cache/External Cache**

These two categories speed up memory access. However, it also depends on the CPU and chipset design. If your CPU does not have an Internal Cache then "CPU Internal Cache" will not be displayed. The default value is Enable.

Enabled (Default) Enable cache

Disabled Disable cache

### **Quick Power On Self Test**

This category speeds up the Power On Self Test (POST) after you power on the computer. If it is set to Enable, the BIOS will execute more quickly by skipping check items during POST.

Enabled Enable quick POST

Disabled (Default) Normal POST

### **Boot From LAN First**

This category specifies whether the System Boot accesses through the LAN Boot ROM. If not, just disable it.

Enabled Boot from LAN

Disabled (Default) Do not boot from LAN

### **Boot Sequence**

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

A, C, SCSI Default

C, A, SCSI

## **Chapter 5 - Award BIOS Setup**

---

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

### **Swap Floppy Drive**

This item allows you to determine whether you want to enable the swap floppy drive or not. The choice: Enabled, Disabled (Default).

### **Boot Up Floppy Seek**

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

### **Boot Up NumLock Status**

The default value is On.

On	(Default) Keypad is number keys
Off	Keypad is arrow keys

### **Boot Up System Speed**

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

## ***Chapter 5 - Award BIOS Setup***

---

High (Default) Set the speed to high  
Low Set the speed to low

### **Gate A20 Option**

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

### **Typematic Rate Setting**

This category determines the typematic rate.

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

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

6 (Default) 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)**

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

250 (Default) 250 msec  
500 500 msec  
750 750 msec  
1000 1000 msec

## **Chapter 5 - Award BIOS Setup**

---

### **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	(Default) The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

To disable security:

1. Select PASSWORD SETTING at Main Menu
2. When prompted to enter a password, do not type anything
3. Press <Enter>

Security will be disabled. Once the security is disabled, the system will boot and you can enter Setup freely.

### **PCI/VGA Palette Snoop**

Enables PCI controller to support PCI/VGA palette snoop. If enabled, VGA cycle will transfer to ISA bus. If disabled (Default), VGA cycle will only transfer to PCI bus.

### **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 the DRAM used is larger than 64MB, you have to select "OS 2". Otherwise, non-OS2 (Default) will be selected.

### **Video BIOS Shadow**

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

Enabled	(Default) Video shadow is enabled
Disabled	Video shadow is disabled

## ***Chapter 5 - Award BIOS Setup***

---

### **C8000 - CFFFF Shadow/D0000 - DFFFF Shadow**

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

Enabled            Optional shadow is enabled  
Disabled           (Default) 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 devices. The item is optional only for PCI BIOS.

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

### ***Chipset Features Setup Menu***

Since the features in this section are related to the chipset on the CPU board which are optimized, it is not recommended to change the default settings in the setup table, unless you are extremely knowledgeable about the chipset features.

#### **Auto Configuration**

Auto Configuration selects predetermined optimal 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: Enabled (Default), Disabled.

Note: When this item is enabled, the pre-defined items will become SHOW-ONLY.

## Chapter 5 - Award BIOS Setup

### DRAM Timing

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

60ns DRAM Timing Type.

70ns (Default) DRAM Timing Type.

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

Auto Configuration	: Enabled	CPU Warning Temperature	: Disabled
DRAM Timing	: 70ns	Current CPU Temperature	: 0°C/32°F
		Current CPUFANI Speed	: 1999RPM
		Current Vin (V)	: 1.91V
DRAM Leadoff Timing	: 10/6/4		
DRAM Read Burst (EDO/FP)	: x333/x444		
DRAM Write Burst Timing	: x333		
Fast EDO Lead Off	: Disabled		
Refresh RAS# Assertion	: 5 Clks	Shutdown Temperature	: 60°C/140°F
Fast RAS To CAS Delay	: 3		
DRAM Page Idle Timer	: 2 Clks		
DRAM Enhanced Paging	: Enabled		
Fast MA to RAS# Delay	: 2 Clks		
SDRAM(CAS Lat/RAS-to-CAS)	: 3/3		
SDRAM Speculative Read	: Disabled		
System BIOS Cacheable	: Disabled		
Video BIOS Cacheable	: Disabled	ESC: Quit	↑ → : Select item
8 Bit I/O Recovery Time	: 1	F1 : Help	PU/PD/+/- : Modify
16 Bit I/O Recovery Time	: 2	F5 : Old Values	(Shift) F2 : Color
Memory Hole At 15M-16M	: Disabled	F6 : Load BIOS Defaults	
PCI 2.1 Compliance	: Disabled	F7 : Load Setup Defaults	

