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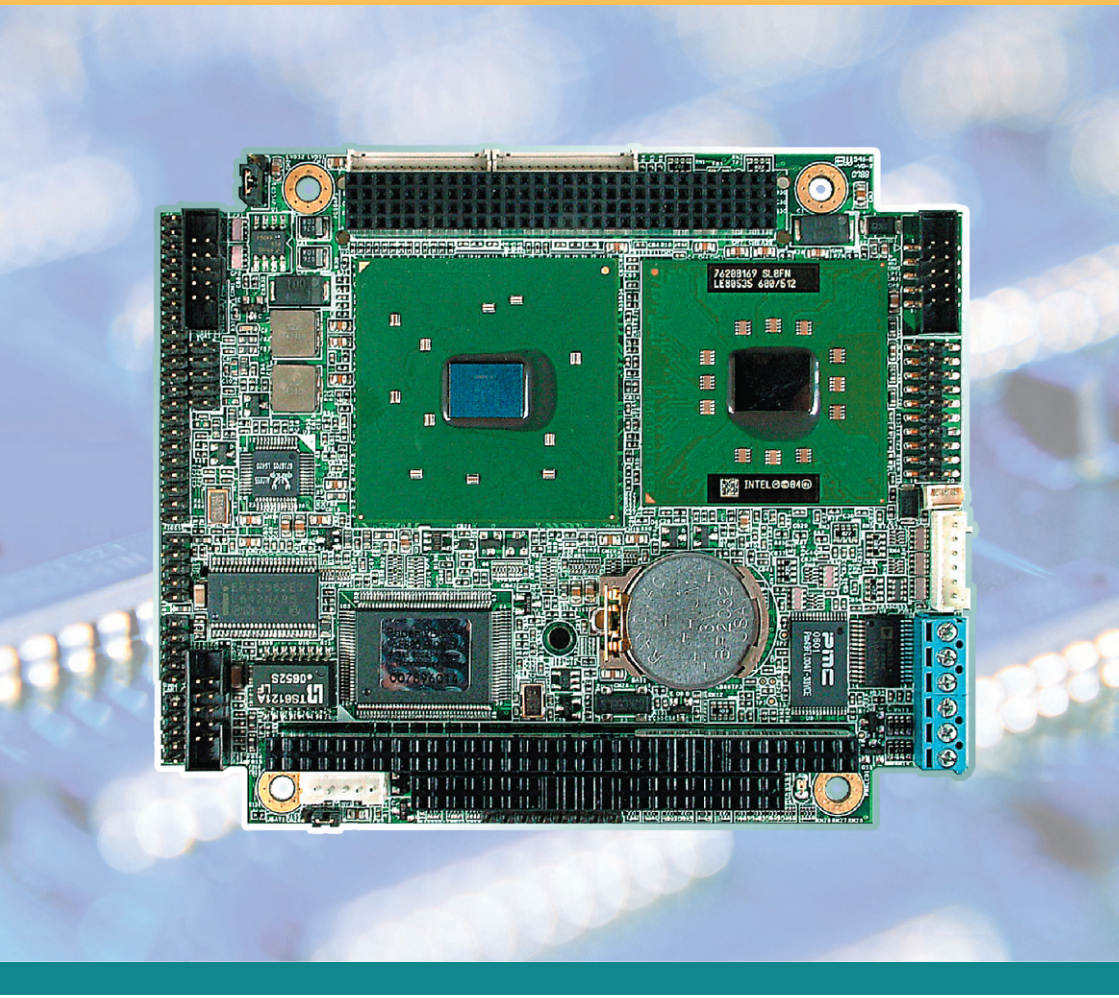
74208169 SL8FN
LE80535 600/512
INTEL

Em104P-i8523

Computer On Module (COM)

User's Manual

Version 1.0

2007.06

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Chapter 1

Introduction

1.1 Copyright Notice

All Rights Reserved.
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Under no circumstances will the manufacturer be liable for any direct, indirect, special, incidental, or consequential damages arising from the use or inability to use the product or documentation, even if advised of the possibility of such damages.
This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

1.2 About User's Manual

This User's Manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this User's Manual, please consult your vendor before further handling.

1.3 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

1.4 Replacing the lithium battery

Incorrect replacement of the lithium battery may lead to a risk of explosion. The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.
Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local requlations concerning special waste.

1.5 Technical Support

If you have any technical difficulites, please contact support first at:
http://www.emacinc.com/support

Please do not hesitate to call or e-mail our customer service when you still can not find out the answer.
http://www.emacinc.com
E-mail: info@emacinc.com

1.6 Warranty

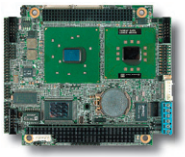
This product is warranted to be in good working order for a period of two years from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

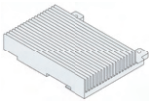
Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantibility and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

1.7 Packing List



1 x Em104P-i8523



1x CPU Heat Sink

1 x CD-ROM (Optional for Drivers and Manuals)

1 x RJ45 cover

If any of the above items is damaged or missing, contact your vendor immediately.

