GLOBAL
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Integration with Integrity

User's Manual

Version 1.0

3307540

Half-size PCI Slot-bus Socket 370 CPU SBC with Flat Panel / CRT/ TMDS / TV-out SVGA, Dual 10/100 LAN, Audio, and Compact Flash Interfaces.

Introduction

The Single Board Computer is based on Intel 815E chipset that combines PC-133, 133MHz FSB, UltraDMA/100 IDE technologies and rich 4xAGP 2D/3D graphics capabilities in a single package. Its onboard 10Base-T/100Base-TX Fast Ethernet, CRT display controller, and a daughterboard connector for Flat TMDS Panel Link LCD (DVI) or TV-out Interfaces by adding communication and multimedia features to its powerful function.

A wide range of CPUs including Intel® Pentium® III/ Tualatin / Celeron™ and C3 processors are supported up to 1.4GHz at 133MHz FSB, while memory is expandable up to 512MB PC-133 SDRAM.

The Intel 815E chipset consists of the 82815 GMCH Northbridge and 82801BA ICH2 Super Southbridge. It integrates Intel 815/ Sil 164 DVI supported with 4xAGP data transfer by using Dynamic Video Memory Technology.

The highlight of the Super Southbridge supports high speed PCI UltraDMA/100 enhanced IDE which can tremendously increases transfer speed for database applications. Other exclusive features include onboard DiskOnChip®+ 2000 socket for memory up to 288MB.

Specifications

General Specifications

- **CPU**: Socket 370 FC-PGA2/FC-PGA Pentium®III, Tualatin, Celeron™, VIA C3™ with 133/100 MHz FSB

- **Chipset**: Intel 815E (82815 GMCH Northbridge and 82801BA ICH2 Southbridge) integrates Graphics Memory Controller Hub with Dynamic Video Memory Technology and supports PC-133 memory bus, 133MHz FSB and UltraATA/100 IDE interfaces

- **BIOS**: AWARD® Flash BIOS Green & Soft Off function version 6.0, LS120, multiple boot function, FWH 2MB

- **Green Function**: power saving supported in BIOS. DOZE /STANDBY / SUSPEND modes, ACPI & APM

- **L2 Cache**: Integrated on CPU

- **DRAM Memory**: up to 512MB of SDRAM in one 144-pin SODIMM socket (supports PC-133 SDRAM)

- **Enhanced IDE with Ultra DMA**: supports one port and up to 2 ATAPI devices. Ultra DMA transfer 33/66 and 100 MB/sec

- **Watchdog Timer**: 128-level timer generates RESET or NMI when your application loses control over the system.

- **Real-time Clock**: built-in chipset with lithium battery backup for 5 years of data retention. CMOS data backup of BIOS setup and BIOS default.

High Speed Multi I/O

- **Chipset**: ITE IT8712F-A

- **Serial Ports**: One onboard high speed COM1 port with RS-232C (2x5 pin header 2.0 pitch) and one onboard high speed COM2 port with RS232/422/485. Both with 16C550 compatible UART and 16 byte FIFO.

- **USB**: 4 onboard USB ver. 1.1 ports (Dual 2x 5-pin header with 2.0 pitch)

- **SIR Interface**: onboard IrDA TX/RX port (6-pin header)

- **Floppy Disk Drive Interface**: 2 floppy disk drives, 5¼" (360 KB or 1.2 MB) and 3½" (720 KB, 1.44 MB or 2.88 MB).

- **Bi-directional Parallel Port**: SPP, EPP and ECP mode.

- **Keyboard and Mouse Connectors**: external PS/2 KB/Mouse port (2-in-1 mini DIN) onboard AT Keyboard port (5-pin box header)

- **GPIO Interface**: one connector with 4 bit GPI & 4 bit GPO

Network Interface Controller

- **Chipset**: Intel 82559 & ICH2 82562ET PHY
- **Type**: 10/100 Mbps, auto switching
- **Connector**: external RJ-45 with LEDs on bracket

Display Controller

- **Chipset**: 4x AGP Intel 82815 2D/3D engines integrated in Intel 815E with shared memory up to 32M
- **Display Type**: CRT (VGA, SVGA, XGA, SXGA) and LCD (optional, see LCD Daughterboard) Type
- **Connectors**: external DB15 for CRT on bracket and DVI Connector for TMDS daughterboard
- **LCD Display Daughterboard (optional)**: TMDS Panel Link with DVI interface

Solid State Disk

- **Type**: Compact Flash Socket supports Type I/II
- **Capacity**: up to 640 MByte

Environmental and Power

- **Power Requirements**: +5 V @ 4.7 A (typical), ±12 V ; (FC-PGA Pentium® III 800 MHz at 133 FSB and 256 MB PC-133 SDRAM)
- **CPU Power**: onboard PWM switching power supply for auto detects CPU core voltage
- **System Monitoring and Alarm**: CPU and System temperature, system voltage and cooling fan RPM.
- **Board Dimensions**: 185 mm x 127 mm
- **Board Weight:** 0.28 Kg.
- **Operating Temperature**: 0 to 60°C (32 to 140°F)

Board Image
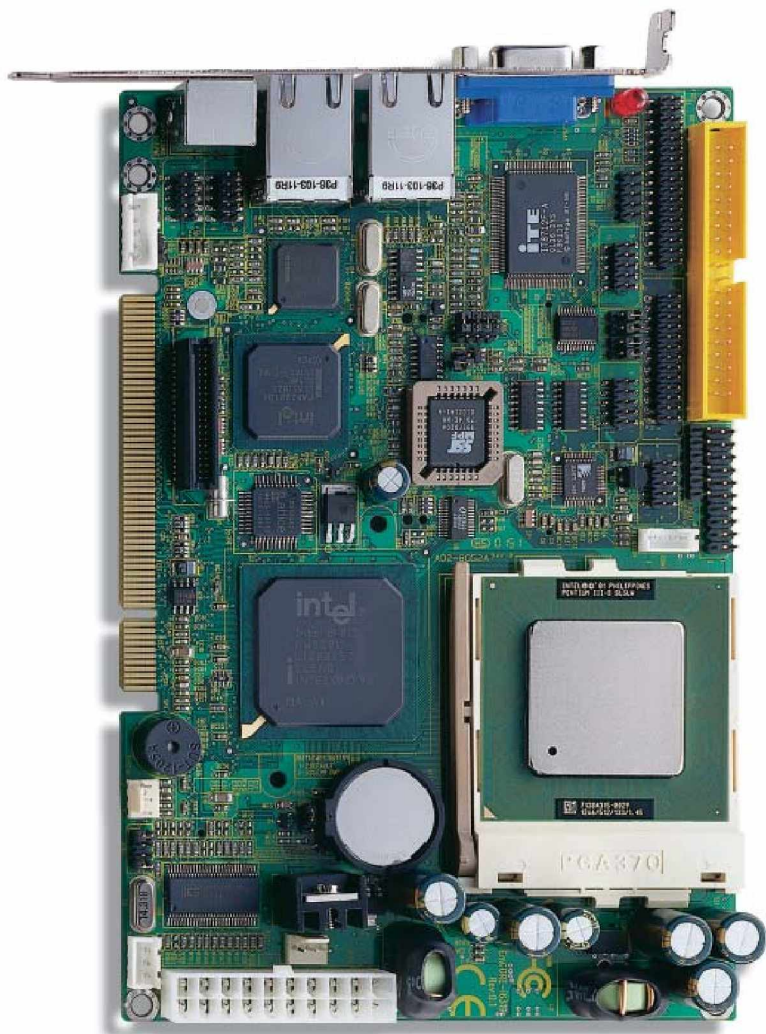
Warning

Single Board Computers and their components contain very delicate Integrated Circuits (IC). To protect the Single Board Computer and its components against damage from static electricity, you should always follow the following precautions when handling it :

1. Disconnect your Single Board Computer from the power source when you want to work on the inside

2. Hold the board by the edges and try not to touch the IC chips, leads or circuitry

3. Use a grounded wrist strap when handling computer components.

4. Place components on a grounded antistatic pad or on the bag that came with the Single Board Computer, whenever components are separated from the system
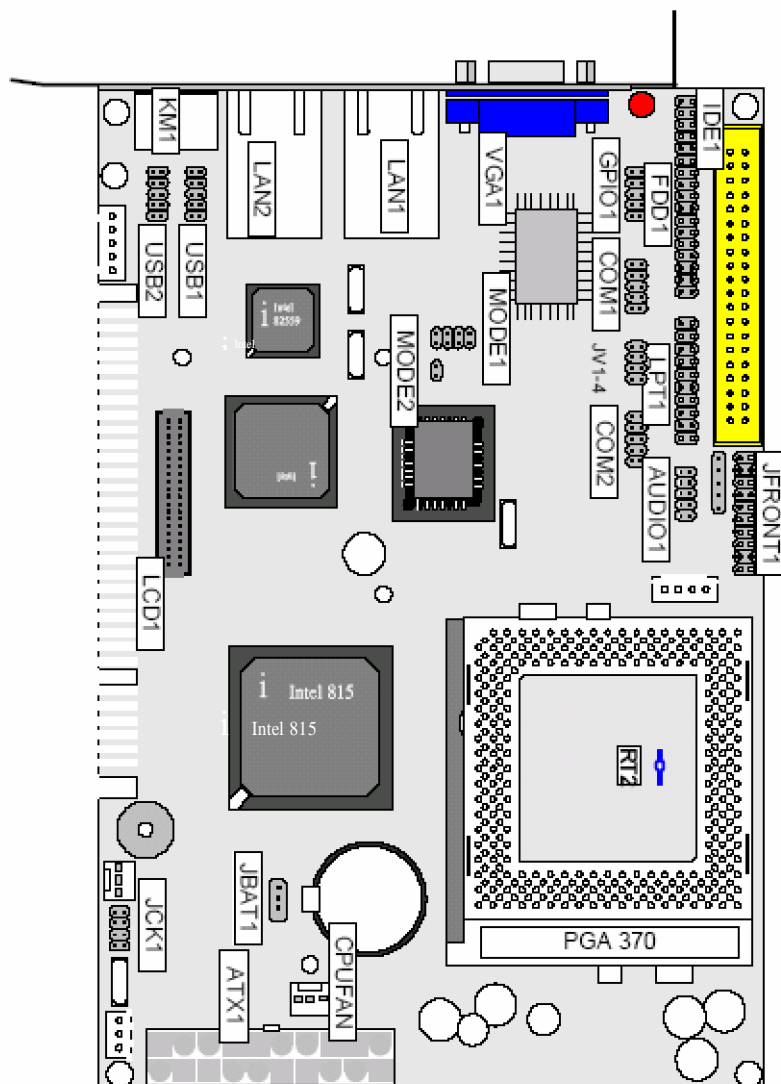
Jumper/Connector   Quick   Reference