Figure 5-4: Chipset Features Setup Menu

### DRAM Read Burst (EDO/FP)

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

x222/x333 Read DRAM (EDO/FPM) timing is 2-2-2/3-3-3

## ***Chapter 5 - Award BIOS Setup***

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x333/x444 (Default) Read DRAM (EDO/FPM) timing is 3-3-3/4-4-4  
x444/x444 Read DRAM (EDO/FPM) timing is 4-4-4/4-4-4

### **DRAM Write Burst Timing**

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

x222 Write DRAM timing is 2-2-2-2  
x333 (Default) Write DRAM timing is 3-3-3-3  
x444 Write DRAM timing is 4-4-4-4

### **Fast EDO Lead Off**

This item allows you to select the Fast EDO Lead Off to enhance the performance. The Choices: Enabled, Disabled (Default).

### **Refresh RAS# Assertion**

This item allows you to select the type of DRAM refresh clock delay.

4Clks The timing type.  
5Clks (Default) The timing type.

### **Fast RAS To CAS Delay**

This field lets you insert a timing delay to get a faster performance between the Row Address Strobe (RAS) and Column Address Strobe (CAS) strobe signals, when DRAM is written to, read from, or refreshed.

2 The timing delay  
3 (Default) The timing delay.

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### **DRAM Enhanced Paging**

This item allows you to determine whether to keep the page open until a page/row is missed or to use additional information to keep the DRAM page open when the host may be "right back". The Choices: Enabled (Default), Disabled.

### **Fast MA To RAS# Delay**

This item allows you to select the DRAM Row Miss timing.

Note: The timing adjustments are independent of DLT timing adjustments.

- 1 One clock (MA setup to RAS# assertion)
- 2 Two clocks (Default).

### **SDRAM (CAS Lat/RAS-to-CAS)**

This item allows you to select the CAS# latency for all SDRAM cycles and RAS# to CAS# delay.

- 2/2 The timing type.
- 3/3 (Default) The timing type.

### **SDRAM Speculative Read**

This item is capable of allowing a DRAM read request to be generated slightly before the address has been fully decoded. This can reduce all read latencies.

More simply, the CPU will issue a read request and include it at the address in memory where the desired data is to be found. This request is received by the DRAM controller. When it is enabled, the controller will issue the read command before it has finished determining the address. The Choices: Enabled, Disabled (Default).

### **System BIOS Cacheable**

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

- Enabled BIOS access cached
- Disabled (Default) BIOS access not cached

### **Video BIOS Cacheable**

Selecting Enabled allows the 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.

Enabled            Video BIOS access cached  
Disabled         (Default) Video BIOS access not cached

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

The recovery time is the length of time (measured in CPU clocks) that the system will be delayed upon completion of an input/output request. This delay takes place because the CPU is operating faster than the input/output bus. 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 the 8 bit I/O. The choices are from NA and 1 (Default) to 8 CPU clocks.

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

This item allows you to determine the recovery time allowed for 16 bit I/O. The choices are NA, 1,2 (Default), 3, and 4 CPU clocks.

### **Memory Hole At 15M-16M.**

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

Enabled     Memory hole supported.  
Disabled    (Default) Memory hole not supported

### **CPU Warning Temperature**

When the temperature is over the CPU warning temperature, then the warning signal will notify you.

### **Current CPU Temperature**

This field displays the current system temperature of the CPU.

## ***Chapter 5 - Award BIOS Setup***

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### **Current CPU FAN1 Speed**

These fields display the current speed of CPU fans.

### **Current Voltage**

These fields display the current voltage.

## ***Power Management Setup***

The Power management setup will appear on your screen as follows:

### **Power Management**

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

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

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

Disabled	No power management. Disable all four modes
Min. Power Saving	Minimum power management. Doze Mode = 1 hr. Standby Mode = 1 hr., Suspend Mode = 1 hr., and HDD Power Down = 15 min.
Max. Power Saving	(Default) Maximum power management -- ONLY AVAILABLE FOR SL CPU'S. Doze Mode = 1 min., Standby Mode = 1 min., Suspend Mode = 1 min., and HDD Power Down = 1 min.

## Chapter 5 - Award BIOS Setup

**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.

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

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

**Figure 5-5: Power Management Setup**

### 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**      (Default) 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.

## ***Chapter 5 - Award BIOS Setup***

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### **Video Off After**

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

N/A	Monitor will remain on during power saving modes.
Suspend	Monitor blanked when the systems enters 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: NA, 3 (Default), 4, 5, 7, 9, 10, 11.