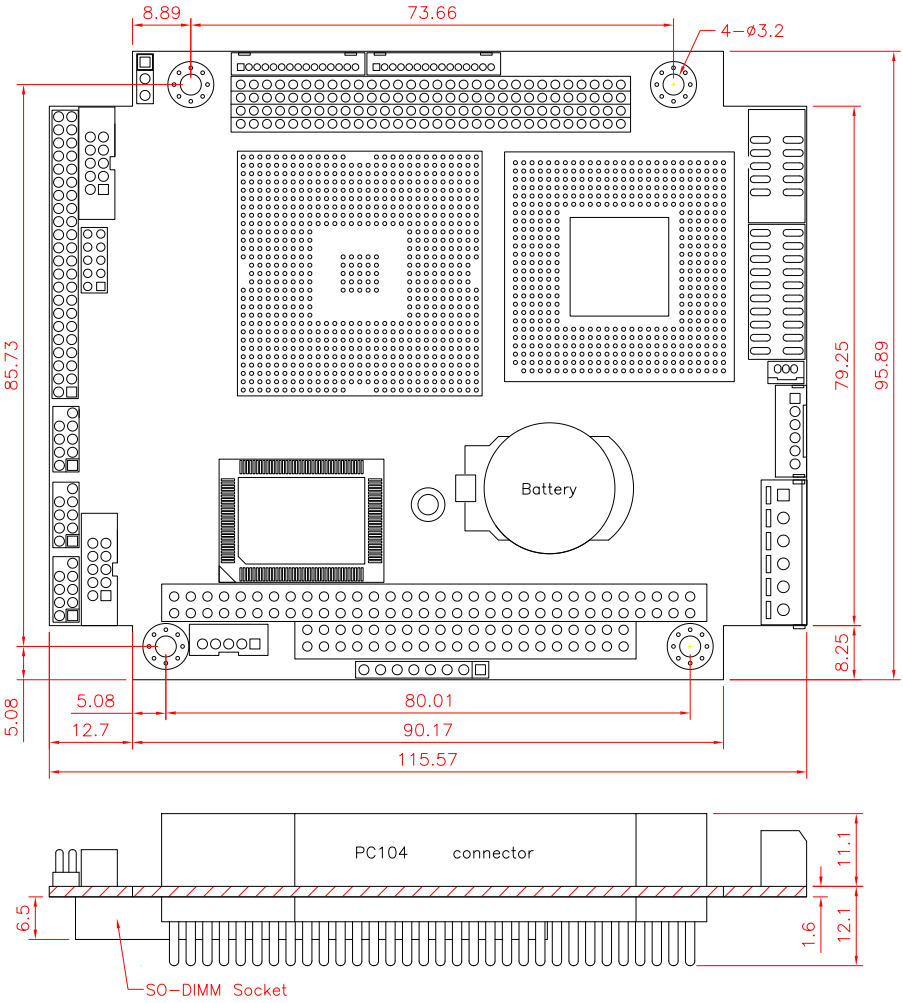
1.8 Ordering Information

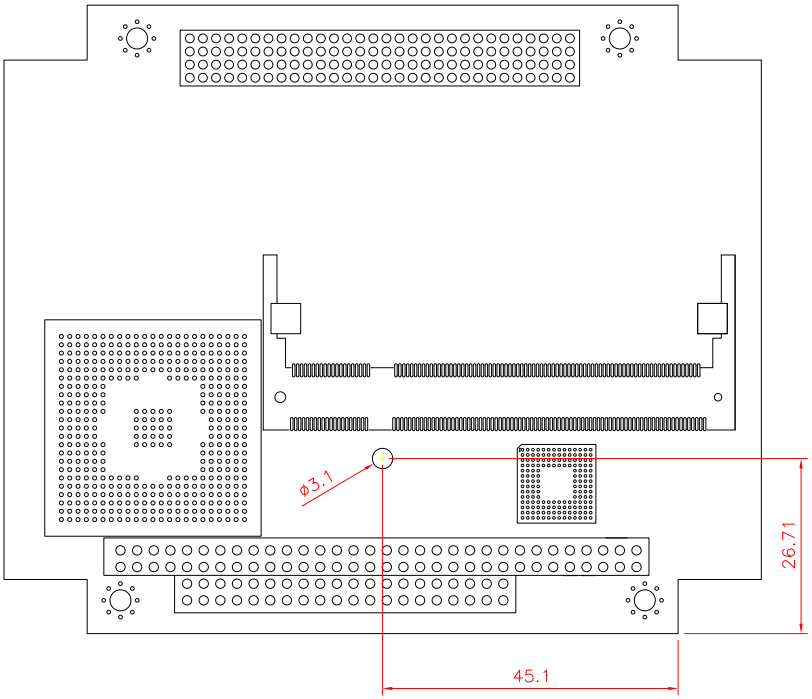
Em104P-i8523VL/C	PC/104 Plus Intel Celeron M 600MHz with CRT/ LCD/ Audio and LAN
Em104P-i8523VL/P	PC/104 Plus Intel Pentium M 1.4GHz with CRT/ LCD/ Audio and LAN
Cable Kit	CBK-13-8523-00

1.9 Specification

Form Factor	PC/104 Plus form factor
Processor	Intel Celeron M 600MHz or Intel Pentium M 1.4GHz (Optional)
Chipset	Intel 852GM + Intel 82801DB (ICH4)
System Memory	1 x 200-pin DDR SO-DIMM up to 1GB SDRAM
VGA/ LCD Controller	Intel 852GM Extreme Graphics2 Engine up to 64MB UMA Video RAM
Ethernet	Intel 82562ET 10/100Mbps Controller
I/O Chips	W83627HG
BIOS	Phoenix-Award BIOS
Audio	ALC655 AC'97 codec, supports MIC-In/ Line-In / Line-Out
LCD	Supports 18/36 bit LVDS up to 1600 x 1200
Hardware Monitor	Integrated in W83627HG
RTC	Built-in Intel ICH4 with lithium battery
Power Input Connector	1*6-pin power terminal
Operation Temp.	0 - 60ºC (32 - 140ºF)
Watchdog Timer	1 - 255 Level (Sec. or Min.)
Dimension (L x W)	116 x 96 mm (4.6" x 3.8")

1.10 Board Dimensions

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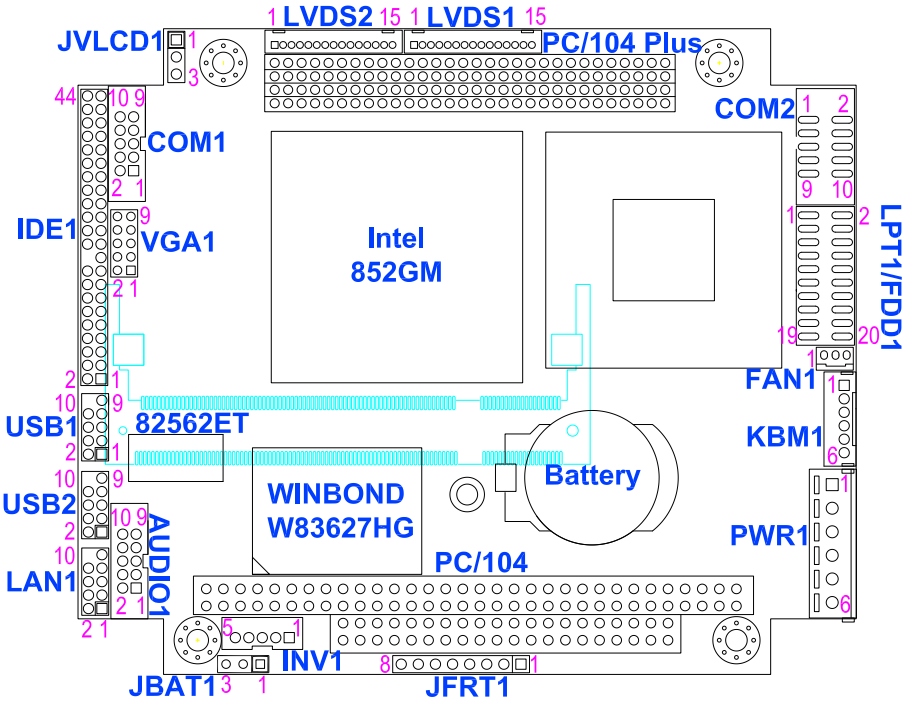
Chapter 2

Installation

2.1 Jumpers and Connectors

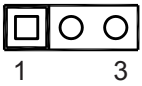


Jumpers

2.2 JVLCD1: LCD Panel Voltage Select

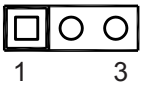
The voltage of LCD panel could be selected by JVLCD1 in 5V or 3.3V.

Pin	Voltage
1-2	5V
2-3	3.3V (Default)



2.3 JBAT1: CMOS Setup

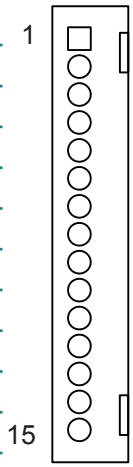
Pin	Mode
1-2	Keep CMOS (Default)
2-3	Clear CMOS



Connectors

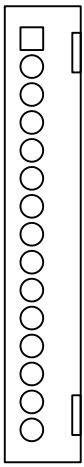
2.4 LVDS1/ LVDS2: LVDS LCD Connector

Pin	Description
1	VCC
2	TX1CLK+
3	TX1CLK-
4	GND
5	TX1D0+
6	TX1D0-
7	GND
8	TX1D1+
9	TX1D1-
10	GND
11	TX1D2+
12	TX1D2-
13	GND
14	TX1D3+
15	TX1D3-



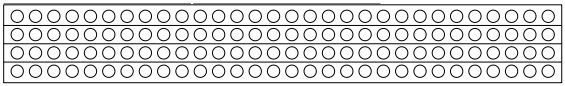
LVDS1

Pin	Description
1	VCC
2	TX2CLK+
3	TX2CLK-
4	GND
5	TX2D0+
6	TX2D0-
7	GND
8	TX2D1+
9	TX2D1-
10	GND
11	TX2D2+
12	TX2D2-
13	GND
14	TX2D3+
15	TX2D3-



LVDS2

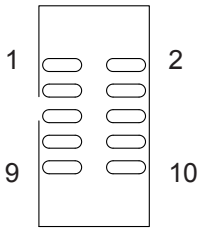
2.5 PC/104 Plus: PC/104+ PCI Interface



PC/104+

2.6 COM1/ COM2

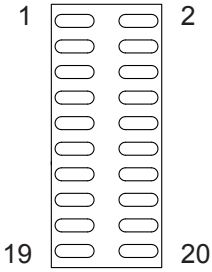
Pin	Description	Pin	Description
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N/C



2.7 LPT1/ FDD1: Parallel Port or FDD Connector

It can be selected by LPT or FDD mode via BIOS

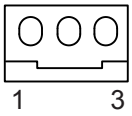
Pin	Description	Pin	Description
1	STROBE	2	AFD
3	PTD0	4	ERROR
5	PTD1	6	INIT
7	PTD2	8	SLIN
9	PTD3	10	GND
11	PTD4	12	GND
13	PTD5	14	GND
15	PTD6	16	BUSY
17	PTD7	18	PE
19	ACK	20	SELECT



2.8 FAN1: CPU Fan Power Connector

CPUF1 is a 3-pin header for the CPU fan. The fan must be a 12V fan.