Jumpers

Lable	Function
JBAT1	Clear CMOS
JV1~JV4	COM1 & COM2 Power select
JCK1	CPU Frequency Select
JP1	PCI for Serial IRQ & PME function
Mode1, Mode2	RS 232/422/485 Selected

Jumper/Connector   Quick   Reference

Connectors

Label	Function
ATX1	ATX Power Connector
AUDIO1	Audio Connector
CFD1	Compact Flash Disk Connector
CDIN1	CD ROM audio connector
COM1	Serial Port: COM1
COM2	Serial Port: COM2
CPUFAN1	CPU FAN1 Connector
SODIMM1	one socket with 72 pin SODIMM
ATK1	ATX Feature Connector
EKB	External Keyboard Connector
JFRONT1	Front Panel
FDD1	Floppy Disk Connector
IDE1	Primary IDE Connector
KM1	PS/2 Keyboard & Mouse
LCD1	TMDS-DVI Connector
LAN1	10/100M LAN1 Connector
LAN2	10/100M LAN2 Connector
LPT1	Parallel Port
GPIO1	GPIO Connector
IRDA1	Infrared (IR) Connector
SYSFAN1	Chassis Auxiliary Fan Connector
USB1	USB Port 0,1
USB2	USB Port 2,3
VGA1	CRT SVGA Connector

CMOS Jumper Settings

CMOS Setup (JBAT1)

Type: JBAT1: onboard 3-pin header

CMOS Setup (JBAT1)		J1
Keep CMOS	1-2	ON
Clear CMOS	2-3	ON
default setting		

1 2 3
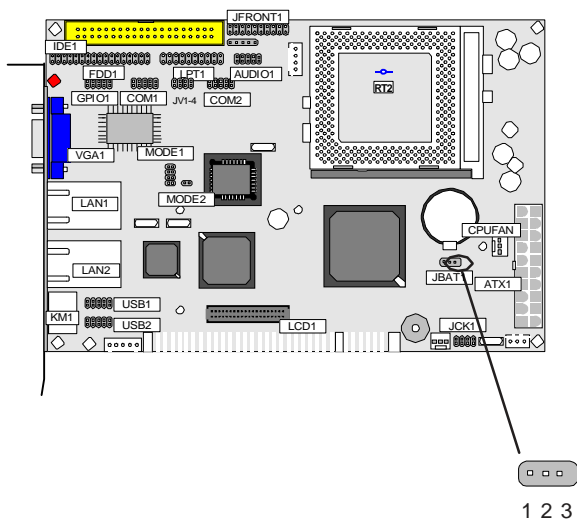
CPU Frequency Select

CPU Frequency Select

The FSB/Core ratio has been prefixed inside the Pentium-III and Celeron CPUs by Intel. The prefixed ratio is auto-detected by the 3307540.

CPU Frequency is ratio multiplied by FSB speed. The FSB value can be set by jumper to 66, 100 or 133 depending on the speed of the Pentium-III/ Tualatin / Celeron. Maximum frequency supported can up to 1.4 GHz

CPU FSB Speed SELECT (JCK1)

1-2	3-4	5-6	7-8	Speed
OFF	ON	ON	OFF	66 MHz
OFF	ON	OFF	OFF	100 MHz
ON	OFF	OFF	ON	133 Mhz / Auto

default setting

2468

1357
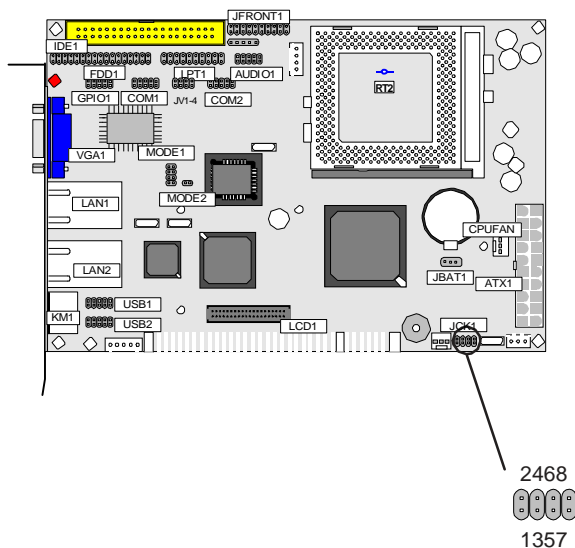
Watchdog   Timer

Watchdog Output

The onboard watchdog timer can be set up either reboot by system RESET or
invoking an NMI (Non-Maskable Interrupt). To initialize or refresh the watchdog
timer writing of port 444 is sufficient. To disable the watchdog time read port
044h.

Status	Action
Enable/refresh the Watchdog Timer	I/O Write 444
Disable the Watchdog Timer.	I/O Read 044H

After the watchdog timer has been initialized by writing port F2, it has to be
strobed at preconfigured intervals to keep it from issuing a RESET or NMI.

The watchdog timer timeout intervals are set by software programming.
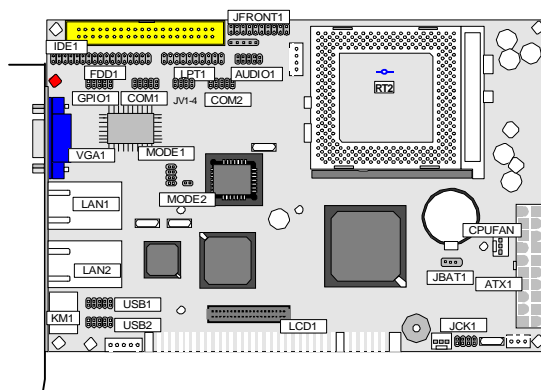
Timeout   Values

Timeout values are programmed. The watchdog timer supports 127 steps.
use the table on the next page to find the hexadecimal value that needs to
be passed on to get the correct timer interval. Look subsequently at the
program example how to pass the value to the watchdog timer.

Timeout   Table

Level	Value	Seconds	Level	Value	Seconds	Level	Value	Seconds
1	1	1	2	2	2	3	3	3
4	4	4	5	5	5	6	6	6
7	7	7	8	8	8	9	9	9
10	A	10	11	B	11	12	C	12
13	D	13	14	E	14	15	F	15
16	10	16	17	11	17	18	12	18
19	13	19	20	14	20	21	15	21
22	16	22	23	17	23	24	18	24
25	19	25	26	1A	26	27	1B	27
28	1C	28	29	1D	29	30	1E	30
31	1F	31	32	20	32	33	21	33
34	22	34	35	23	35	36	24	36
37	25	37	38	26	38	39	27	39
40	28	40	41	29	41	42	2A	42
43	2B	43	44	2C	44	45	2D	45
46	2E	46	47	2F	47	48	30	48
49	31	49	50	32	50	51	33	51
52	34	52	53	35	53	54	36	54
55	37	55	56	38	56	57	39	57
58	3A	58	59	3B	59	60	3C	60
61	3D	61	62	3E	62	63	3F	63
64	40	64	65	41	65	66	42	66
67	43	67	68	44	68	69	45	69
70	46	70	71	47	71	72	48	72
73	49	73	74	4A	74	75	4B	75
76	4C	76	77	4D	77	78	4E	78
79	4F	79	80	50	80	81	51	81
82	52	82	83	53	83	84	54	84
85	55	85	86	56	86	87	57	87
88	58	88	89	59	89	90	5A	90
91	5B	91	92	5C	92	93	5D	93
94	5E	94	95	5F	95	96	60	96
97	61	97	98	62	98	99	63	99
100	64	100	101	65	101	102	66	102
103	67	103	104	68	104	105	69	105
106	6A	106	107	6B	107	108	6C	108
109	6D	109	110	6E	110	111	6F	111
112	70	112	113	71	113	114	72	114
115	73	115	116	74	116	117	75	117
118	76	118	119	77	119	120	78	120
121	79	121	122	7A	122	123	7B	123
124	7C	124	125	7D	125	126	7E	126
127	7F	127						

Programming   Example

The following program is an examples of how to enable, disable and refresh the Watchdog timer:

```
WDT_EN_RF         equ       444

WDT_DIS equ       044h

WT_Enable         push AX; Save AX,DX
                  push DX
                  mov DX,WDT_EN_RF; Enable Timer mov
                  AX,INTERVAL; Set Timeout Value
                  out DX,AX
                  pop DX; Restore DX,AX
                  pop AX
                  ret

WT_Refresh        push AX; Save AX,DX
                  push DX
                  mov DX,WDT_EN_RF; Refresh Timer mov
                  AX,INTERVAL; Set Timeout Value
                  out DX,AX
                  pop DX; Restore DX,AX
                  pop AX
                  ret

WT_Disable        push AX; Save AX,DX
                  push DX
                  mov DX,WDT_DIS; Disable Timer
                  in AX,DX
                  pop DX; Restore DX,AX
                  pop AX
                  ret

WT_Disable        push AX; save AX,DX
                  push DX
                  mov DX,WDT_DIS; Disable Timer
                  in AX,DX
                  pop DX; restore DX,AX
                  pop AX
                  ret
```

Serial Port Selection (RS232C/422/485)

RS-232/422/485 Mode on COM2

RS-232/422/485 Mode select (Mode 1, Mode2)

COM1 & COM2 Power voltage select (JV1, JV2, JV3 & JV4)

The onboard COM2 port can be configured to operate in RS232 or RS-422/RS-485 modes. RS-422 modes differ in the way RX/TX is being handled. Jumper Mode1 & Mode2 switch between RS-232 or RS-422/485 mode. All of the RS-232/422/485 modes are available on COM2.