### **PM Timers**

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

### **Doze Mode**

After a set time of system inactivity, the CPU clock will run at slower speed while all other devices continue to operate at full speed when this feature is enabled.

### **Standby Mode**

After the set time of system inactivity, the fixed disk drive and the video will shut off while all other devices continue to operate at full speed when this feature is enabled.

1. Disable      System will never enter STANDBY mode
2. 1 Min      Defines the continuous idle time before the system  
   2 Min      entering STANDBY mode.  
   4 Min

## ***Chapter 5 - Award BIOS Setup***

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- 6 Min     If any item defined in (J) is enabled & active,
- 8 Min     STANDBY timer will be reloaded
- 10 Min
- 20 Min
- 30 Min
- 40 Min
- 1 Hr

### **Suspend Mode**

After a set time of system inactivity, all devices except the CPU will be shut off when this feature is enabled.

### **HDD Power Down**

After a set time of system inactivity, the hard disk drive will be powered down while all other devices remain active when this feature is enabled.

### **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: 12.5%, 25.0%, 37.5%, 50.0%, 62.5% (Default), 75.0%

### **PCI/VGA Active Monitor**

When Enabled, any video activity restarts the global timer for Standby mode. The choices: Enabled (Default), Disabled.

### **Power On 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: Enabled (Default), Disabled.

### **IRQ8 Break Suspend**

You can Enable or Disable monitoring of IRQ8 so it does not awaken

## ***Chapter 5 - Award BIOS Setup***

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the system from Suspend mode. The choices: Enabled, Disabled (Default).

### **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	Enabled (Default), Disabled
Primary IDE 0	Enabled, Disabled (Default)
Primary IDE 1	Enabled, Disabled (Default)
Secondary IDE 0	Enabled, Disabled (Default)
Secondary IDE 1	Enabled, Disabled (Default)
Floppy Disk	Enabled, Disabled (Default)
Serial Port	Enabled (Default), Disabled
Parallel Port	Enabled, Disabled (Default)

## Chapter 5 - Award BIOS Setup

### 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 near the speed the CPU itself when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users make any changes to the default settings.

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

PNP OS Installed	: No	Slot 1 Use IRQ No.	: Auto
Resource Controlled By	: Auto	Slot 2 Use IRQ No.	: Auto
Reset Configuration Data	: Disabled	Slot 3 Use IRQ No.	: Auto
		Slot 4 Use IRQ No.	: Auto
		PCI IDE IRQ Map To	: PCI-AUTO
		Primary IDE INT#	: A
		Secondary IDE INT#	: B
		Assign IRQ for USB	: Enabled
		ESC : Quit	↑ → : Select Item
		F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(Shift) F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

Figure 5-6: PnP/PCI Configuration

#### PNP OS Installed

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

#### Resource Controlled by

The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. If you select Auto, all the interrupt request (IRQ) and DMA assignment fields disappear as the BIOS automatically assigns them. The choice: Auto (Default) and Manual.

## Chapter 5 - Award BIOS Setup

### Reset Configuration Data

Select Enabled to reset the Extended System Configuration Data (ESCD) when you:

1. Exit Setup if you have installed a new add-on and;
2. The system reconfiguration has caused such a serious conflict that the operating system cannot boot. The choices: Enabled and Disabled (Default).

### Assigning IRQ For USB

Assigning IRQ for USB : Enabled

Not assign IRQ for USB : Disabled (Default)

### Integrated Peripherals

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

IDE HDD Block Mode	: Enabled	Onboard Parallel Port	: 378/IRQ 7
IDE Primary Master PIO	: Auto	Parallel Port Mode	: ECP+EPP1.9
IDE Primary Slave PIO	: Auto	ECP Mode Use DMA	: 3
IDE Secondary Master UDMA	: Auto		
IDE Secondary Slave UDMA	: Auto		
IDE Primary Master PIO	: Auto		
IDE Primary Slave PIO	: Auto		
IDE Secondary Master UDMA	: Auto		
IDE Secondary Slave UDMA	: Auto		
On-Chip Primary PCI IDE	: Enabled		
On-Chip Secondary PCI IDE	: Enabled		
Onboard PCI SCSI Chip	: Enabled		
USB Keyboard Support	: Disabled		
Onboard FDC Controller	: Enabled		
Onboard Serial Port 1	: Auto	ESC : Quit	↑ : Select Item
Onboard Serial Port 2	: Auto	F1 : Help	PU/PD/+/- : Modify
UART2 Mode	: Standard	F5 : Old Values	(Shift) F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

Figure 5-7: Integrated Peripherals

### **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          (Default) IDE controller uses standard mode.

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

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

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

Ultra DMA/33 implementation is possible only if your 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: Auto (Default), Disabled

### **On-Chip Primary/Secondary PCI IDE**

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled (Default) to activate each channel separately.