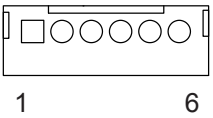
Pin	Description
1	FAN_CTL
2	+12V
3	GND



2.9 KBM1: Keyboard & Mouse

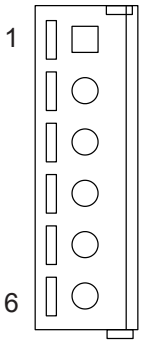
6-pin Keyboard & Mouse wafer connector

Pin	Description
1	KB_DATA
2	GND
3	MS_DATA
4	KB_CLK
5	KB_VCC
6	MS_CLK



2.10 PWR1: Power Supply Connector

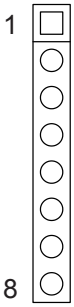
Pin	Description
1	12V
2	GND
3	GND
4	GND
5	5V
6	5V



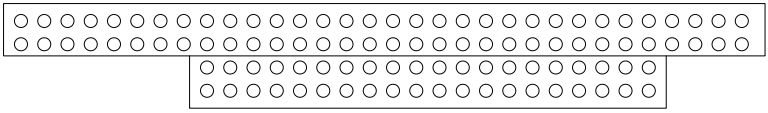
2.11 JFRT1: Switches and Indicators

It provides connectors for system indicators that provides light indication of the computer activities and switches to change the computer status.

Pin	Description
1	RESET+
2	GND
3	PWR LED+
4	GND
5	HDD LED+
6	HDD LED-
7	SPK OUT+
8	SPK OUT-



2.12 PC/104: PC/104 ISA Interface

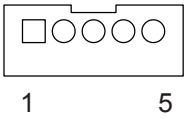


PC/104

2.13 INV1: LCD Inverter Connector

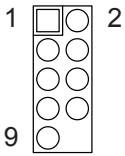
Onboard 5-pin mini boxheader

Pin	Description
1	+12V
2	GND
3	Backlight on/off
4	Brightness control
5	GND



2.14 LAN1: Fast Ethernet Connector

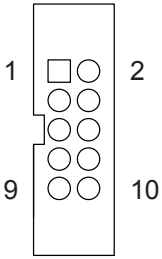
Pin	Description	Pin	Description
1	TX+	2	TX-
3	RX+	4	D2+
5	D2+	6	RX-
7	D3+	8	D3+
9	GND		



2.15 AUDIO1: Audio Interface Connector

AUDIO1, ALC655 AC'97 Codec, is composed of Line in, Line out and Microphone jacks.

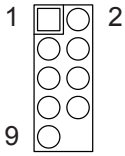
Pin	Description	Pin	Description
1	Line_in Left	2	Line_in Right
3	GND	4	GND
5	Mic_in	6	N/C
7	GND	8	GND
9	Line_out Left	10	Line_out Right



2.16 USB1/ USB2: USB Connector

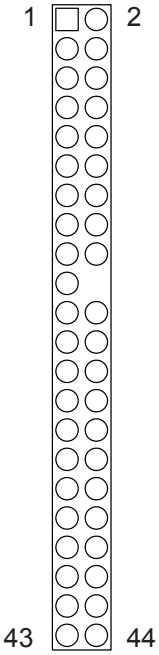
USB1/ USB2 supports two USB 2.0 w/ 480MB/s by pin header

Pin	Description	Pin	Description
1	+5V	2	+5V
3	USBD-	4	USBD-
5	USBD+	6	USBD+
7	GND	8	GND
9	GND	10	N/C



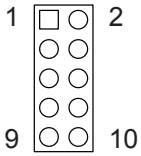
2.17 IDE1: 44-pin IDE Connector

Pin	Description	Pin	Description
1	IDE RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	N/C
21	REQ	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO READY	28	N/C
29	DACK	30	GND
31	IRQ14	32	N/C
33	ADDR1	34	ATA66 DETECT
35	ADDR0	36	ADDR2
37	CS#2	38	CS#3
39	IDEACTP	40	GND
41	VCC (+5V)	42	VCC (+5V)
43	GND	44	N/C



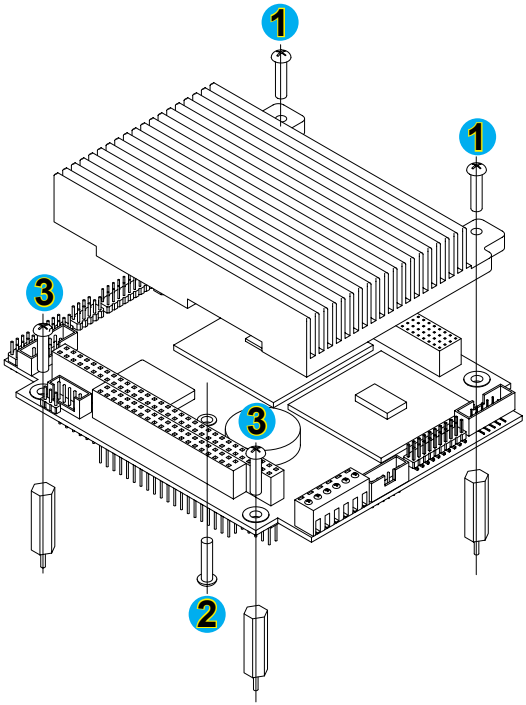
2.18 VGA1: CRT Connector

Pin	Description	Pin	Description
1	RED	2	GND
3	GREEN	4	GND
5	BLUE	6	CRTDEC
7	HSYNC	8	GND
9	VSYNC	10	GND



2.19 Heatsink Installation

1. Put the heatsink on Em104P-i8523, and screw it on in the direction shown in the figure below. Insert two screws (No. 1) downward into the holes and turn them tightly.
2. Insert screw (No. 2) upward into the hole and turn it tightly.
3. Insert two screws (No. 3) downward into the holes and turn them tightly.

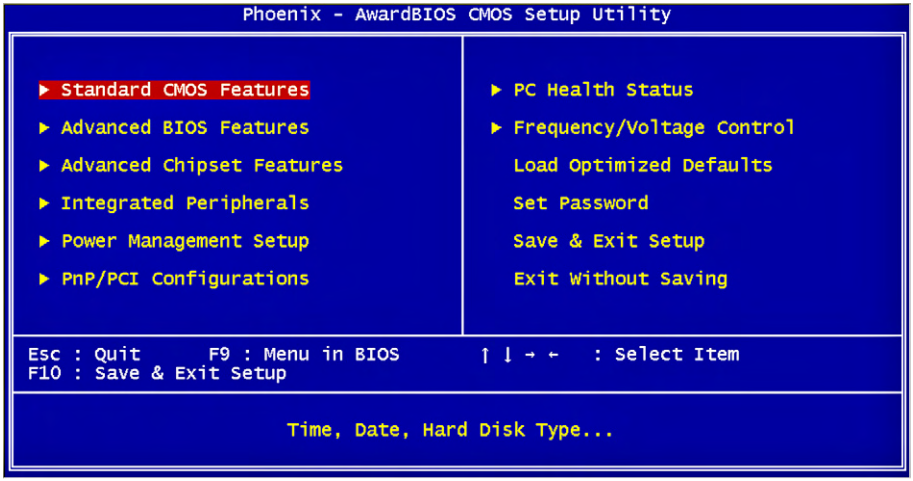


Chapter 3

BIOS

3.1 BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your computer system's. The BIOS provides for a standard device such as disk drives, serial ports and parallel ports. It also adds password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.