JV1 & JV2 can be operated on the voltage for COM1, so JV3 & JV4 do the same thing for COM2.
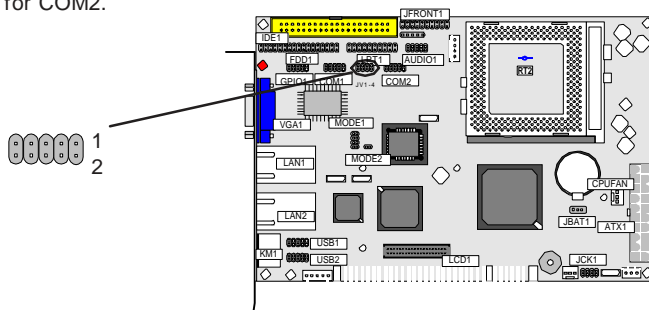
COM2 Selection	Mode1	Mode2
RS-232	ON	ALL OFF
RS-422	OFF	ALL OFF
RS-485	OFF	ALL ON

default setting

COM1 Power Select	JV1	JV2
COM1	1-2	1-2
+5V (pin 1)	2-3	1-2
+12V (pin 9)	1-2	2-3
+5V (pin 1) & +12V (pin 9)	2-3	2-3

default setting

COM2 Power Select	JV3	JV4
COM2	1-2	1-2
+5V (pin 1)	2-3	1-2
+12V (pin 9)	1-2	2-3
+5V (pin 1) & +12V (pin 9)	2-3	2-3

default setting

Hardware monitor Alarm

Hardware monitor Alarm

Hardware monitor alarm can auto detect three main functions for the system: CPU Current Temperature, Current Fan and Current Voltage.

PCI for Serial IRQ & PME (JP1)

JP1 has been placed the "Power Manager Event" as default. When you select to enable PME, you can access Power Manger Event under BIOS setting. To choose "Serial IRQ" enabled, you have to make sure the add-on cards also supporting this function as well.

Jumper: **JP1**
Type: onboard 3 pin header

PIN	JP1
1-2	Serial IRQ
2-3	PME / Default

default setting

1
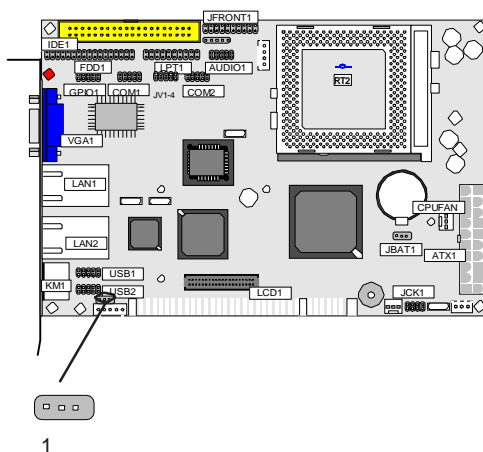
Solid State Disk

Compact Flash Disk

Installation   Instructions

1. Make sure the Single Board Computer is powered OFF.

2. Plug the Compact Flash Type I/II device into its socket. Verify the direction is correct on Secondary IDE which is located in the back of SBC.

3. Power up the system
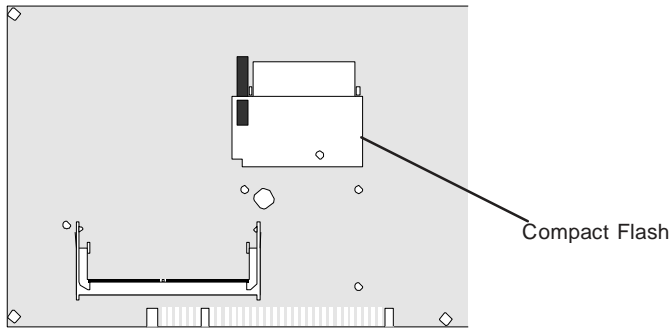
Compact Flash

For more information on Compact Flash disk, visit Pretech Web site at

http:// www.pretech.com

Where you can find the utilities manual, data sheets and application notes. In addition, you can find the latest Compact Flash disk utilities.

Dual Fast Ethernet Connectors

LAN Port

Connector: **LAN1, LAN2**
Type: external RJ-45 on bracket

Pin	1	2	3	4	5	6	7	8
Description	TX+	TX-	RX+	NC	NC	RX-	NC	NC
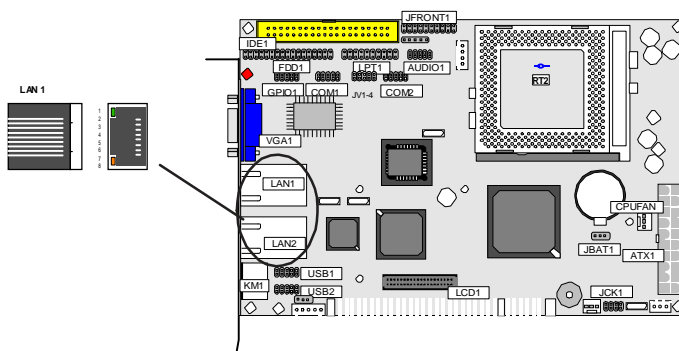
LAN LED Indicator on RJ-45 connector

Connector: **LED**
Type: 2 LED

LED	ACT (yellow)	Speed (green)
Description	Active Transfer	100 MB mode

Power Connector

ATX Feature Connector

ATX Feature Connector:EATX1

Type: onboard 3-pin Wafer connector

1 2 3

Pin	Description
1	PS-ON
2	GND
3	5VSB

ATX Power Connector (ATX1)

Connector: **ATX1**
Type: 20 pin

Pin	Description	Pin	Description
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	GND	13	GND
4	+5V	14	Power On
5	GND	15	GND
6	+5V	16	GND
7	GND	17	GND
8	Power Good	18	-5V
9	+5V Standby	19	+5V
10	+12V	20	+5V

CPU Fan Connector
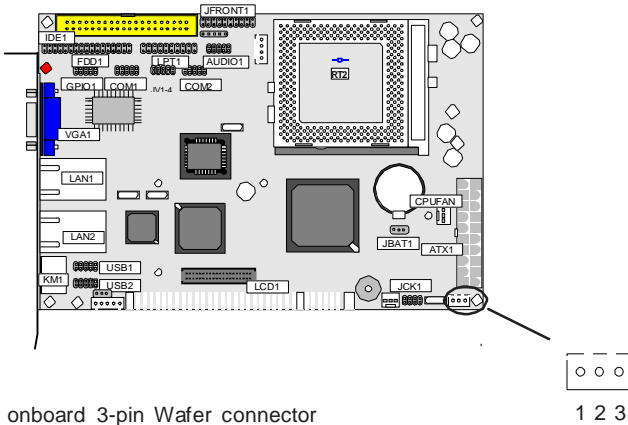
Connector: **CPUFAN1**
Type: onboard 3-pin wafer connector

Pin	Description
1	GND
2	+12V
3	FAN_CTL

CPUFAN
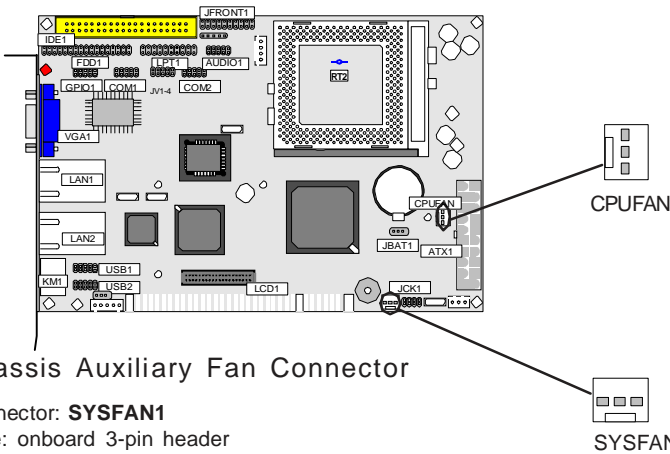
SYSFAN

Chassis Auxiliary Fan Connector

Connector: **SYSFAN1**
Type: onboard 3-pin header

Pin	Description
1	GND
2	+12V
3	FAN_CTL

Switches   and   Indicators
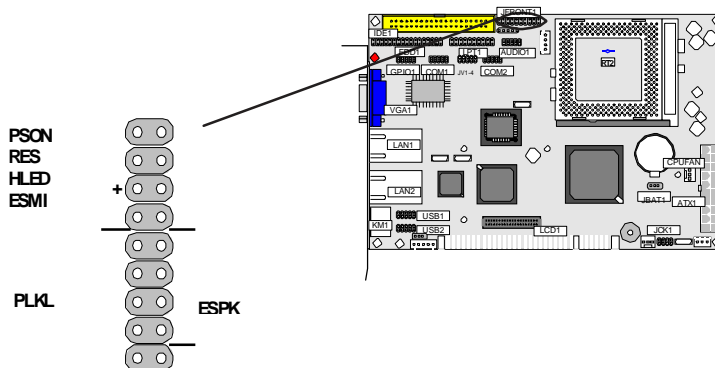
Connector: **JFRONT1**
Type: onboard 20-pin header

Pin	Jumper	Description
1-2	PWRBTN	power button
2-4	RESET	reset function
5-6	EXTSMI	external SMI
7-8	HD LED	Hard Disk LED
9-10	GNLED	Green LED
11		**NC**
12, 14	SLPBTN	sleep button
13,15,17,19	SPKE	external speaker
16, 18, 20	PWRLED	power LED

Connector: **SPKE**

Pin	Description
13	Speak +
15	NC
17	NC
19	Speak -

Connector: **PWRLED**

Pin	Description
16	LED -
18	NC
20	LED +

Floppy Disk Drive Connector

Connector: **FDD1**
Type: onboard 34-pin box header
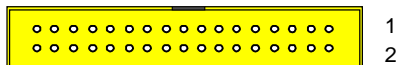
Pin	Description	Pin	Description
1	GND	2	DRIVE DENSITY SELECT 0
3	GND	4	DRIVE DENSITY SELECT 1
5	GND	6	NC
7	GND	8	#INDEX
9	GND	10	#MOTOR ENABLE A
11	GND	12	#DRIVER SELECT B
13	GND	14	#DRIVER SELECT A
15	GND	16	#MOTOR ENABLE B
17	GND	18	#DIRECTION
19	GND	20	#STEP
21	GND	22	#WRITE DATA
23	GND	24	#WRITE GATE
25	GND	26	#TRACK 0
27	GND	28	#WRITE PROTECT
29	GND	30	#READ DATA
31	GND	32	#HEAD SELECT
33	GND	34	#DISK CHANGE