### **Onboard PCI SCSI Chip**

This item allows you to determine whether the onboard PCI SCSI chip is enabled (Default) 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: Enabled, Disabled (Default).

## ***Chapter 5 - Award BIOS Setup***

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### **Onboard FDC Controller**

Select Enabled if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install FDC or the system has no floppy drive, select Disabled in this field. The choices: Enabled (Default), Disabled.

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

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

### **UART 2 Mode**

This item allows you to determine the Infra Red (IR) function of onboard I/O chip. The choices: Standard (Default), IrDA1.0, ASK-IR, IrDA1.1

### **Duplex Select**

This item allows you to select the IR function when you select the UART 2 Mode to be IrDA1.0, ASK-IR, IrDA1.1 The choices are Half, Full.

### **TxD, RxD Active**

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

### **Onboard Parallel Port**

Select a logical LPT port name and matching address for the physical parallel (printer) port. The choices: 378H/IRQ7 (Default), 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

## ***Chapter 5 - Award BIOS Setup***

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software can support EPP or ECP mode. The choices: SPP, ECP+EPP1.7, EPP1.7+SPP, EPP1.9+SPP, ECP, ECP+EPP1.9 (Default), and Normal.

### **ECP Mode Use DMA**

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

## ***Chapter 5 - Award BIOS Setup***

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### *Supervisor/User Password Setting*

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

supervisor password: can enter and change the setup menu options

user password: can enter but does not have the access to change setup menu options.

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 a password, up to eight characters in length
2. Press <Enter>.

The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password:

1. Type the password again
2. Press <Enter>.

Note: Pressing <Esc> will 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 the password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents unauthorized people from changing any part of your system configuration. Additionally, when a password is enabled, you can also require the BIOS to request the password every time your system is rebooted. This can 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 5 - Award BIOS Setup

### IDE HDD Auto Detection

The Enhance IDE features are 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 are supported by the HDD including NORMAL, LBA & LARGE.

If the 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 BIOS  
CMOS SETUP UTILITY  
AWARD SOFTWARE, INC.

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR
<b>MODE</b>							
Primary Master:							
Select Primary Master Option (N = Skip) : N							
OPTION	SIZE	CYLS	HEADS	PRECOMP	LANDZ	SECTORS	MODE
1(Y)	516	1120	1	65535	1119	59	NORMAL
2	516	524	32	0	1119	63	LBA
3	516	560	32	65535	1119	59	LARGE

Figure 5-8: IDE HDD Auto Detection

<II> Standard CMOS Setup

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

HARD DISK	TYPE	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

Table 5-2: Standard CMOS Setup

## Chapter 5 - Award BIOS Setup

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### HDD Modes

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

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

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

no. Cylinder	(1024)
x no. Head	( 16)
x no. Sector	( 63)
x no. per sector	( 512)
<hr/>	
528 Megabytes	

If the user sets the 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 and 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 heads, sectors, and cylinders 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)
<hr/>	
8.4 Gigabytes	

### LARGE mode

Extended HDD access mode is supported by Award Software. Some IDE HDDs contain more than 1024 cylinder without LBA support (in some cases, the user may not want LBA). The Award BIOS provides yet another alternative to support these kinds of HDD.

## Chapter 5 - Award BIOS Setup

Example of LARGE mode:

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

BIOS tricks DOS (or other OS) that the number of cylinders is less than 1024 by dividing it by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT13h in order to access the right HDD address. Maximum HDD size:

$$\begin{aligned}
 & \text{no. Cylinder} && ( 1024) \\
 & \times \text{ no. Head} && ( 32) \\
 & \times \text{ no. Sector} && ( 63) \\
 & \times \text{ bytes per sector} && ( 512)
 \end{aligned}$$

---

1 Gigabytes

### 2. Remarks

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

Hard Disk Low Level Format Utility								
SELECT DRIVE BAD TRACK LIST PREFORMAT		NO. CYLS HEAD						
Current select drive is: C								
DRIVE: C CYLINDER: 0 HEAD : 0								
		Size	Cyls	Head	Precomp	Landz	Sector	Mode
Primary Master	:	0	0	0	0	0	0	AUTO
Primary Slave	:	0	0	0	65535	65535	0	AUTO
Secondary Master	:	0	0	0	0	0	0	AUTO
Secondary Slave	:	0	0	0	0	65280	0	AUTO
Up/Down- Select item      ENTER-Accept      ESC-Exit/Abort Copyright (C) Award Software, Inc. 1992-98 All Rights Reserved								

**Figure 5-9: Low Level Format Utility Main Menu**

## ***Chapter 5 - Award BIOS Setup***

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### ***Hard Disk Low Level Format Utility***

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

#### **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 an installed hard disk drive C or D. Listed at the bottom of the screen is the drive automatically detected by the utility.