3.2 BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility.

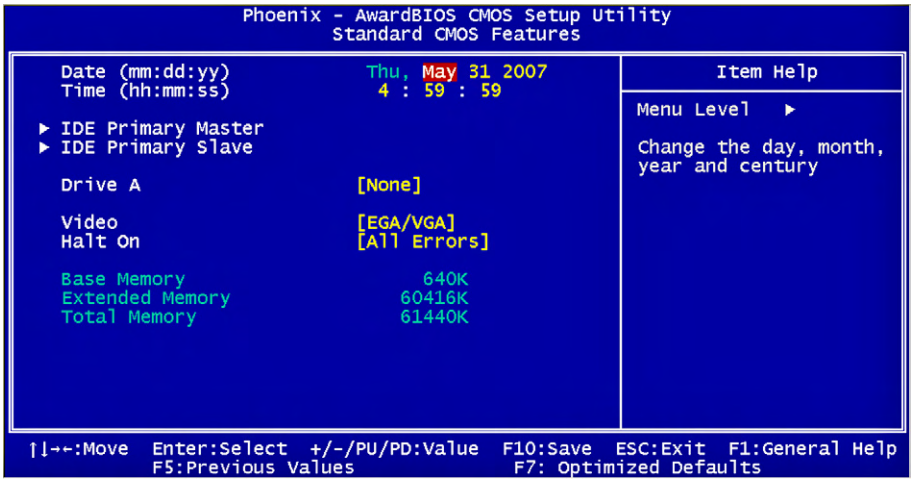
When you turn on the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you a little bit late press the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

Press <DEL> to Enter Setup

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit. When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

3.3 Standard CMOS Features



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

Date

The date format is:

Day : Sun to Sat
Month : 1 to 12
Date : 1 to 31
Year : 1999 to 2099

Time

The time format is:

Hour : 00 to 23
Minute : 00 to 59
Second : 00 to 59

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

IDE Primary HDDs / IDE Secondary HDDs

The onboard PCI IDE connectors provide Primary and Secondary channels for connecting up to four IDE hard disks or other IDE devices.
Each channel can support up to two hard disks; the first is the “Master” and the second is the “Slave”.
Press <Enter> to configure the hard disk. The selections include Auto, Manual, and None. Select ‘Manual’ to define the drive information manually.
You will be asked to enter the following items.

Cylinder:	Number of cylinders
Head:	Number of read/write heads
Precomp:	Write precompensation
Landing Zone:	Landing zone
Sector:	Number of sectors

The Access Mode selections are as follows:

CHS	(HD < 528MB)
LBA	(HD > 528MB and supports Logical Block Addressing)
Large	(for MS-DOS only)
Auto	

Drive A / Drive B

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

None	360K, 5.25 in.	1.2M, 5.25 in.
720K, 3.5 in.	1.44M, 3.5 in.	2.88M, 3.5 in.

Video

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

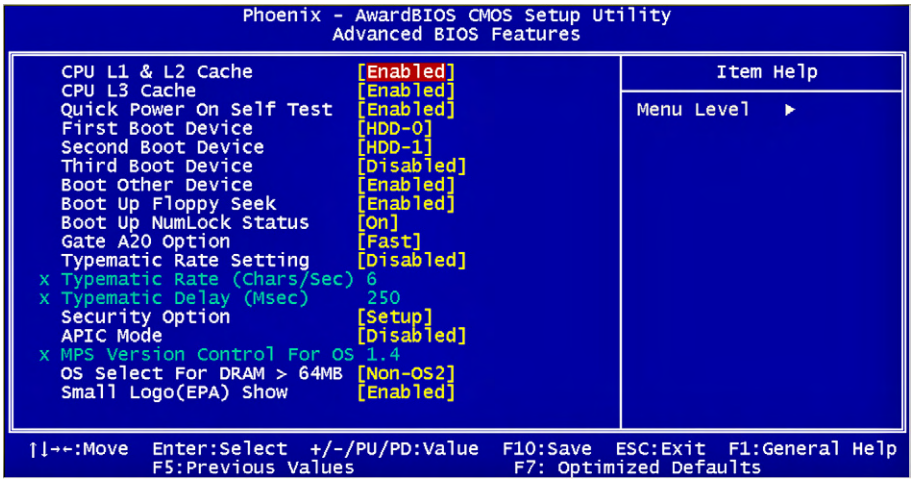
EGA/VGA	For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default)
CGA 40	Power up in 40 column mode.
CGA 80	Power up in 80 column mode.
MONO	For Hercules or MDA adapters.

Halt On

This field determines whether or not the system will halt if an error is detected during power up.

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

3.4 Advanced BIOS Features



CPU L1/ L2/ L3 Cache

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

Quick Power On Self Test

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

First/ Second/ Third Boot Device

These fields determine the drive that the system searches first for an operating system. The options available include
Setting: Floppy, LS120, HDD-0, SCSI, CDROM, HDD-1, ZIP100, USB-FDD, USB-ZIP, USB-CDROM, USB-HDD, LAN and Disabled.

Boot Other Device

It allows the system to search for an OS from other devices other than the ones selected in the First/ Second/ Third Boot Device.
Setting: Enabled (Default), Disabled.

Boot Up Floppy Seek

This feature controls whether the BIOS checks for a floppy drive while booting up. If it cannot detect one (either due to improper configuration or its absence), it will flash an error message.
Setting: Enabled (Default), Disabled.

Boot Up NumLock Status

It allows you to activate the NumLock function after you power up the system.
Setting: On (Default), Off.

Gate A20 Option

It allows you to select how the Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB.
Setting: Normal, Fast (Default).

Typematic Rate Setting

When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed at the next.
Setting: Disabled (Default), Enabled.

Typematic Rate (Chars/Sec)

When the typematic rate is enabled, the system registers repeated keystrokes speeds.
Setting: 6 to 30 characters per second.

Typematic Delay (Msec)

When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters.
Setting: 250 (Default), 500, 750, 1000.

Security Option

It allows you to limit access to the System and Setup.
When you select System, the system prompts for the User Password every time you boot up.
When you select Setup, the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.
Setting: Setup (Default), System.

APIC Mode

APIC stands for Advanced Programmable Interrupt Controller.
Setting: Disabled (Default), Enabled.

MPS Version Control for OS

It is specifies the MPS (Multiprocessor Specification) version for your operating system. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability.
Setting: 1.1, 1.4 (Default).

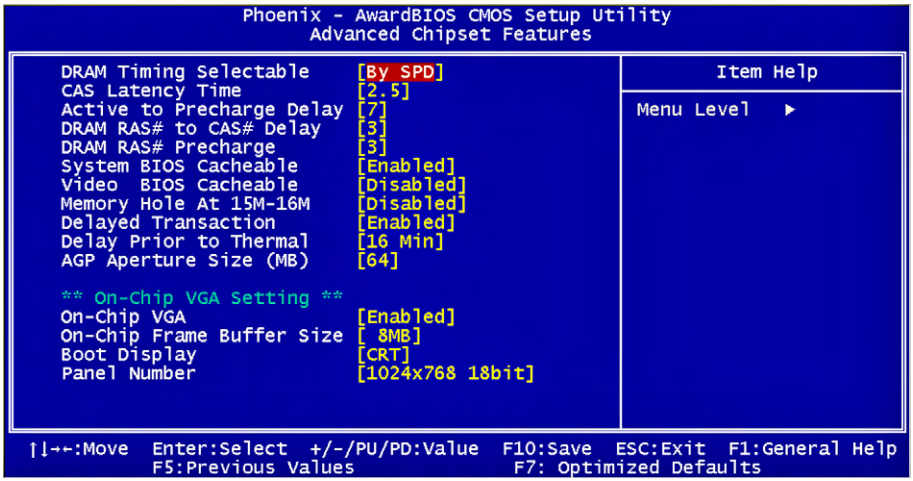
OS Select for DRAM > 64MB

It allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory.
Setting: Non-OS2 (Default), OS2.

Small Logo (EPA) Show

The EPA logo appears at the right side of the monitor screen when the system is boot up.
Setting: Disabled, Enabled (Default).

3.5 Advanced Chipset Features



DRAM Timing Selectable

It refers to the method by which the DRAM timing is selected.
Setting: Manual, By SPD (Default).

CAS Latency Time

It allows CAS latency time in HCLKs as 2 or 2.5. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or CPU.
Setting: 2.5 (Default), 2.

Active to Precharge Delay

Setting: 7 (Default), 6, 5.

DRAM RAS# to CAS# Delay

It allows you to insert a delay between the RAS (Row Address Strobe) and CAS (Column Address Strobe) signals. This delay occurs when the SDRAM is written to, read from or refreshed. Reducing the delay improves the performance of the SDRAM.
Setting: 3 (Default), 2.