Enhanced IDE Connector

1
2
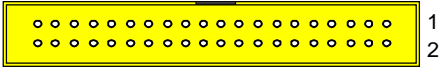
Connector: **IDE1**
Type: Two onboard 40-pin box headers, primary and secondary IDE

Pin	Description	Pin	Description
1	#RESET	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	NC/(Vcc)
21	REQ	22	GND
23	#IOW	24	GND
25	#IOR	26	GND
27	#IORDY	28	IDESEL
29	#DACK	30	GND
31	IRQ	32	NC
33	ADDR1	34	CBLID
35	ADDR0	36	ADDR2
37	#CS0	38	#CS1(#HD SELET1)
39	#ACT	40	GND

LCD   Interface   Connector

TMDS LCD / External TV Encoder Port (LCD1)

Connector: **LCD1**
Type: Onboard 42-pin header

Pin	Description	Pin	Description
1	GPIO	2	GND
3	Vcc	4	FPBKLENR
5	5V FTSCL	6	VCC3
7	5V FTSDA	8	GND
9	5V HTPLG	10	VCC3
11	GND	12	VCC3
13	FPVDDEN	14	FTD11
15	Vcc 12	16	FTD10
17	PCI RST#	18	FTD9
19	Vcc	20	VEE_OK
21	3V HTPLG	22	FTD8
23	3V FTSDA	24	FTD7
25	3V FTSCL	26	FTD6
27	GND	28	CRT_VSYNC
29	SL_STALL	30	FTD5
31	FTVSYNC	32	FTD4
33	FTHSYNC	34	FTD3
35	FTBLNK#	36	GND
37	CRT_HSYNC	38	FTD2
39	FTCLK1	40	FTD1
41	FTCLK0	42	FTD0

Peripheral Port

Parallel Port

Connector: **LPT1**
Type: onboard 26-pin box header
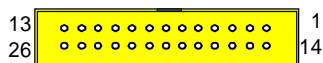
LPT1

Pin	Description	Pin	Description
1	#STROBE	14	#AUTO FEED
2	DATA0	15	#ERROR
3	DATA1	16	#INITIALIZE
4	DATA2	17	#SELECT INPUT
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	#ACKNOWLEDGE	23	GND
11	BUSY	24	GND
12	PAPER EMPTY	25	GND
13	SELECT	26	GND

USB Ports

USB1 (USB2)

Connector: **USB1, USB2**
Type: onboard Two 10-pin box headers for four USB
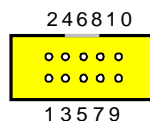
Pin	Description	Pin	Description
1	VCC	2	VCC
3	DATA-	4	DATA-
5	DATA+	6	DATA+
7	GND	8	GND
9	GND	10	GND

SIR

Connector: **IRDA1**
Type: onboard 6-pin header

Pin	Description	Pin	Description
1	Vcc	2	CIRTX
3	IRRX	4	GND
5	IRTX	6	CIRTX

CRT SVGA

Connector: **VGA1**
Type: external 15-pin D-sub female connector on bracket

VGA1
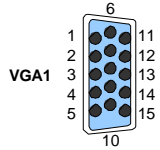
Pin	Description	Pin	Description	Pin	Description
1	RED	6	GND	11	NC
2	GREEN	7	GND	12	VDDAT
3	BLUE	8	GND	13	HSYNC
4	NC	9	Vcc	14	VSYNC
5	GND	10	GND	15	VDCLK

AT Keyboard

EKB

Connector: **EKB**
Type: Onboard 5-pin header
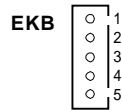
Pin	Description	Pin	Description
1	CLK	2	DATA
3	NC	4	GND
5	Vcc		

Note: ATKB1doesn't provide Vcc power pin on pin-5, that is, ATKB1 cannot connect to AT keyboard directly. ATBK1 supports AT keyboard with passive backplane.

PS/2 Keyboard & Mouse

Connector: **KM1**
Type: external 6-pin Mini DIN connector on bracket
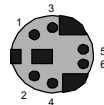
Pin	Description	Pin	Description
1	KB-DATA	2	MS-DATA
3	GND	4	VCC
5	KB-CLK	6	MS-CLK

Note: KB1 supports PS/2 keyboard directly, and PS/2 mouse supported with the additional PS2 1-to-2 cable in the standard packing.

COM1 with RS-232 Mode

COM1

Connector: **COM1**
Type: onboard 10-pin box header
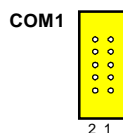
Pin	Description	Pin	Description
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	NC

COM2 with RS-232/422/485 Mode

COM2

Connector: **COM2**
Type: onboard 10-pin box header
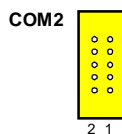
RS-422 Mode

Pin	Description	Pin	Description
1	TX-	2	TX+
3	RX+	4	RX-
5	X	6	X
7	X	8	X
9	X	10	X

GPIO Connector (GPIO1)

Connector: **GPIO1**
Type: onboard 10-pin header
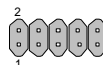
Pin	Description	Pin	Description
1	GPIO 7	2	GPIO 6
3	GPIO 5	4	GPIO 4
5	GPIO 3	6	GPIO 2
7	GPIO 1	8	GPIO 0
9	VCC	10	GND

The following pages show how to run the example as 4 bit of GPI and 4 bit GPO on GPIO program. It also can be defined the different number of GPIO by using this program. Please use TASM to compiler the program and execute under DOS environment.

GPIO Sample Program

```
;  set  gpio5~gpio8  is  output  data
;  set  gpio1~gpio4  is  input  data
;

.model  small
.code


init_dugutak_port:

   call  unlock_chip
   mov  ax,00707h
   call  write_chip
   mov  ax,0ff26h
   call  write_chip


   mov  ax,00fb9h  ;Rx[b9h]set  internal  pull-up  en/dis
   call  write_chip  ;set  1  to  internal  pull-up  enable
                     ;when  ah=00000011b
                     ;gpio7  &  gpio8  set  to  pull-up
                     ;output  use  only


   mov  ax,0ffc1h
   call  write_chip


   mov  ax,00fc9h  ;Rx[c9h]set  digital  I/O  in/out
   call  write_chip  ;set  1  to  output
                     ;when  ah=00001111b
                     ;gpio5,gpio6,gpio7,gpio8  are  input
                     ;other  is  output
   call  lock_chip


run_digital_port:
   mov    dx,801h  ;digital  I/O  index  address=801h
   mov    al,0ffh  ;output=high
   out    dx,al
   jcxz   short  $+2

   mov    ah,4ch  ;return  to  DOS
   int    21h
```

```
unlock_chip:
   mov        al,87h
   out        2eh,al
   jcxz       short $+2
   move       al,01h
   out        2eh,al
   jcxz       short $+2
   mov        al,55h
   out        2eh,al
   jcxz       short $+2
   move       al,551h
   out        2eh,al
   jcxz       short $+2
   ret


 lock_chip:
   move       al,0aah
   out        2eh,al
   jcxz       short $+2
   ret

write_chip:

   out        2eh,al
   jcxz       short $+2
   move       al,ah
   out        2fh,al
   jcxz       short $+2

   ret

end
```

Audio Interface Port (AUDIO)

Connector: **AUDIO1**
Type: onboard 10-pin header

Pin	Description	Pin	Description
1	LINE LEFT	2	LINE RIGHT
3	GND	4	GND
5	MIC	6	MIC VCC
7	GND	8	GND
9	OUT LEFT	10	OUT RIGHT

CDROM audio connector (CDIN1)

Connector: **CDIN1**
Type: onboard 4-pin box header

Pin	Description	Pin	Description
1	CD Left	2	GND
3	GND	4	CD Right

System Resources

Interrupt Assignment

IRQ Address	Description
0	System Timer
1	Keyboard (KB output buffer full)
2	Programmable Interrupt Controller
3	Serial Port 2 (COM2)
4	Serial Port 1 (COM1)
5	Audio device & SMP bus
6	Floppy controller
7	Parallel Port 1
8	Real-Time Clock
9	SCI IRQ used by ACPI bus
10	Ethernet 1
11	Ethernet 2
12	PS/2 Mouse
13	Numeric data processor
14	Primary IDE Controller
15	Secondary IDE Controller

I/O Address Space

Address	Description
0000 - 001F	DMA Controller
0020 - 003F	PIC
0040 - 005F	System Timer
0060 - 006F	Keyboard
0070 - 007F	System CMOS / Real time clock
0080 - 008F	DMA Controller
00A0 - 00BF	PIC
00C0 - 00DF	DMA Controller
00F0 - 00FF	Floating Point Unit
01F0 - 01F7	Primary IDE channel
02F8 - 02FF	Communications Port
03C0 - 03DF	VGA
03F6 - 03F6	Primary IDE channel
03F8 - 03FF	Communications Port

0500 - 050F	Intel 82801BA (M) SMBus	
0CF8 - 0CFF	PCI	
C000 - CFFF	PCI Bus	
C000 - C03F	Intel Corporation 82801BA(M) SMBus	
C000 - C03F	Intel 82559 SMBus	
D000 - D01F	Intel Corporation 82801BA(M) USB (Hub A)	
D000 - D01F	USB - uhci	
D400 - D41F	Intel Corporation 82801BA(M) USB (Hub B)	
D400 - D41F	USB - uhci	
D800 - D8FF	Intel Corporation 82801BA(M) AC'97 Audio	
DC00 - DC3F	Intel Corporation 82801BA(M) AC'97 Audio	
F000 - F00F	Intel Corporation 82801BA IDE U100	
F000 - F007	Primary IDE channel	
F008 - F00F	Secondary IDE channel	

PCI Bus Map

Functino	Device ID	INT# A,B,C,D	GNT#
LAN1	AD16	INTC	
PCI slot 1	AD31	INTB,C,D,A	GNTA
PCI slot 2	AD30	INTC,D,A,B	GNTB
PCI slot 3	AD29	INTD,A,B,C	GNTC
PCI slot 4	AD28	INTA,B,C,D	GNTD

AWARD BIOS Setup

The SBC uses the Award PCI/ISA BIOS version 6.0 for the system configuration. The Award BIOS setup program is designed to provide the maximum flexibility in configuring the system by offering various options which could be selected for end-user requirements. This chapter is written to assist you in the proper usage of these features.