#### **Bad Track List**

##### Auto scan bad track

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

##### Add bad track

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.

## ***Chapter 5 - Award BIOS Setup***

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### 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.

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

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

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

During the Power On Self Test (POST), if the BIOS detects an error requiring a 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

## **Chapter 5 - Award BIOS Setup**

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### **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 detected or the drive does not contain proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you set 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.

## **Chapter 5 - Award BIOS Setup**

### **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 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 allows you to run the EISA Configuration Utility.

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

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

## **Chapter 5 - Award BIOS Setup**

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### **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 allows you to run the EISA Configuration Utility.

### **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.

### **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

## **Chapter 5 - Award BIOS Setup**

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.

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

## **Chapter 5 - Award BIOS Setup**

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### 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 allows you to run the EISA Configuration Utility.

### 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 allows you to run the EISA Configuration Utility.

### 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 allows you to run the EISA configuration utility.

## Chapter 5 - Award BIOS Setup

### 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 includes:<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-detection of onboard DRAM & Cache
C3	<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>
C5	Copy the BIOS from ROM into E0000-FFFFFF shadow RAM so that POST will go faster
01-02	Reserved
03	Initialize EISA registers (EISA BIOS only)
04	Reserved
05	<ol style="list-style-type: none"><li>1. Keyboard Controller Self-Test</li><li>2. Enable Keyboard Interface</li></ol>
06	Reserved
07	Verifies CMOS s basic R/W functionality
BE	Program defaults values into chipset according to the MODBINable Chipset Default Table
09	<ol style="list-style-type: none"><li>1. Program the configuration register of Cyrix CPU according to the MODBINable Cyrix Register Table</li><li>2. OEM specific cache initialization (if needed)</li></ol>
0A	<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 no from 33-120 with Dummy(Suprious) 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 5-3: BIOS Reference POST Codes**

## Chapter 5 - Award BIOS Setup

This code is for boot block.

POST (hex)	Description
C0	1. Turn off OEM specific cache, shadow... 2. Initialize all the standard devices with default values standard devices includes: -DMA controller (8237) -Programmable Interrupt Controller (8259) -Programmable Interval Timer (8254) -RTC chip
C1	Auto-detection of onboard DRAM & Cache
C3	Checking checksum of compressed code
C5	Copy the BIOS from ROM into E0000-FFFFFF shadow RAM so that POST will go faster
01	Clear base memory 0~640K
0C	Initial interrupt vector 00-1FH
0D	Initial ISA VGA
41H	Enable FDD and detect media type
FFH	Boot from FDD

**Table 5-4: BootBlock POST codes**

## Chapter 5 - Award BIOS Setup

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The following is for Non-Compressed version only.

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

**Table 5-5: Non-Compressed Version POST Codes**

## Chapter 5 - Award BIOS Setup

The following POST Codes are for all Compress Versions and Non-Compress Versions.