DRAM RAS# Precharge

It allows you to sets the number of cycles required for the RAS to accumulate its charge before the SDRAM refreshes.
Setting: 3 (Default), 2.

System BIOS Cacheable

The setting of Enabled allows caching of the system BIOS ROM at F000h-FFFFFh for better system performance. However, if any program writes to this memory area, a system error may result.
Setting: Disabled, Enabled (Default).

Video BIOS Cacheable

The Setting Enabled allows caching of the video BIOS ROM at C0000h-F7FFFh for better video performance. However, if any program writes to this memory area, a system error may result.
Setting: Disabled (Default), Enabled.

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.
Setting: Disabled (Default), Enabled.

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.
Setting: Disabled, Enabled (Default).

Delay Prior to Thermal

This field activates the CPU thermal function after the systems boots for the set number of minutes.
Setting: 4 Min, 8 Min, 16 Min (Default), 32 Min.

AGP Aperture Size (MB)

It sets aperture size of the graphics. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation.
Setting: 4, 8, 16, 32, 64 (Default), 128, 256.

On-Chip VGA

Setting: Enabled (Default), Disabled.

On-Chip Frame Buffer Size

Setting: 1MB, 4MB, 8MB (Default), 16MB, 32MB.

Boot Display

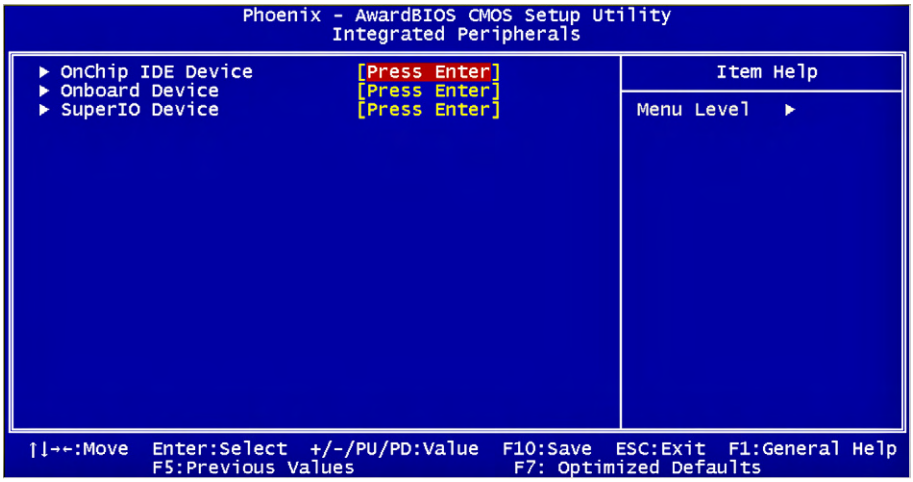
Setting: VBIOS Default, CRT (Default), LFP, CRT+LFP

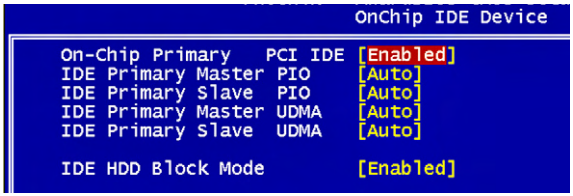
Panel Number

It allows you to select the LCD Panel type as below ---

Setting:				
	640x480	18-bit		
	800x600	18-bit		
	1024x768	18-bit		(Default)
	1280x1024	18-bit		
	1400x1050	18-bit	2-CH	
	1600x1200	18-bit	2-CH	

3.6 Integrated Peripherals





On-Chip Primary PCI IDE

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

IDE Primary Master/Slave PIO

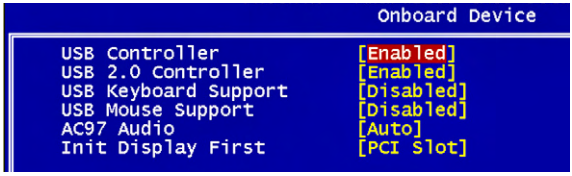
It allows your system HDD controller to run faster.
Rather than having the BIOS issue with a series of commands that transferring to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.
When Auto is selected, the BIOS will select the best available mode.
Setting: Auto (Default), Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Primary Master/Slave UDMA

It allows your system to improve disk I/O throughput to 33MB/sec with the Ultra DMA33 feature.
Setting: Disabled, Auto.

IDE HDD Block Mode

It allows your HDD controller to use the fast block mode to transfer data to and from your HDD drive.
Setting: Disabled, Enabled (Default).



USB Controller

Setting: Enabled (Default), Disabled.

USB 2.0 Controller

For using USB 2.0, it is necessary OS drivers must be installed first. Please update your system to at least Windows 2000 SP4 or Windows XP SP2.
Setting: Enabled (Default), Disabled.

USB Keyboard/ Mouse Support

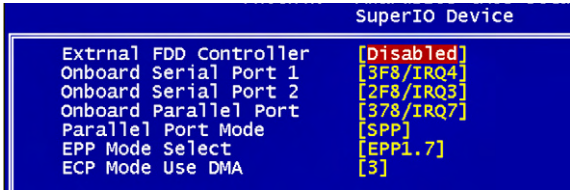
For using USB 2.0, it is necessary OS drivers must be installed first. Please update your system to at least Windows 2000 SP4 or Windows XP SP2.
Setting: Disabled (Default), Enabled.

AC97 Audio

Setting: Auto (Default), Disabled.

Init Display First

This determines which VGA controller is initialized when the system boots.
Setting: PCI Slot (Default), Onboard/AGP.



External FDD Controller

Select “Enabled” if your system has a floppy disk controller (FDC) installed and you wish to use it. Select “Disabled” if your system has an add-in FDC or has no floppy drive.
Setting: Disabled (Default), Enabled.

Onboard Serial/Parallel Port

It allows you to select the onboard serial and parallel ports with their addresses.

Setting:	Serial Port 1	3F8/IRQ4 (Default)
	Serial Port 2	2F8/IRQ3 (Default)
	Parallel Port	378H/IRQ7 (Default)

Parallel Port Mode

Setting: SPP (Default)
EPP
ECP
ECP+EPP
Normal

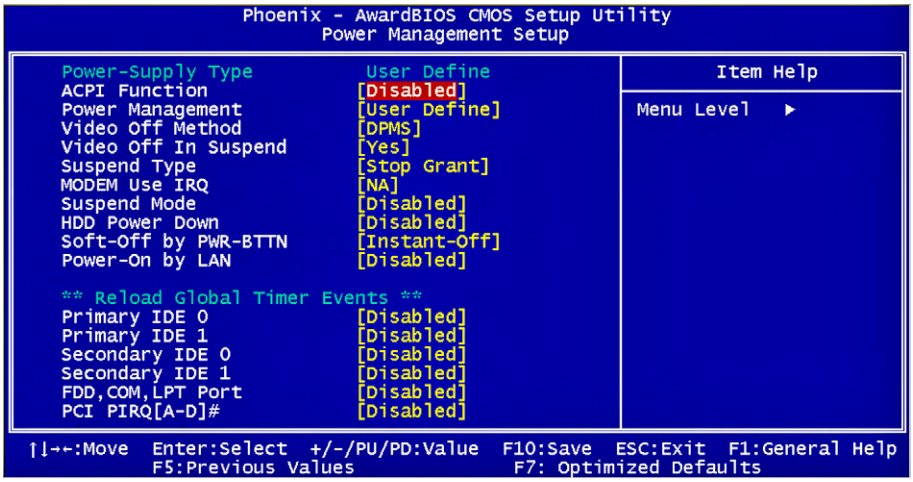
EPP Mode Select

Setting: EPP1.9, EPP1.7 (Default)

ECP Mode Use DMA

Setting: 1, 3 (Default).

3.7 Power Management Setup



ACPI Function

It supports ACPI (Advance Configuration and Power Interface).
Setting: Enabled, Disabled (Default).

Power Management

It allows you to select the type of power saving management modes.

Setting:	User Define (Default)	Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min
	Min Saving	Minimum power management
	Max Saving	Maximum power management

Video Off Method

It defines the Video Off features.