To access AWARD PCI/ISA BIOS Setup program, press <Del> key. The Main Menu will be displayed at this time.

```
       CMOS Setup Utility - Copyright (C) 1984-2002 Award Software

    ▶ Standard CMOS Features          ▶ PC Health Status

    ▶ Advanced BIOS Features          ▶ Frequency/Voltage Control

    ▶ Advanced Chipset Features          Load Optimized Defaults

    ▶ Integrated Peripherals             Set Password

    ▶ Power Management Setup             Save & Exit Setup

    ▶ PnP/PCI Configurations             Exit Without Saving


    Esc : Quit                      ↑ ↓ → ←   : Select Item
    F10 : Save & Exit Setup

                    Time, Date, Hard Disk Type...
```

Once you enter the AwardBIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

Setup Items

The main menu includes the following main setup categories. Recall that some systems may not include all entries.

Standard CMOS Features
Use this menu for basic system configuration.

Advanced BIOS Features
Use this menu to set the Advanced Features available on your system.

Advanced Chipset Features
Use this menu to change the values in the chipset registers and optimize your system's performance.

Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.

Power Management Setup
Use this menu to specify your settings for power management.

PnP / PCI Configuration
This entry appears if your system supports PnP / PCI.

PC Health Status
Use this menu to describe the CPU temperature of system

Frequency/Voltage Control
Use this menu to specify your settings for frequency/voltage control.

Load Optimized Defaults
Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

Set Password
Use this menu to set User and Supervisor Passwords.

Save & Exit Setup
Save CMOS value changes to CMOS and exit setup.

Exit Without Save
Abandon all CMOS value changes and exit setup.

Standard CMOS Setup

```
          CMOS Setup Utility - Copyright (C) 1984-2002 Award Software
                              Standard CMOS Features

    Date (mm:dd:yy)            Thu, Jul 17 2003          Item Help
    Time (hh:mm:ss)            11 : 52 :  9
                                                    Menu Level   ►
  ► IDE Primary Master
  ► IDE Primary Slave                               Change the day, month,
  ► IDE Secondary Master     [ None]                year and century
  ► IDE Secondary Slave      [ None]

    Drive A                   [1.44M, 3.5 in.]
    Drive B                   [None]

    Video                     [EGA/VGA]
    Halt On                   [All , But Keyboard]

    Base Memory                     640K
    Extended Memory               65472K
    Total Memory                   1024K


 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
            F5:Previous Values                  F7: Optimized Defaults
```

:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help

F5:Previous Values F6:Fail-SAfe Defaults F7:Optimized Defaults

Date
The BIOS determines the day of the week from the other date information; this field is for information only.

Time
The time format is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Press the « or (key to move to the desired field . Press the PgUp or PgDn key to increment the setting, or type the desired value into the field.

IDE Primary Master/Slave
IDE Secondary Master/Slave
Options are in sub menu (see page 30)

Drive A, B
Select the correct specifications for the diskette drive(s) installed in the computer.

> **None** :   No diskette drive installed
> **360K** ;   5.25 in 5-1/4 inch PC-type standard drive
> **1.2M** ;   5.25 in 5-1/4 inch AT-type high-density drive
> **720K** ;   3.5 in 3-1/2 inch double-sided drive
> **1.44M** ;   3.5 in 3-1/2 inch double-sided drive
> **2.88M** ;   3.5 in 3-1/2 inch double-sided drive

Video   Select the type of primary video subsystem in your computer. The BIOS usually detects the correct video type automatically. The BIOS supports a secondary video subsystem, but you do not select it in Setup.

Halt On   During the power-on self-test (POST), the computer stops if the BIOS detects a hardware error. You can tell the BIOS to ignore certain errors during POST and continue the boot-up process. These are the selections:

No errors   POST does not stop for any errors.

All errors   If the BIOS detects any non-fatal error, POST stops and prompts you to take corrective action.

All, But Keyboard   POST does not stop for a keyboard error, but stops for all other errors.

All, But Diskette   POST does not stop for diskette drive errors, but stops for all other errors.

All, But Disk/Key   POST does not stop for a keyboard or disk error, but stops for all other errors.

IDE Hard disk Setup (submenu)

```
         CMOS SETUP UTILITY - Copyright (C) 1984-2001 Award Software
                            IDE Primary Master

   IDE HDD Auto-Detection     ress Enter              Item Help


   IDE Primary Master         [Auto]         Menu Level    ▶▶
   Access Mode                [Auto]

   Capacity                   0 MB

   Cylinder                   0
   Head                       0
   Precomp                    0
   Landing Zone               0
   Sector                     0




      :Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
   F5:Previous Values F6:Fail-SAfe Defaults F7:Optimized Defaults
```

IDE HDD Auto-detection
Press Enter to auto-detect the HDD on this channel. If detection is success-
ful, it fills the remaining fields on this menu.

IDE Primary Master
Selecting 'manual' lets you set the remaining fields on this screen. Selects
the type of fixed disk. "User Type" will let you select the number of cylin-
ders, heads, etc. Note: PRECOMP=65535 means NONE !

Capacity
Disk drive capacity (Approximated). Note that this size is usually slightly
greater than the size of a formatted disk given by a disk checking program.

Access Mode
Normal, LBA, Large or Auto Choose the access mode for this hard disk

The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'

Cylinder   Min = 0   Max = 65535
Set the number of cylinders for this hard disk.

Head   Min = 0   Max = 255
Set the number of read/write heads

Precomp   Min = 0   Max = 65535
**** Warning: Setting a value of 65535 means no hard disk

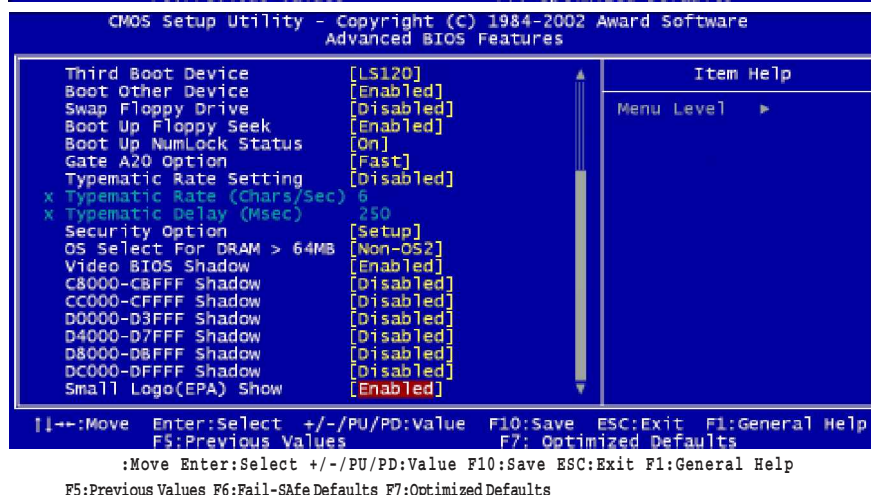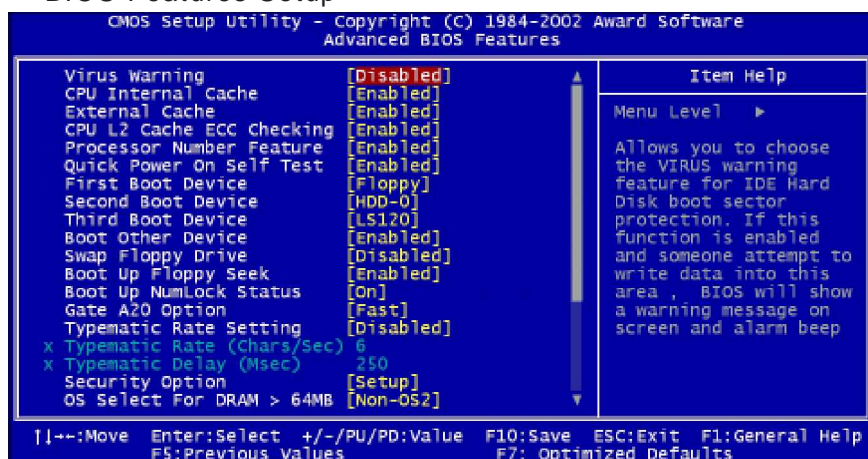**Landing zone**   Min = 0   Max = 65535
**** Warning: Setting a value of 65535 means no hard disk

Sector   Min = 0   Max = 255
Number of sectors per track

We recommend that you select Type "AUTO" for all drives. The BIOS will auto-detect the hard disk drive and CD-ROM drive at the POST stage.

If your hard disk drive is a SCSI device, please select "None" for your hard drive setting.