POST (hex)	Description
0B	<ol style="list-style-type: none"> <li>1. Verify the RTC time is valid or not</li> <li>2. Detect bad battery</li> <li>3. Read CMOS data into BIOS stack area</li> <li>4. PnP initializations including (PnP BIOS only) <ul style="list-style-type: none"> <li>-Assign CSN to PnP ISA card</li> <li>-Create resource map from ESCD</li> </ul> </li> <li>5. Assign IO &amp; Memory for PCI devices (PCI BIOS only)</li> </ol>
0C	Initialization of the BIOS Data Area (40 : 00 -40:FF)
0D	<ol style="list-style-type: none"> <li>1. Program some of the Chipset s value according to Setup. (Early Setup Value Program)</li> <li>2. Measure CPU speed for display &amp; decide the system clock speed</li> <li>3. Video initialization including Monochrome, CGA, EGA/VGA . If no display device found, the speaker will beep which consists of one single long beep followed by two short beeps.</li> </ol>
0E	<ol style="list-style-type: none"> <li>1. Initialize the APIC (Multi-Processor BIOS only)</li> <li>2. Test video RAM (If Monochrome display device found)</li> <li>3. Show messages including: <ul style="list-style-type: none"> <li>-Award Logo, Copyright string, BIOS Date code &amp; Part No.</li> <li>-OEM specific sign on messages</li> <li>-Energy Star Logo (Green BIOS ONLY)</li> <li>-CPU brand, type &amp; speed</li> <li>-Test system BIOS checksum(Non-Compress Version only)</li> </ul> </li> </ol>
0F	DMA channel 0 test
10	DMA channel 1 test
11	DMA page registers test
12-13	Reserved
14	Test 8254 Timer 0 Counter 2.
15	Test 8259 interrupt mask bits for channel 1
16	Test 8259 interrupt mask bits for channel 2
17	Reserved
19	Test 8259 functionality
1A-1D	Reserved
1E	If EISA NVM checksum is good, execute EISA initialization (EISA BIOS only)
1F-29	Reserved
30	Detect Base Memory & Extended Memory Size
31	<ol style="list-style-type: none"> <li>1. Test Base Memory from 256K to 640K</li> <li>2. Test Extended Memory from 1M to the top of memory</li> </ol>

**Table 5-6: Compress and Non-Compressed Version POST Codes**

## Chapter 5 - Award BIOS Setup

32	<ol style="list-style-type: none"> <li>1. Display the Award Plug &amp; Play BIOS Extension message (PnP 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>
POST (hex)	Description
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>
3E	<p>Try to turn on Level 2 cache</p> <p>Note: Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST 61h</p>
BF	<ol style="list-style-type: none"> <li>1. Program the rest of the Chipset s value according to Setup. (Later Setup Value Program)</li> <li>2. If auto-configuration is enabled, programmed the chipset with pre-defined values in the MODBINable Auto-Table</li> </ol>
41	Initialize floppy disk drive controller
42	Initialize Hard drive controller
43	If it is a PnP BIOS, initialize serial & parallel ports
44	Reserved
45	Initialize math coprocessor.
46-4D	Reserved
4E	If there is any error detected (such as video , kb...), show all the error messages on the screen & wait for user to press <F1> key
4F	<ol style="list-style-type: none"> <li>1. If password is needed, ask for password</li> <li>2. Clear the Energy Star Logo (Green BIOS only)</li> </ol>
50	Write all CMOS values currently in the BIOS stack area back into the CMOS
51	Reserved
52	<ol style="list-style-type: none"> <li>1. Initialize all ISA ROMs</li> <li>2. Later PCI initializations (PCI BIOS only) <ul style="list-style-type: none"> <li>-assign IRQ to PCI devices</li> <li>-initialize all PCI ROMs</li> </ul> </li> <li>3. PnP Initializations (PnP BIOS only) <ul style="list-style-type: none"> <li>-assign IO, Memory, IRQ &amp; DMA to PnP ISA devices</li> <li>-initialize all PnP ISA ROMs</li> </ul> </li> <li>4. Program shadows RAM according to Setup settings</li> <li>5. Program parity according to Setup setting</li> <li>6. Power Management Initialization <ul style="list-style-type: none"> <li>-Enable/Disable global PM</li> <li>-APM interface initialization</li> </ul> </li> </ol>
53	<ol style="list-style-type: none"> <li>1. If it is NOT a PnP BIOS, initialize serial &amp; parallel ports</li> <li>2. Initialize time value in BIOS data area by translate the RTC time value into a timer tick value</li> </ol>
60	Setup Virus Protection (Boot Sector Protection) functionality according

**Table 5-6: Compress and Non-Compressed Version POST Codes con't**

## Chapter 5 - Award BIOS Setup

### 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	Land Zone	Example Model
1	10	306	4	17	128	305	TEAC SD510, MMI 112, 5412
2	21	615	4	17	300	615	Seagate ST225, ST4026
3	32	615	6	17	300	615	
4	65	940	8	17	512	940	
5	49	940	6	17	512	940	
6	21	615	4	17	65535	615	Seagate ST125, Tandon TM262
7	32	462	8	17	256	511	
8	31	733	5	17	65535	733	Tandon TM 703
9	117	900	15	17	65535	901	
10	21	820	3	17	65535	820	
11	37	855	5	17	65535	855	
12	52	855	7	17	65535	855	
13	21	306	8	17	128	319	Disctron 526, MMI M125
14	44	733	7	17	65535	733	
15		Reserved					
16	21	612	4	17	0	663	Microscience HH725, Syquest 3250, 3425
17	42	977	5	17	300	977	
18	59	977	7	17	65535	977	
19	62	1024	7	17	512	1023	
20	31	733	5	17	300	732	
21	44	733	7	17	300	732	
22	31	733	5	17	300	733	Seagate ST4038
23	10	306	4	17	0	336	
24	42	977	5	17	65535	976	Seagate ST4051
25	80	1024	9	17	65535	1023	Seagate ST4096
26	74	1224	7	17	65535	1223	Maxtor 2085
27	117	1224	11	17	65535	1223	Maxtor 2140, Priam S14