Setting:	Blank Screen	Writes blanks to the video buffer
	V/H SYNC + Blank	blank the screen and turn off vertical and horizontal scanning
	DPMS (Default)	Allowing BIOS to control the video display.

Video Off In Suspend

When enabled, the video is off in suspend mode.
Setting: No, Yes (Default).

Suspend Type

Setting: Stop Grant (Default), PwrOn Suspend.

Modem Use IRQ

It sets the IRQ used by the Modem.
Setting: NA (Default), 3, 4, 5, 7, 9, 10, 11.

Suspend Mode

When “Enabled”, after the set time of system inactivity, all devices except the CPU will be shut off as the set time.
Setting: Disabled (Default), 1 Min, 2 Min, 4 Min, 8 Min, 12 Min, 20 Min, 30 Min, 40 Min, 1 Hour.

HDD Power Down

When “Enabled”, after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.
Setting: Disabled (Default), 1 Min - 15 Min.

Soft-Off by PWR-BTTN

It defines the power-off mode when using an ATX power supply.
In the Instant Off mode, It allows powering off immediately upon pressing the power button.
In the Delay 4 Sec mode, the system powers off when the power button is pressed for more than 4 seconds or enters the suspend mode when pressed for less than 4 seconds.
Setting: Instant-off (Default), Delay 4 Sec. .

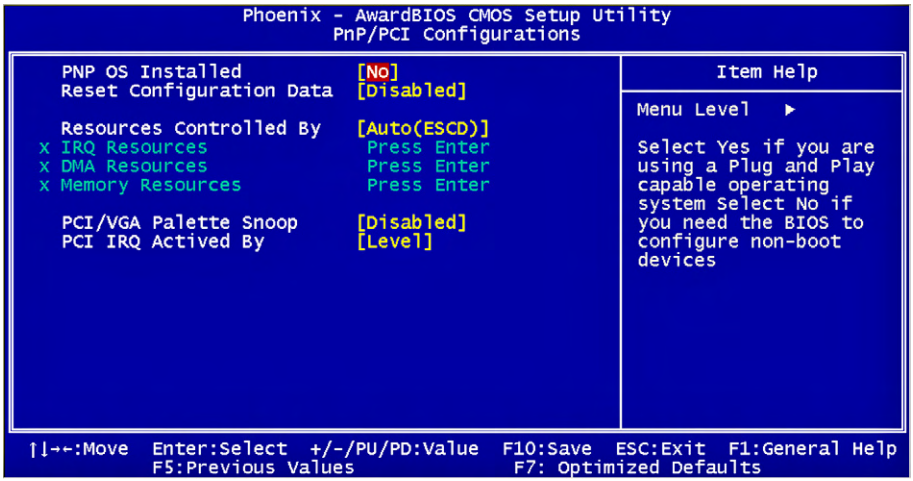
Power-On by LAN

It enables or disables the power on of the system through the modem connected or LAN.
Setting: Disabled (Default), Enabled.

Reload Global Timer Events

The HDD, FDD, COM, LPT Ports, and PCI PIRQ are I/O events that can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

3.8 PNP/PCI Configurations



PNP OS Installed

It allows you to enable the PNP OS Install option if it is supported by the OS installed.
Setting: No (Default), Yes.

Reset Configuration Data

It allows you to determine whether to reset the configuration data or not.
Setting: Disabled (Default), Enabled.

Resources Controlled By

This PnP BIOS can configure all of the boot and compatible devices with the use of a PnP operating system.
Setting: Auto(ESCD) (Default), Manual.

IRQ / DMA Resources

It allows you to configure the IRQ / DMA Resources.

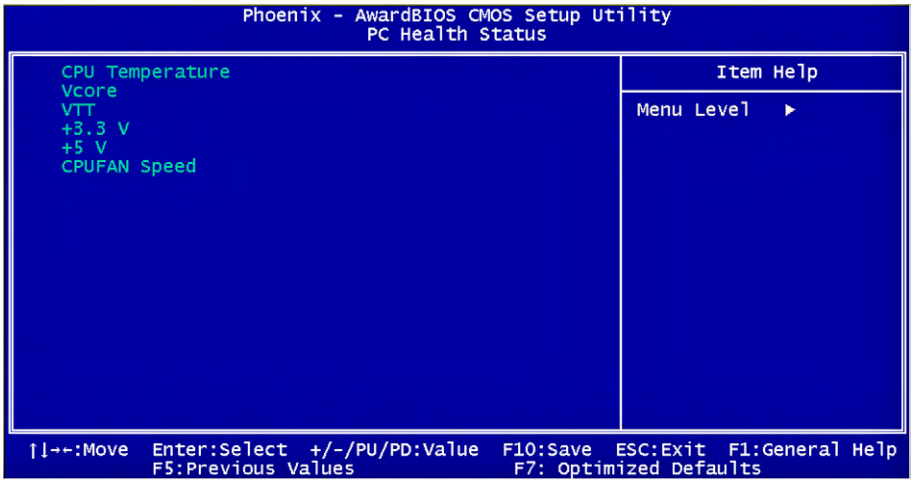
PCI/VGA Palette Snoop

Some non-standard VGA display cards may not show colors properly.
It allows you to set whether or not MPEG ISA/VESA VGA cards can display with PCI/VGA.
When “Enabled”, a PCI/VGA can display with an MPEG ISA/VESA VGA card.
When “Disabled”, a PCI/VGA can not display with an MPEG ISA/VESA VGA card.
Setting: Disabled (Default), Enabled.

PCI IRQ Actived By

Setting: Edge, Level (Default).

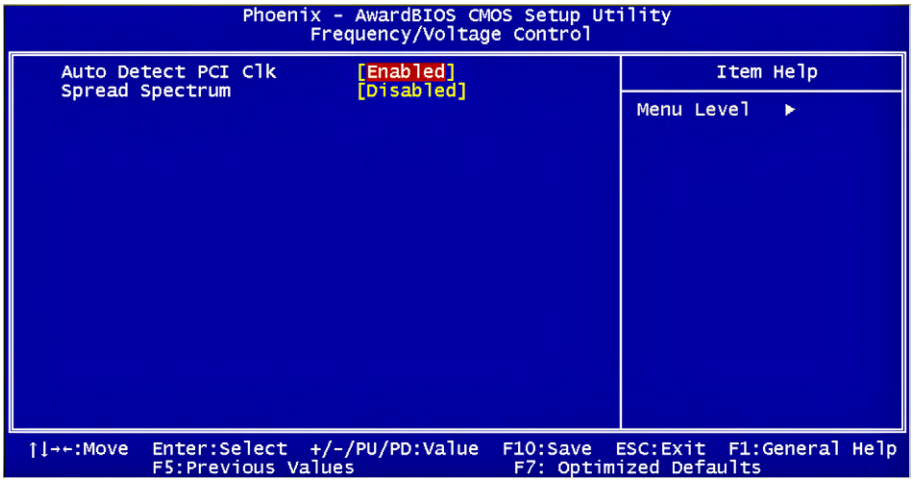
3.9 PC Health Status



Shutdown Temperature

It allows you to set the temperature by which the system automatically shuts down once the threshold temperature is reached.
The setting can help prevent damage to the system that is caused by overheating.
Setting: 60°C/140°F, 65°C/149°F, 70°C/158°F, Disabled (Default).