BIOS Features Setup


```
CMOS Setup Utility - Copyright (C) 1984-2002 Award Software
                  Advanced BIOS Features

 Virus Warning                  [Disabled]          ▲        Item Help
 CPU Internal Cache             [Enabled]
 External Cache                 [Enabled]                 Menu Level  ▶
 CPU L2 Cache ECC Checking      [Enabled]
 Processor Number Feature       [Enabled]                 Allows you to choose
 Quick Power On Self Test       [Enabled]                 the VIRUS warning
 First Boot Device              [Floppy]                  feature for IDE Hard
 Second Boot Device             [HDD-0]                   Disk boot sector
 Third Boot Device              [LS120]                   protection. If this
 Boot Other Device             [Enabled]                  function is enabled
 Swap Floppy Drive             [Disabled]                 and someone attempt to
 Boot Up Floppy Seek           [Enabled]                  write data into this
 Boot Up NumLock Status        [On]                       area , BIOS will show
 Gate A20 Option               [Fast]                     a warning message on
 Typematic Rate Setting        [Disabled]                 screen and alarm beep
x Typematic Rate (Chars/Sec)   6
x Typematic Delay (Msec)       250
 Security Option               [Setup]
 OS Select For DRAM > 64MB     [Non-OS2]          ▼

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
        F5:Previous Values              F7: Optimized Defaults
```

```
CMOS Setup Utility - Copyright (C) 1984-2002 Award Software
                  Advanced BIOS Features

 Third Boot Device             [LS120]              ▲        Item Help
 Boot Other Device             [Enabled]
 Swap Floppy Drive             [Disabled]                 Menu Level  ▶
 Boot Up Floppy Seek           [Enabled]
 Boot Up NumLock Status        [On]
 Gate A20 Option               [Fast]
 Typematic Rate Setting        [Disabled]
x Typematic Rate (Chars/Sec)   6
x Typematic Delay (Msec)       250
 Security Option               [Setup]
 OS Select For DRAM > 64MB     [Non-OS2]
 Video BIOS Shadow             [Enabled]
 C8000-CBFFF Shadow            [Disabled]
 CC000-CFFFF Shadow            [Disabled]
 D0000-D3FFF Shadow            [Disabled]
 D4000-D7FFF Shadow            [Disabled]
 D8000-DBFFF Shadow            [Disabled]
 DC000-DFFFF Shadow            [Disabled]
 Small Logo(EPA) Show          [Enabled]          ▼

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
        F5:Previous Values              F7: Optimized Defaults
```

:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-SAfe Defaults F7:Optimized Defaults

Virus Warning
Allows you to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and beep.

Enabled   Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.

Disabled No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

CPU Internal Cache/External Cache
These two categories speed up memory access. However, it depends on CPU/chipset design. Enabled: Enable cache, Disabled: Disable cache

CPU L2 Cache ECC Checking
This item allows you to enable/disable CPU L2 Cache ECC checking.
The choice: Enabled, Disabled.

Processor Number Feature
This feature appears when a a Pentium III processor is installed. It enables you enables you to control whether the Pentium III's serial number can be read by external programs. The choice: Enabled. Disabled

Quick Power On Self Test
This category speeds up Power On Self Test (POST) after you power up the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST. Enabled: Enable quick POST. Disabled: Normal POST

First/Second/Third/Other Boot Device
The BIOS attempts to load the operating system from the devices in the sequence selected in these items. The choices are: Floppy, LS/ZIP, HDD, SCSI, CDROM, Disabled.

Swap Floppy Drive
If the system has two floppy drives, you can swap the logical drive name assignments. The choice: Enabled/Disabled.

Boot Up Floppy Seek
Seeks disk drives during boot up. Disabling speeds boot up.
The choice: Enabled/Disabled.

Boot Up NumLock Status
Select power on state for NumLock. The choice: Enabled/Disabled.

Gate A20 Option
Select if chipset or keyboard controller should control GateA20.
Normal: A pin in the keyboard controller controls GateA20
Fast: Lets chipset control GateA20

Typematic Rate Setting
Key strokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected.
The choice: Enabled/Disabled.

Typematic Rate (Chars/Sec)
Sets the number of times a second to repeat a key stroke when you hold the key down. The choice: 6, 8, 10, 12, 15, 20, 24, 30.

Typematic Delay (Msec)
Sets the delay time after the key is held down before it begins to repeat the keystroke. The choice: 250, 500, 750, 1000.

Security Option
Select whether the password is required every time the system boots or only when you enter setup.

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

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

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

OS Select For DRAM > 64MB
Select the operating system that is running with greater than 64MB of RAM on the system. The choice: Non-OS2, OS2.
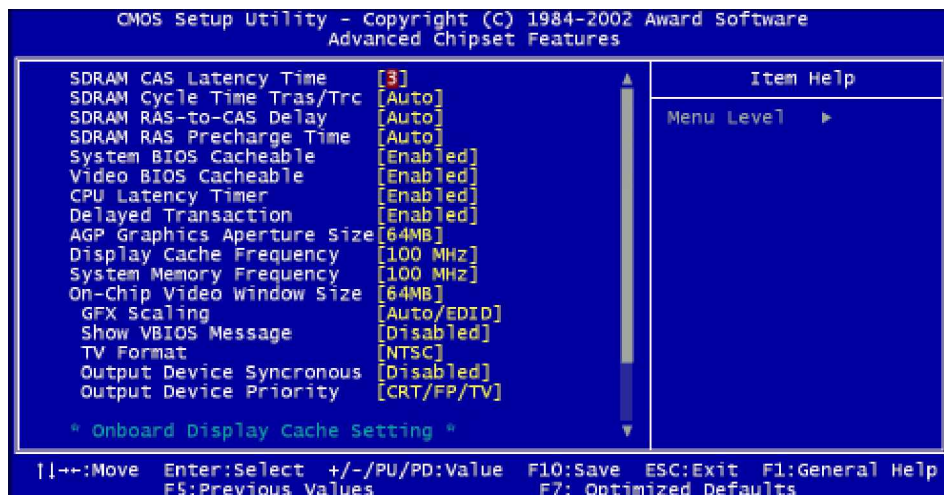
Video BIOS Shadow
Enabled this copies the video BIOS from ROM to RAM. effectively enhancing performance, and reducing the amount of upper memory available by 32KB (the C0000~C7FFF area of memory between 640 KB and 1 MB is used).

C8000-CBFFF Shadow
Enabling any of the C8000~CBFFF segments allows components to move their firmware into these upper memory segments. However your computer can lock-up doing so, because some devices don't like being shadowed at those particular 16 KB segments of upper memory.

Note - In Windows 95, double click 'Computer' within Device Manager and select 'Memory'. This will tell you what segments (if any) are being shadowed For DOS you can use MSD.EXE to see what segments are claimed.
CC000-CFFFF - D0000-D3FFF - D4000-D7FFF - D8000-DBFFF and
DC000-DFFFF - Same as above.

Chipset Features Setup

```
         CMOS Setup Utility - Copyright (C) 1984-2002 Award Software
                         Advanced Chipset Features
  ┌─────────────────────────────────────────────────┬──────────────────────┐
  │ SDRAM CAS Latency Time        [3]              ▲ │     Item Help        │
  │ SDRAM Cycle Time Tras/Trc     [Auto]            │ │                      │
  │ SDRAM RAS-to-CAS Delay        [Auto]            │ │ Menu Level      ►    │
  │ SDRAM RAS Precharge Time      [Auto]            │ │                      │
  │ System BIOS Cacheable         [Enabled]         │ │                      │
  │ Video BIOS Cacheable          [Enabled]         │ │                      │
  │ CPU Latency Timer             [Enabled]         │ │                      │
  │ Delayed Transaction           [Enabled]         │ │                      │
  │ AGP Graphics Aperture Size    [64MB]            │ │                      │
  │ Display Cache Frequency       [100 MHz]         │ │                      │
  │ System Memory Frequency       [100 MHz]         │ │                      │
  │ On-Chip Video Window Size     [64MB]            │ │                      │
  │  GFX Scaling                  [Auto/EDID]       │ │                      │
  │  Show VBIOS Message           [Disabled]        │ │                      │
  │  TV Format                    [NTSC]            │ │                      │
  │  Output Device Syncronous     [Disabled]        │ │                      │
  │  Output Device Priority       [CRT/FP/TV]       │ │                      │
  │                                                ▼ │                      │
  │ " Onboard Display Cache Setting "                │                      │
  ├─────────────────────────────────────────────────┴──────────────────────┤
  │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
  │           F5:Previous Values              F7: Optimized Defaults         │
  └─────────────────────────────────────────────────────────────────────────┘
```

DRAM Settings

The first chipset settings deal with CPU access to dynamic random access memory (DRAM). The default timings have been carefully chosen and should only be altered if data is being lost. Such a scenario might well occur if your system had mixed speed DRAM chips installed so that greater delays may be required to preserve the integrity of the data held in the slower memory chips.

SDRAM CAS Latency Time

When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing.

SDRAM Cycle Time Tras/Trc

Select the number of SCLKs for an access cycle

SDRAM RAS-to-CAS Delay

This field let's you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. Fast gives faster performance; and Slow gives more stable performance. This field applies only when synchronous DRAM is installed in the system.

SDRAM RAS Precharge Time
If an insufficient number of cycles is allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain data. Fast gives faster performance; and Slow gives more stable performance. This field applies only when synchronous DRAM is installed in the system.

P2C/C2P Concurrency
When Disabled, CPU bus will be occupied during the entire PCI operation period.

System BIOS Cacheable
Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

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

CPU latency Timer
When enabled this item, the CPU cycle will only be deferred after it has been held in a "Snoop Stall" for 31 clocks and another ADS# has arrived. When disabled, the CPU cycle will be deferred immediately after the GMCH receives another ADS#.

Delayed Transaction
The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI specification version 2.1

AGP Graphics Aperture Size
This fielf determines the effective size of the Graphic Aperture used for a particular GMCH configuration. It can be updated by the GMCH-specific BIOS configuration sequence before the PCI standard bus enumeration sequence takes place. If it is not updated then a default value will select an aperture of maximum size.

Display Cache Frequency
You can use this item to select the frequency of the display cache.

System Memory Frequency
You can use this item to select the operating frequency for the main system.

On-Chip Video Window Size
Select the on chip video window size for VGA drives use. The Choice: 32MB, 64MB, Disabled.

GFX Scaling
To select "Auto / EDID" as default to active this function. The Choice: Auto/ EDID, Forced On and Disabled.

Show VBIOS Message
This item allows you to "Enabled" or "Disabled" the VBIOS message

TV Format
To select the different format on TV output

Output Device Synchronous
This item allows you to "Enabled" or "Disabled" the synchronous on output device

Output Device Priority
To select the different priority on display types

Onboard Display Cache Setting
Setting the onboard display cache timing

CAS#Latency
Select the local memory clock periods

Paging Mode Control
Select the paging mode control

RAS-to-CAS Override
Select the display cache clock periods control

RAS# Timing
This item controls RAS# active to Protegra, and refresh to RAS# active delay (in local memory clocks).

RAS# Precharge Timing
This item controls RAS# precharge (in local memory clocks).

Integrated Peripherals

OnChip Primary/Secondary PCI IDE
The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately.