**Table 5-7: BIOS Default Drive Table**

## Chapter 5 - Award BIOS Setup

28	159	1224	15	17	65535	1223	Maxtor 2190, Priam S19
Type	Size (MB)	Cylinders	Heads	Sectors	Write Precomp	Land Zone	Example Model
29	71	1024	8	17	65535	1023	Maxtor 1085, Micropolis 1325
30	98	1024	11	17	65535	1023	Maxtor 1105, 1120, 4780
31	87	918	11	17	65535	1023	Maxtor 1170
32	72	925	9	17	65535	926	CDC 9415
33	89	1024	10	17	65535	1023	
34	106	1024	12	17	65535	1023	
35	115	1024	13	17	65535	1023	
36	124	1024	14	17	65535	1023	
37	17	1024	2	17	65535	1023	
38	142	1024	16	17	65535	1023	
39	119	918	15	17	65535	1023	Maxtor 1140, 4380
40	42	820	6	17	65535	820	Seagate ST251
41	44	1024	5	17	65535	1023	Seagate 4053 Miniscribe 3053/6053
42	68	1024	5	26	65535	1023	Miniscribe 3053/6053 RLL
43	42	809	6	17	65535	852	Miniscribe 3650
44	64	809	6	26	65535	852	Miniscribe 3675 RLL
45	104	776	8	33	65535	775	Conner CP3104
Auto							
User							
None							

**Table 5-7: BIOS Default Drive Table**

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

### ***Watch Dog Timer Working Procedure***

The Watch Dog Timer (WDT) is the special hardware device. The WDT is used to monitor the computer system. If the system is not functioning normally, it will have some measures to fix the system.

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

The operator has to write a value into the WDT Configuration Register (Write the control value to the Configuration Port), and clear the 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 active for	Reset NMI	Default at Reset
WDT Active Time	1 sec 2 sec 4 sec 8 sec 16 sec 32 sec 64 sec	Default at 64 sec

***Table A1-1: Watch Dog Timer Character and Function***

## Appendix 1 - Watch Dog Timer

### Watch Dog Timer Control Register

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

The following is the Control Register bit definition.

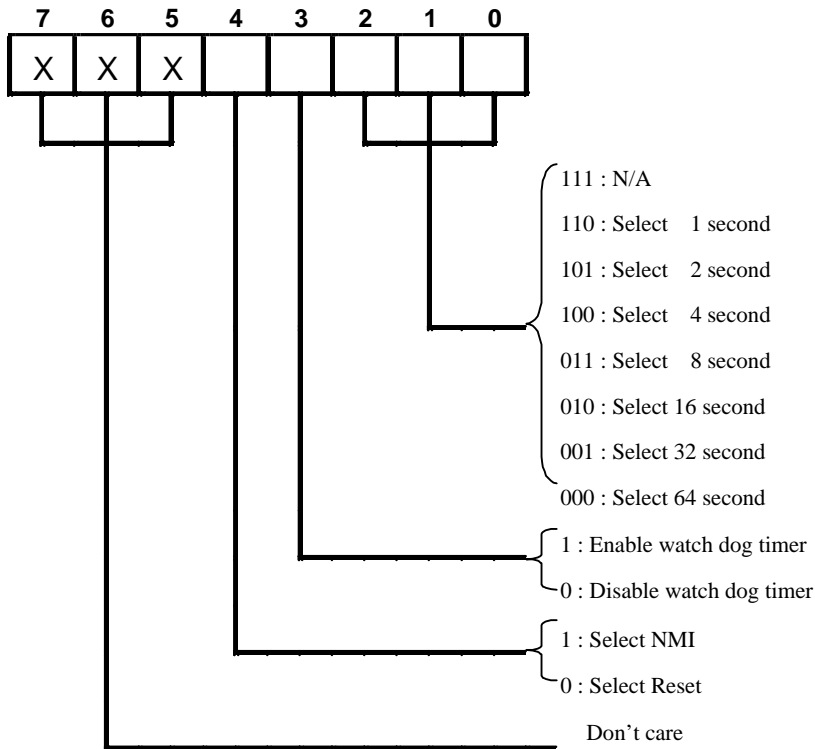


Figure A1-1: Watch Dog Timer Control Register

## 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 the power is on or when the system is reset. The following means the initial value of WDT (00000000b):