3.10 Frequency/Voltage Control



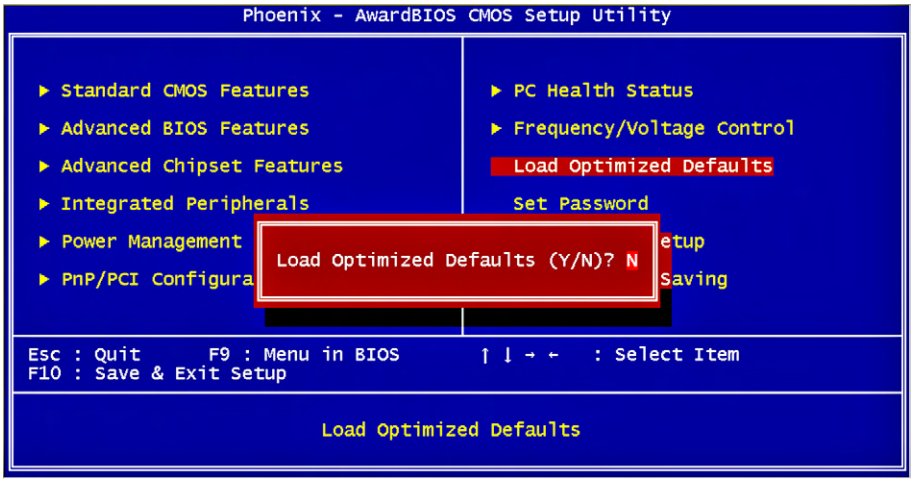
Auto Detect PCI Clk

It enables or disables the auto detection of the PCI clock.
Setting: Enabled (Default), Disabled.

Spread Spectrum

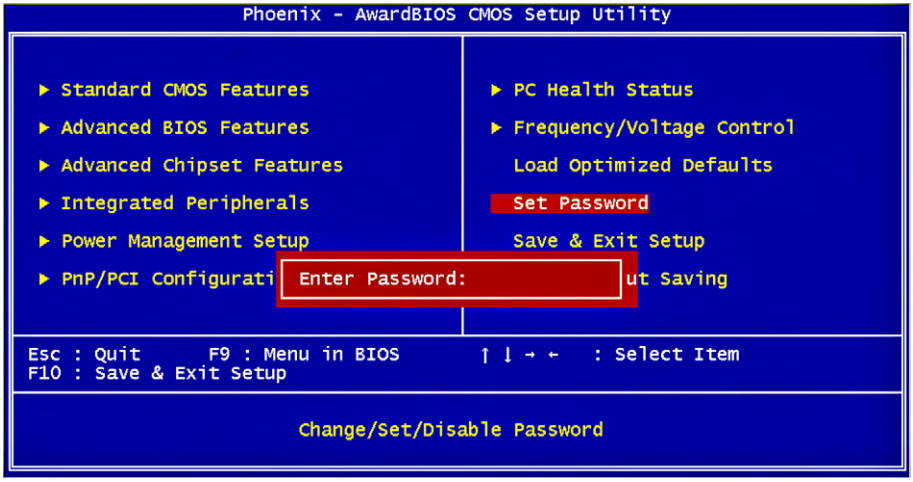
It sets the value of the spread spectrum. It is for CE testing use only.
Setting: Disabled (Default), Enabled.

3.11 Load Optimized Defaults



It allows you to load the default values to your system configuration. The default setting is optimal and enabled all high performance features.

3.12 Set Password

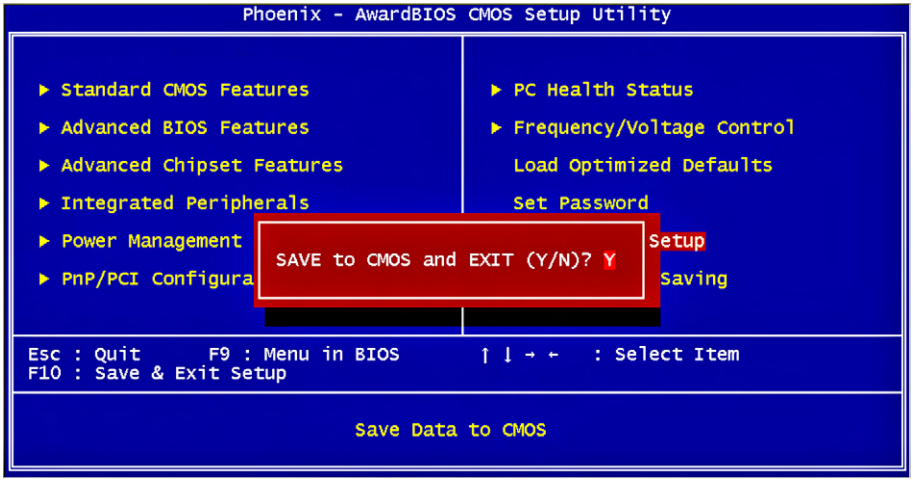


Useing Password to set a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>.

The Enter Password: message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. And the system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

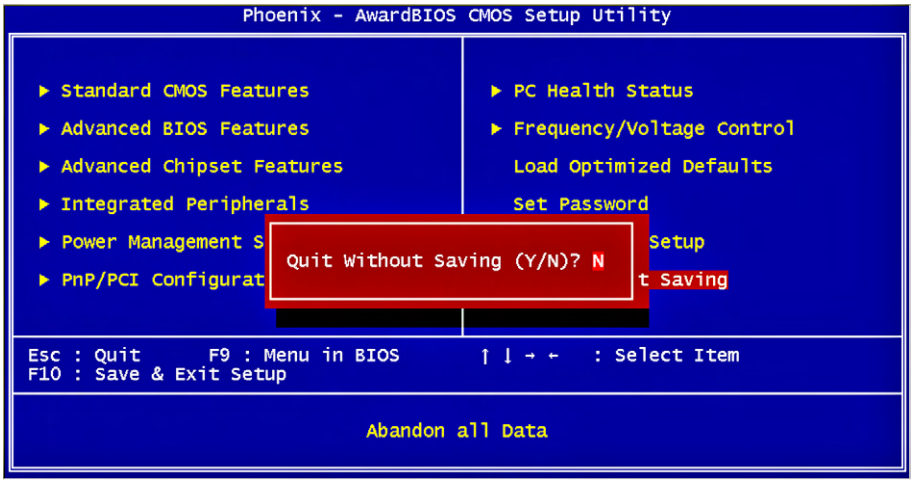
To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot, then you can enter BIOS Setup freely.

3.13 Save & Exit Setup



Typing “Y”, you will quit the setup utility and save all the changes into the CMOS memory.
Typing “N”, you will return to Setup utility.

3.14 Exit Without Saving



Typing “Y” will quit the Setup utility without saving the modifications.
Typing “N” will return you to Setup utility.

3.15 BIOS Beep Sound code list

Beep Sound	Message
1 short (Beep)	System booting is normally
2 short (Beep)	CMOS setting error
1 long - 1 short (Beep)	DRAM error
1 long - 2 short (Beep)	Display card or monitor connected error
1 long - 3 short (Beep)	Keyboard error
1 long - 9 short (Beep)	ROM error
Long (Beep) continuous	DRAM hasn't inset correctly
Short (Beep) continuous	POWER supply has problem

3.16 BIOS memory mapping

Address	Device Description
E000:0000h - F000:FFFFh	System BIOS Area
D000:2000h - D000:FFFFh	Free space
D000:0000h - D000:1FFFh	LAN ROM
C000:E000h - CF00:FFFFh	Free space
C000:0000h - C000:DFFFh	VGA BIOS
A000:0000h - B000:FFFFh	VGA RAM
0000:0000h - 9000:FFFFh	DOS 640K

3.17 Award BIOS Post Codes

CFh	Test CMOS read/write functionality
C0h	Early chipset initialization: Disable shadow RAM, L2 cache (socket 7 and below), program basic chipset registers
C1h	Detect memory: Auto detection of DRAM size, type and ECC, auto detection of L2 cache (socket 7 and below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM
01h	Expand the Xgroup codes located in physical memory address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch
04h	Reserved
05h	Blank out screen; Clear CMOS error flag
06h	Reserved
07h	Clear 8042 interface; Initialize 8042 self test
08h	Test special keyboard controller for Winbond 977 series Super I/O chips; Enable keyboard interface
09h	Reserved
0Ah	Disable PS/2 mouse interface (optional); Auto detect ports for keyboard & mouse followed by a port & interface swap (optional); 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 read/write capable or not. If test fails, keep beeping the speaker
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash read/write 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 overrride
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch
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	Check validity of RTC value; Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead; Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information; Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots; 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
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	Program CPU internal MTRR (P6 & PII) for 0-640K memory address; Initialize the APIC for Pentium class CPU; Program early chipset according to CMOS setup; Measure CPU speed; Invoke video BIOS
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved
2Dh	Initialize multilanguage; Put information on screen display, including Award title, CPU type, CPU speed, etc...
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1
3Fh	Reserved
40h	Test 9259 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	Calculate total memory by testing the last double last word of each 64K page; Program writes allocation for AMD K5 CPU
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	Program MTRR of M1 CPU; initialize L2 cache for P6 class CPU & program cacheable range; Initialize the APIC for P6 class CPU; 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
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	Display PnP logo; Early ISA PnP initialization and assign CSN to every ISA PnP device
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code
5Ah	Reserved
5Bh	Show message for entering AWDFLASH.EXE from FDD (optional feature)
5Ch	Reserved
5Dh	Initialize Init_Onboard_Super_IO switch; Initialize Init_Onboard_ AUDIO switch
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility
61h	Reserved
62h	Reserved
63h	Reserved
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	Assign resources to all ISA PnP devices; Auto assign ports to onboard COM ports if the corresponding item in Setup is set to “AUTO”
6Eh	Reserved
6Fh	Initialize floppy controller; Setup floppy related fields in 40:hardware