Primary & Secondary Master/Slave PIO
These four PIO fields let you set a PIO mode (0-4) for each of four IDE devices. When under "Auto" mode, the system automatically set the best mode for each device

Primary & Secondary Master/Slave UDMA
When set to "Auto" mode, the system will detect if the hard drive supports

Ultra DMA mode.

USB Controller
Select "Enable" if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals.

USB Keyboard Support
Select "Enable" if your system contains a Universal Serial Bus (USB) controller and you have USB keyboard.

Init Display First
This item allows you to decide to active whether PCI slot or on-chip VGA first

AC97 Audio
This item allows you to active audio function

SMB Controller
Select "Disable" for System Management Controller to free more IRQ address to be used.

Onboard LAN1
Select "Enable" if your system contains a LAN1 port.

Onboard LAN2
Select "Enable" if your system contains a LAN2 port.

Onboard LAN3
Select "Enable" if your system contains a LAN3 port.

Onboard SCSI
Select "Enable" if your system contains a Small Computer System Integrated (SCSI) and you have SCSI device

Disk On Chip Address
Show the memory address for DiskOnChip device

IDE HDD Block Mode
This feature enhances disk performance by allowing multi-sector data transfers and eliminates the interrupt handling time for each sector.

Power On Function
This item allows you the select power on event. The choice: Password, Hot key, Mouse left, Mouse Right, Any Key, Button Only, Keyboard 98

Onboard FDC Controller
Select "Enabled" to activate the on-board FDD
Select "Disabled" to activate an add-on FDD

Onboard Serial Port 1 & 2
Select an address and corresponding interrupt for the first/second serial port. The default value for the first serial port is "3F8/IRQ4" and the second serial port is "2F8/IRQ3".

UART Mode Select
This item allows you to select UART mode. The choices: IrDA, ASKIR, Normal.

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

IR Transmission Delay
This item allows you to enable/disable IR transmission delay. The Choices:Enable, Disabled.

UR2 Duplex Mode
This item allows you to select the IR half/full duplex function.

Use IR Pins
This item allows you to select IR transmission routes, IR-Rx2Tx2, RxD2 and TxD2.

Onboard Parallel Mode
Select an operating mode for the parallel port. Mode options are 3BC/IRQ7, 378/IRQ7, 278/IRQ5, and Disable.

Parallel Port EPP Type
Select a EPP Type if parallel Port is set as SPP,EPP, ECP,and ECP+EPP.

EPP Mode Select
Select a EPP Mode Type: EPP1.7 or EPP1.9.

ECP Mode Use DMA
Select a DMA channel if parallel Mode for using ECP mode: 3 or 1.

Power Management Setup

```
        CMOS Setup Utility - Copyright (C) 1984-2002 Award Software
                          Power Management Setup
 ┌──────────────────────────────────────────────┬─────────────────────┐
 │ ACPI Function            [Enabled]            │      Item Help      │
 │ Power Management         [User Define]        ├─────────────────────┤
 │ Video Off Method         [DPMS]               │ Menu Level    ▶     │
 │ Video Off In Suspend     [Yes]                │                     │
 │ Suspend Type             [Stop Grant]         │                     │
 │ MODEM Use IRQ            [NA]                  │                     │
 │ Suspend Mode             [Disabled]           │                     │
 │ HDD Power Down           [Disabled]           │                     │
 │ Soft-Off by PWR-BTTN     [Instant-Off]        │                     │
 │ Power-On by LAN          [Disabled]           │                     │
 │ Power On by Ring         [Disabled]           │                     │
 │                                               │                     │
 │ ** Reload Global Timer Events **              │                     │
 │ Primary IDE 0            [Disabled]           │                     │
 │ Primary IDE 1            [Disabled]           │                     │
 │ Secondary IDE 0          [Disabled]           │                     │
 │ Secondary IDE 1          [Disabled]           │                     │
 │ FDD,COM,LPT Port         [Disabled]           │                     │
 │ PCI PIRQ[A-D]#           [Disabled]           │                     │
 └──────────────────────────────────────────────┴─────────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
             F5:Previous Values            F7: Optimized Defaults
```

:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-SAfe Defaults F7:Optimized Defaults

ACPI Function
Select Enabled only if your computer's operating system supports ACPI (the Advanced Configuration and Power Interface) specification. Currently, Windows 98 and Windows2000 support ACPI.

Power Management
There are 4 selections for Power Management, 3 of which have fixed mode :

Disabled (default)   No power management. Disables all four modes.

Min. Power Saving   Minimum power management. Doze Mode = 1 hr., Standby Mode = 1 hr., Suspend Mode = 1 hr.,

Max. Power Saving   Maximum power management -- ONLY AVAILABLE FOR SL CPU's.. Doze Mode = 1 min., Standby Mode = 1 min., Suspend Mode = 1 min.

User Defined   Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr.

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

V/H SYNC+Blank	cause the system to turn off the vertical and horizontal synchronization signals and writes blanks to the screen.
Blank Screen	This option only writes blanks to the screen.
DPMS	Initial display power management signaling.HDD Power Down is always set independently

Video Off In Suspend

Controls what causes the display to be switched off
Suspend -> Off   Always On   All Mode -> Off

Suspend Type
S1 (POS) Power On suspend
All devices are powered up except for the clock synthesizer. The Host and PCI clocks are inactive and PIIX4 provides control signals and 32-kHz Suspend Clock (SUSCLK) to allow for DRAM refresh and to turn off the clock synthesizer. The only power consumed in the system is due to DRAM Refresh and leakage current of the powered devices. When the system resumes from POS, PIIX4 can optionally resume without resetting the system, can reset the processor only, or can reset the entire system. When no reset is performed, PIIX4 only needs to wait for the clock synthesizer and processor PLLs to lock before the system is resumed. This takes typically 20 ms.

S3 (STR) Suspend To RAM
Power is removed from most of the system components during STR, except the DRAM. Power is supplied to Suspend Refresh logic in the Host Controller, and RTC and Suspend Well logic in PIIX4. PIIX4 provides control signals and 32-kHz Suspend Clock (SUSCLK) to allow for DRAM refresh and to turn off the clock synthesizer and other power planes.

Modem Use IRQ
Name the interrupt request (IRQ) assigned to the modem (if any) on your system. Activity of the selected IRQ always awakens the system.

Suspend Mode
When the suspend mode has been enabled after the selected period of system inactivity, all devices except CPU will be shut down.

HDD Power Down
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.

Soft-Off By PWRBTN
The field defines the power-off mode when using an ATX power supply. The Instant-Off mode means powering off immediately when pressing the power button. In the Delay 4 Sec mode, the system powers off when the power button is pressed for more than four seconds or places the system in a very low-power-usage state, with only enough circuitry receiving power to detect power button activity or resume by ring activity when press for less than four seconds. The default is 'Instant-Off'.

Power-On by LAN
An input signal on the LAN, which awakens the system from a soft off state.

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.

Resume by Alarm

Wake Up Events

Setting an event on each device listed to awaken the system from a soft off state.

> VGA
>
> LPT & COM
>
> HDD & FDD
>
> PCI Master
>
> Power On by PCI Card
>
> Wake Up on LAN/Ring
>
> RTC Alarm Resume
>
> Date (of Month)
>
> Resume Time (hh:mm:ss)
>
> Primary INTR
>
> IRQs Activity Monitoring

PnP/PCI Configuration

```
      CMOS Setup Utility - Copyright (C) 1984-2002 Award Software
                         Power Management Setup

   ACPI Function              [Enabled]                Item Help
   Power Management           [User Define]
   Video Off Method           [DPMS]              Menu Level   ►
   Video Off In Suspend       [Yes]
   Suspend Type               [Stop Grant]
   MODEM Use IRQ              [NA]
   Suspend Mode               [Disabled]
   HDD Power Down             [Disabled]
   Soft-Off by PWR-BTTN       [Instant-Off]
   Power-On by LAN            [Disabled]
   Power On by Ring           [Disabled]

   ** Reload Global Timer Events **
   Primary IDE 0              [Disabled]
   Primary IDE 1              [Disabled]
   Secondary IDE 0            [Disabled]
   Secondary IDE 1            [Disabled]
   FDD,COM,LPT Port           [Disabled]
   PCI PIRQ[A-D]#             [Disabled]

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
          F5:Previous Values                F7: Optimized Defaults
```

:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-SAfe Defaults F7:Optimized Defaults

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components.

PnP OS Installed
Select Yes if the system operating environment is Plug-and-Play aware (e.g., Windows 95).

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

Resource Controlled By
The Award Play 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.

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

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

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

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

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

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

PCI/VGA Palette Snoop
Normally this option is always Disabled! Nonstandard VGA display adapters such as overlay cards or MPEG video cards may not show colors properly. Setting Enabled should correct this problem. If this field set Enabled, any I/O access on the ISA bus to the VGA card's palette registers will be reflected on the PCI bus. This will allow overlay cards to adapt to the changing palette colors.

Assign IRQ For VGA
Many high-end graphics accelerator cards now require an IRQ to function properly. Disabling this feature with such cards will cause improper operation and/or poor performance. Thus, it's best to make sure you enable this feature if you are having problems with your graphics accelerator card. However, some low-end cards don't need an IRQ to run normally. Check your graphics card's documentation (manual). If it states that the card does not require an IRQ, then you can disable this feature to release an IRQ for other uses. When in doubt, it's best to leave it enabled unless you really need the IRQ.

Assign IRQ For USB
Windows 95 will automatically give an IRQ to the USB port even if there is no USB peripheral connected. Disabling this will free the IRQ.