<u>Bit</u>	<u>Value</u>	<u>Mean</u>
4	0	Select Reset
3	0	Disable watch dog timer
2, 1, 0	0 0 0	Select 64 second

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

To initialize the SQW of the RTC processor is to set the SQW signal whose output 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 reads the WDT Configuration Port and the interval cannot be longer than the preset time. Otherwise, the WDT will generate a NMI or reset signal from the system.

The following is an example of clear from 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. Make sure the initial value is zero before enabling the WDT.

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

You can set the WDT Control Register to control the WDT working mode. The initial value of the WDT Control Register is as follows:

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

You must plan an option from the 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 completing the above settings, you must output the Control Registers value to the WDT Configuration Port, before WDT will start according to the above setting.

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

You should build in a mechanism in the program to continue to read the WDT Configuration Port for clearing the WDT before the time is up.

## Appendix 2 - Memory Mapping

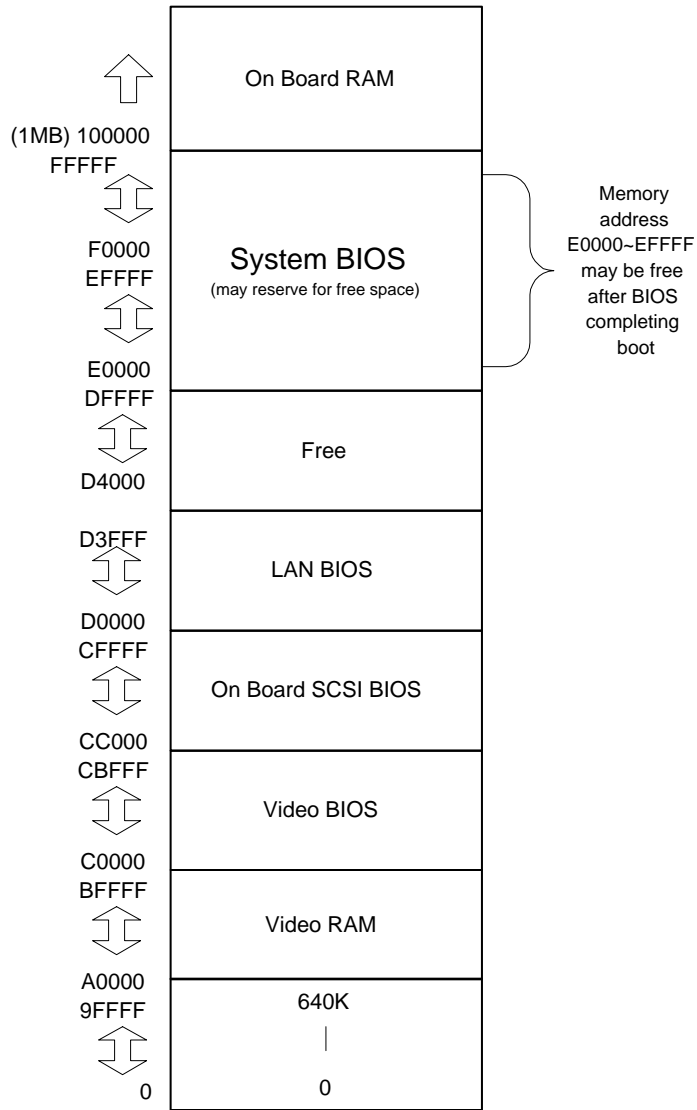


Figure A2-1: Memory Mapping

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## ***Appendix 3 - 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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

**WARNING:** This equipment has been tested and found to comply with the limits for a Class “A” digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

**Note:** This product was FCC verified under test conditions that included the use of shielded I/O cables and connectors between system components. To be in compliance with FCC regulations, the user must use shielded cables and connectors and install them properly.

## ***Appendix 5 - Declaration of Conformity***

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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 5 - 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 233 MHz

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 233 MHz

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

## ***Appendix 5 - Declaration of Conformity***

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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™166/233MHx  
Hawkfish 233 MHz

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™166/233MHx  
Hawkfish 233 MHz

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™166/233MHx  
Hawkfish 233 MHz

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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  
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 233 MHz

**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.



Vice President, Engineering Services