70h	Reserved
71h	Reserved
72h	Reserved
73h	Enter AWDFLASH.EXE if: AWDFLASH.EXE is found in floppy dive and ALT+F2 is pressed
74h	Reserved
75h	Detect and install all IDE devices: HDD, LS120, ZIP, CDROM...
76h	Reserved
77h	Detect serial ports and parallel ports
78h	Reserved
79h	Reserved
7Ah	Detect and install coprocessor
7Bh	Reserved
7Ch	Reserved
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 continue - Clear EPA or customization logo
80h	Reserved
81h	Reserved
82H	Call chipset power management hook: Recover the text fond used by EPA logo (not for full screen logo), If password is set, ask for password
83H	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	Final USB initialization; NET PC: Build SYSID structure; Switch screen back to text mode; Set up ACPI table at top of memory; Invoke ISA adapter ROM's; Assign IRQ's to PCI devices; Initialize APM; Clear noise of IRQ's
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	Enable L2 cache; Program boot up speed; Chipset final initialization; Power management final initialization; Clear screen and display summary table; Program K^ write allocation; Program P6 class write combining
95h	Program daylight saving; Update keyboard LED and typematic rate
96h	Build MP table; Build and update ESCD; Set CMOS century to 20h or 19h; Load CMOS time into DOS timer tick; Build MSIRQ routing table
FFh	Boot attempt (INT 19h)

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Chapter 4

Appendix

4.1 I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device.
The following table lists the I/O port addresses used.

Address	Device Description
00000000-0009FFFF	System board extension for PnP BIOS
00000000-FFFFFFFF	PCI standard PCI-to-PCI bridge
00000000-FFFFFFFF	PCI standard PCI-to-PCI bridge
00000000-FFFFFFFF	PCI standard PCI-to-PCI bridge
000A0000-000AFFFF	Standard PCI Graphics Adapter (VGA)
000B0000-000BFFFF	Standard PCI Graphics Adapter (VGA)
000C0000-000CC7FF	Standard PCI Graphics Adapter (VGA)
000D8000-000D97FF	Intel(R) PRO/100 VE Network Connection
000D9800-000DBFFF	Motherboard resources
000F0000-000F3FFF	Motherboard resources
000F0000-000F3FFF	Motherboard resources
000F4000-000F7FFF	Motherboard resources
000F8000-000FFFFF	Motherboard resources
00100000-00FFFFFF	System board extension for PnP BIOS
D0000000-D7FFFFFF	Standard PCI Graphics Adapter (VGA)
D8000000-DFFFFFFF	Standard PCI Graphics Adapter
E0000000-E3FFFFFF	PCI standard host CPU bridge
E4000000-E4000FFF	Intel(R) PRO/100 VE Network Connection
E4000000-E40FFFFF	PCI standard PCI-to-PCI bridge
E4100000-E417FFFF	Standard PCI Graphics Adapter
E4180000-E41FFFFF	Standard PCI Graphics Adapter (VGA)
E4200000-E42003FF	PCI Universal Serial Bus
E4201000-E42011FF	PCI Multimedia Audio Device
E4202000-E42020FF	PCI Multimedia Audio Device
FEC00000-FEC0FFFF	System board extension for PnP BIOS

FEE00000-FEE0FFFF	System board extension for PnP BIOS
FFB00000-FFB7FFFF	System board extension for PnP BIOS
FFB80000-FFBFFFFF	Unknown Device
FFF00000-FFFFFFFF	System board extension for PnP BIOS
Port 0000-FFFF	PCI standard PCI-to-PCI bridge
Port 0020-0021	Programmable interrupt controller
Port 0040-0043	System timer
Port 0060-0060	Standard 101/102-Key or Microsoft Natural Keyboard
Port 0061-0061	System speaker
Port 0070-0071	System CMOS/real time clock
Port 0081-0083	Direct memory access controller
Port 0087-0087	Direct memory access controller
Port 0089-008B	Direct memory access controller
Port 008F-0091	Direct memory access controller
Port 00A0-00A1	Programmable interrupt controller
Port 00C0-00DF	Direct memory access controller
Port 00F0-00FF	Numeric data processor
Port 0170-0177	Secondary IDE controller (single fifo)
Port 0170-0177	Standard Dual PCI IDE Controller
Port 01F0-01F7	Primary IDE controller (single fifo)
Port 02F8-02FF	Communications Port (COM2)
Port 0376-0376	Secondary IDE controller (single fifo)
Port 0376-0376	Standard Dual PCI IDE Controller
Port 0378-037F	Printer Port (LPT1)
Port 03B0-03BB	Standard PCI Graphics Adapter (VGA)
Port 03C0-03DF	Standard PCI Graphics Adapter (VGA)
Port 03F6-03F6	Primary IDE controller (single fifo)
Port 03F6-03F6	Standard Dual PCI IDE Controller
Port 03F8-03FF	Communications Port (COM1)
Port 0400-04BF	PCI bus

Port 04D0-04D1	PCI bus
Port 0500-051F	PCI System Management Bus
Port 0778-077B	Printer Port (LPT1)
Port 0CF8-0CFF	PCI bus
Port 9000-903F	Intel(R) PRO/100 VE Network Connection
Port 9000-9FFF	PCI standard PCI-to-PCI bridge
Port A000-A01F	Standard Universal PCI to USB Host Controller
Port A400-A41F	Standard Universal PCI to USB Host Controller
Port A800-A81F	Standard Universal PCI to USB Host Controller
Port AC00-AC07	Standard PCI Graphics Adapter (VGA)
Port B400-B4FF	PCI Multimedia Audio Device
Port B800-B83F	PCI Multimedia Audio Device
Port F000-F007	Primary IDE controller (single fifo)
Port F000-F00F	Standard Dual PCI IDE Controller
Port F008-F00F	Secondary IDE controller (single fifo)

4.2 Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 00	System Timer
IRQ 01	Standard 101/102-Key or Microsoft Natural Keyboard
IRQ 02	Programmable interrupt controller
IRQ 03	Communications Port (COM2)
IRQ 04	Communications Port (COM1)
IRQ 05	PCI Multimedia Audio Device
IRQ 05	PCI System Management Bus
IRQ 05	IRQ Holder for PCI Steering
IRQ 07	Printer Port (LPT1)
IRQ 08	System CMOS/real time clock
IRQ 09	PCI Universal Serial Bus
IRQ 09	IRQ Holder for PCI Steering
IRQ 0A	Standard Universal PCI to USB Host Controller
IRQ 0A	Standard Universal PCI to USB Host Controller
IRQ 0A	IRQ Holder for PCI Steering
IRQ 0A	Standard PCI Graphics Adapter (VGA)
IRQ 0B	Intel(R) PRO/100 VE Network Connection
IRQ 0B	Standard Universal PCI to USB Host Controller
IRQ 0B	IRQ Holder for PCI Steering
IRQ 0C	PS/2 Compatible Mouse Port
IRQ 0D	Numeric data processor
IRQ 0E	Primary IDE controller (single fifo)
IRQ 0E	Standard Dual PCI IDE Controller
IRQ 0F	Secondary IDE controller (single fifo)
IRQ 0F	Standard Dual PCI IDE Controller

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