PC Health Status
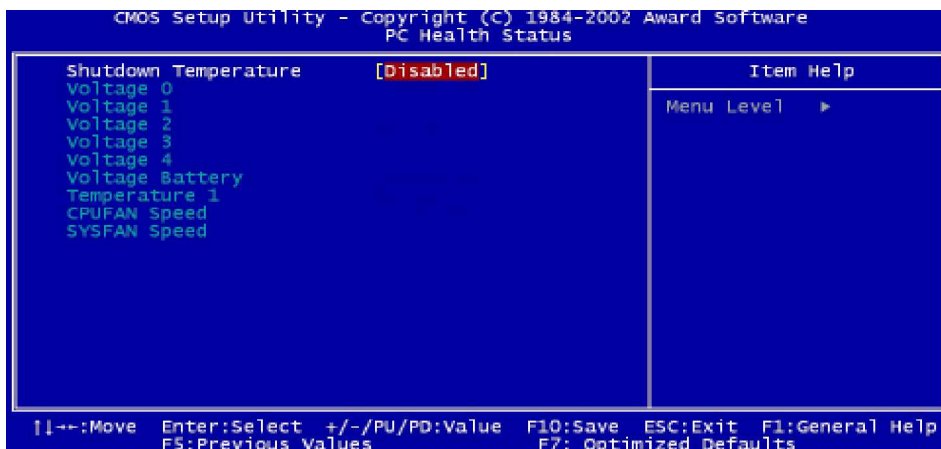
This section describes CPU temperature for the system.

Shutdown Temperature
This item allows you to set up the CPU shutdowm Temperature. This item only effective under Windows 98 ACPI mode.

Voltage0 ~ 4
Show you the different type of voltage

Voltage Battery
This item allows you to use voltage battery function
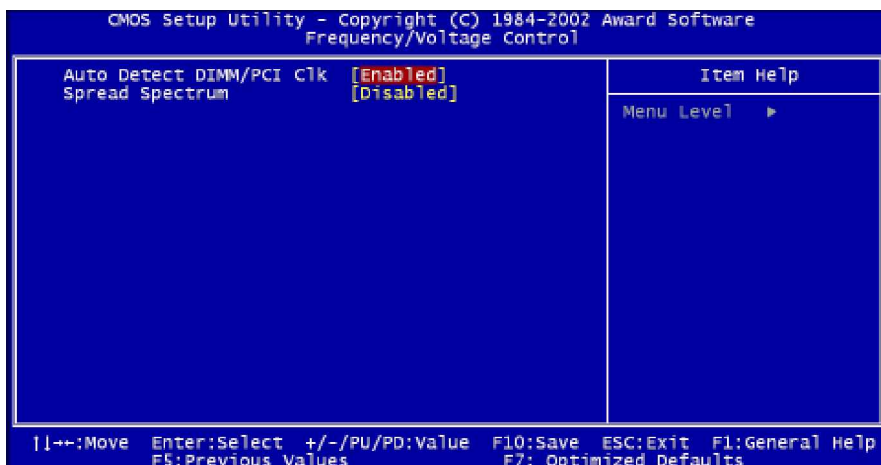
CPU Temperature
Show you the current system temperature

CPUFAN Speed
Show you the current CPUFAN operating speed

SYSFAN Speed
Show you the current SystemFAN operating speed

Frequency/Voltage Control

```
          CMOS Setup Utility - Copyright (C) 1984-2002 Award Software
                              Frequency/Voltage Control
 ┌──────────────────────────────────────────────┬───────────────────────┐
 │  Auto Detect DIMM/PCI Clk    [Enabled]        │       Item Help       │
 │  Spread Spectrum             [Disabled]       ├───────────────────────┤
 │                                               │  Menu Level    ▶      │
 │                                               │                       │
 │                                               │                       │
 │                                               │                       │
 │                                               │                       │
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 │                                               │                       │
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 │                                               │                       │
 │                                               │                       │
 └──────────────────────────────────────────────┴───────────────────────┘
  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
             F5:Previous Values          F7: Optimized Defaults
```

This section describes Frequency and Voltage control for the system.

Auto Detect DIMM/PCI CLK
When enabled, this item will auto detect if the DIMM and PCI socket have devices and will send clock signal to DIMM and PCI devices. When disabled, it will send the clock signal to all DIMM and PCI socket.

Spread Spectrum
This item allows you to enable/disable the spread spectrum modulate.

CPU Host / PCI Clock
This item allows you to select the FSB of CPU and PCI clock by default setting.

POST Codes

The following codes are not displayed on the screen. They can only be viewed on the LED display of a so called POST card. The codes are listed in the same order as the according functions are executed at PC startup. If you have access to a POST Card reader, you can watch the system perform each test by the value that's displayed. If the system hangs (if there's a problem) the last value displayed will give you a good idea where and what went wrong, or what's bad on the system board.

CODE	DESCRIPTION OF CHECK
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved

0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial onboard clock generator if Early_Init_Onboard_Generator is defined. See also POST 26h.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead.
24h	Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.

25h	Early PCI Initialization:
	-Enumerate PCI bus number.
	-Assign memory & I/O resource
	-Search for a valid VGA device & VGA BIOS,
	and put it into C000:0
26h	1. If Early_Init_Onboard_Generator is not defined Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots.
	2. Init onboard PWM
	3. Init onboard H/W monitor devices
27h	Initialize INT 09 buffer
28h	Reserved
29h	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address.
	2. Initialize the APIC for Pentium class CPU.
	3. Program early chipset according to CMOS setup. Example: onboard IDE controller.
	4. Measure CPU speed.
2Ah	Reserved
2Bh	Invoke Video BIOS
2Ch	Reserved
2Dh	1. Initialize double-byte language font (Optional)
	2. Put information on screen display, including Award title, CPU type, CPU speed, full screen logo.
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard if Early_Reset_KB is defined e.g. Winbond 977 series Super I/O chips. See also POST 63h.
34h	Reserved
35h	Test DMA Channel 0
36h	Reserved
37h	Test DMA Channel 1.
38h	Reserved
39h	Test DMA page registers.
3Ah	Reserved
3Bh	Reserved

3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program write allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB Keyboard & Mouse.
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Clear password according to H/W jumper (Optional)
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved

57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO 2. Initialize Init_Onbaord_AUDIO.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reset keyboard if Early_Reset_KB is not defined.
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
70h	Reserved

71h	Reserved
72h	Reserved
73h	(Reserved
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..
76h	(Optional Feature) Enter AWDFLASH.EXE if: -AWDFLASH.EXE is found in floppy drive. -ALT+F2 is pressed.
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Init HDD write protect.
7Dh	Reserved
7Eh	Reserved
7Fh	Switch back to text mode if full screen logo is supported. - If errors occur, report errors & wait for keys - If no errors occur or F1 key is pressed to continue: wClear EPA or customization logo.
80h	Reserved
81h	Reserved

E8POST.ASM   starts

82h	1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	1. USB final Initialization 2. Switch screen back to text mode
86h	Reserved
87h	NET PC: Build SYSID Structure.
88h	Reserved

89h	1. Assign IRQs to PCI devices
	2. Set up ACPI table at top of the memory.
8Ah	Reserved
8Bh	1. Invoke all ISA adapter ROMs
	2. Invoke all PCI ROMs (except VGA)
8Ch	Reserved
8Dh	1. Enable/Disable Parity Check according to CMOS setup
	2. APM Initialization
8Eh	Reserved
8Fh	Clear noise of IRQs
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache
	2. Program Daylight Saving
	3. Program boot up speed
	4. Chipset final initialization.
	5. Power management final initialization
	6. Clear screen & display summary table
	7. Program K6 write allocation
	8. Program P6 class write combining
95h	Update keyboard LED & typematic rate
96h	1. Build MP table
	2. Build & update ESCD
	3. Set CMOS century to 20h or 19h
	4. Load CMOS time into DOS timer tick
	5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

How to: Flash the BIOS

To flash your BIOS you'll need

1) a xxxxx.bin file that is a file image of the new BIOS

2) AWDFLASH.EXE a utility that can write the data-file into the BIOS chip.

Create a new, clean DOS 6 bootable floppy with "format a: /s".

Copy flash utility and the BIOS image file to this disk.

Turn your computer off. Insert the floppy you just created and boot the computer. As it boots up, hit the [DEL] key to enter the CMOS setup. Go to "LOAD SETUP (or BIOS) DEFAULTS," and then save and exit the setup program. Continue to boot with the floppy disk.

Type "AWDFLASH" to execute the flash utility. When prompted, enter the name of the new BIOS image and begin the flash procedure. Note: If you reboot now, you may not be able to boot again.

After the flash utility is complete, reboot the system.

What to do when the Award flasher says: Insufficient memory

1. In CMOS Chipset Features Setup, Disable Video Bios Cacheable.

2. Hit Esc, F10, Save and exit.

3. Flash the BIOS and reboot

4. Enter CMOS Chipset Features Setup, and Enable Video Bios Cacheable, hit Esc, F10, save and reboot.

What if things go wrong

if you use the wrong Flash BIOS or if the writing process gets interrupted, there is a fat chance that your computer won't boot anymore.

How can you recover a corrupt BIOS ?

Boot-block booting (this works only for Award BIOS)

Modern motherboards based on Award BIOS have a boot-block BIOS. This is small area of the BIOS that doesn't get overwritten when you flash BIOS. The boot-block BIOS only has support for the floppy drive. If you have the AGP video enabled you won't see anything on the screen because the boot-block BIOS only supports an ISA video card.

If you do not want to change your AGP video setting than proceed as follows:

The boot-block BIOS will execute an AUTOEXEC.BAT file on a bootable diskette. Copy an Award flasher & the correct BIOS *.bin file on the floppy and execute it automatically by putting awdflash *.bin in the AUTOEXEC.BAT file.

Solution 2:   Hot-swapping

1. Replace the corrupt chip by a working one. The working BIOS doesn't have to be written for your board, it just has to give you a chance of booting to DOS.

BIOS for the same chipset mostly work. (Chipsets that not differ too much also mostly work. (e.g. Triton FX chipset and Triton HX chipset)

2. Boot the system to DOS (with floppy or HD)

3. Be sure that the System BIOS cacheable option in your BIOS is enabled! If so replace (while the computer is powered on) the BIOS chip with the corrupt one. This should work fine with most boards because the BIOS is shadowed in RAM.

4. Flash an appropriate BIOS to the corrupt chip and reboot.

NOTE: Use a flasher from MRBIOS (**http://www.mrbios.com**). Utilities that come with your motherboard often use specific BIOS-hooks. Because you have booted with a BIOS not written for your motherboard they usually don't work. The MR Flash utilities communicate directly with your Flash Rom and always work. In most cases they flash a non-MRBIOS to your BIOS chip without problems.