MIC-3321

3U CompactPCI Pentium M 760 2.0G High-performance Controller

User Manual

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Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.

4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

CE Notification

The MIC-3321, developed by Advantech CO., LTD., has passed the CE test for environment specification when shielded cables are used for external wiring and sleeve core clamps are added to the USB cables. We recommend the use of shielded cables and sleeve core clamps.

Technical Support and Assistance

Step 1. Visit the Advantech web site at **www.advantech.com/support** where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

• One MIC-3321 all-in-one single board computer

• One utility CD-ROM

• This user's manual

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.

2. Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Hardware Configuration

Chapter 1 Hardware Configuration

1.1 Introduction

MIC-3321 is a 3U, all-in-one, controller board, compliant with PICMG 2.0 R2.1 CompactPCI specifications. For high computing performance, MIC-3321 uses an Intel Pentium M 760 2.0GHz CPU and Intel 915GM chipset. This CPU provides high performance with its on-chip 2 MB L2 cache and is delivered in a Micro-FCBGA 479 package.

MIC-3321 offers powerful functions on a 3U-sized board for performance-demanding applications like real-time machine control and industrial automation.

Compact Mechanical Design

In order to decrease the thermal effect, Advantech provides a heat sink specially designed for the MIC-3321, so it only needs external cooling air from the chassis fans for ventilation.

Ordering Information

- MIC-3321S: Pentium M 2.0GHz, 2Mbyte L2 cache,512Mbyte soldered DDR2 SDRAM, 4HP width
- MIC-3321:   Pentium M 2.0GHz, 2Mbyte L2 cache,512Mbyte soldered DDR2 SDRAM, 8HP width
- MIC-3321CS: Celeron M 1.0GHz, 512Kbyte L2 cache,512Mbyte soldered DDR2 SDRAM, -25~70° C, 4HP width
- MIC-3321C: Celeron M 1.0GHz, 512Kbyte L2 cache, 512Mbyte soldered DDR2 SDRAM, -25~70°c, 8HP width
- MIC-3321LS: Celeron M 800MHz, 0Kbyte L2 cache, 256Mbyte soldered DDR2 SDRAM, 4HP width
- MIC-3521-AE: Rear I/O Transition Board for MIC-3321 series

1.2 Specifications

1.2.1 Standard SBC Functions

- **CPU:** MIC-3321 supports Intel Pentium M 2.0 GHz

- **Optional:** Celeron M 1.0GHz/ Celeron M 800MHz (non cache)

- **BIOS:** Award 4 Mb flash memory

- **Chipset:** Intel 915GM Graphics and Memory Controller Hub (GMCH)
  Intel 82801FBM I/O Controller Hub (ICH6M)

- **System Memory:**

  Directed Soldered 512MB DDR2 533 SDRAM (MIC-3321/3321S)

  Directed Soldered 512MB DDR2 400 SDRAM (MIC-3321C/3321CS)

  Directed Soldered 256MB DDR2 400 SDRAM (MIC-3321LS)

  Max:1GB

- **P-IDE:** One Channel IDE CompactFlash socket type II*1(select master/slave DIP-SW), UltraDMA/100/66/33*a (2.5"HDD)

- **SATA:** One external SATA Connector

- **Serial Ports:** Two RS-232 ports with 16C550UARTs (or compatible) with 16-byte FIFO buffer. One Front I/O, the other Rear I/O.

- **Keyboard and PS/2 Mouse Connector:** One 6-pin mini-DIN connector is located on the mounting bracket for easy connection to a keyboard or PS/2 mouse.

- **USB Port:** Four USB2.0 Channels up to 480MB, 2 front I/O, 2 rear I/O

- **PCI-to-PCI Bridge:** PERICOM P17C8150-32-bit/33MHz CompactPCI interface

- **Watchdog Timer:** Provides system reset and software control. Time interval is programmable from 1 to 255 seconds/minutes.

- **Ethernet LAN:** 10/100/1000Base-TX Gigabit Ethernet

- **Controller Chips:** Two Intel 825723E/L PCI Express Gigabit Ethernet Controllers support Pre-boot Execution Environment(PXE).

- **Battery-backup RAM:** 512 KB

- **Input /Output Bus Interface:** PCI 2.2 compliant, 32 bit/33 MHz

- **CompactPCI Compliance:** PICMG 2.1 CompactPCI Hot Swap R3.0

1.2.2 Display

- **Controller:** Intel Graphics Media Accelerator 900
- **VRAM:** DVMT3.0 128MB
- **Resolution:** Up to 2048x1536 with 32-bit color at 75Hz

1.2.3 Mechanical and Environmental Specifications

- **Board Size (W x H) :** 160 x 100 mm (3U)
- **Operating Temperature:** 0 ~ 50° C (MIC-3321 Pentium M 2.0GHz)

    0~50° C (MIC-3321LS Celeron M 800MHz)

    -25 ~ 70° C (MIC-3321C Celeron M 1.0G)
- **Storage Temperature:** -40 ~ 80° C
- **Board Weight:** 0.6 kg

1.3 Function Block Diagram
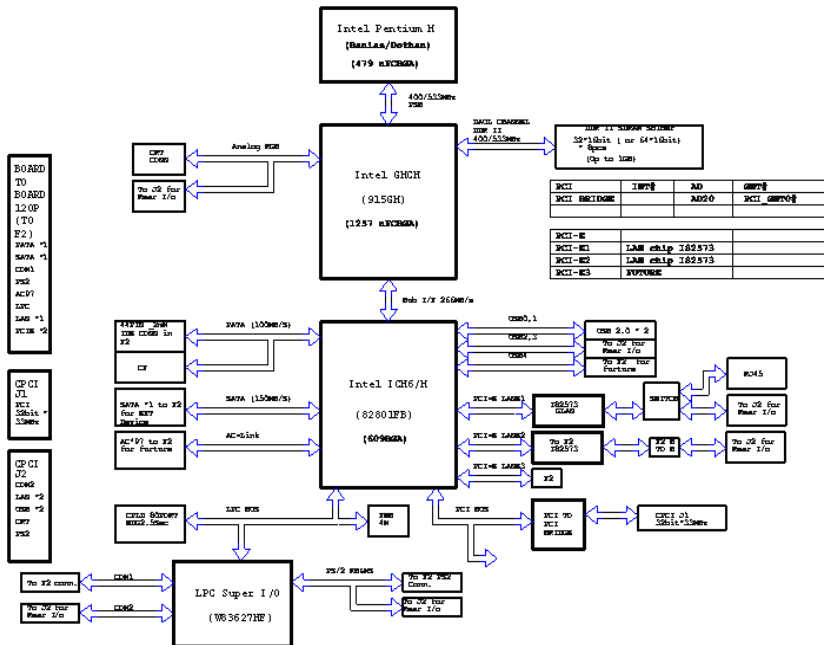
Figure 1.1: MIC-3321 Function Block Diagram

1.4 Board Dimensions

160 mm

100 mm
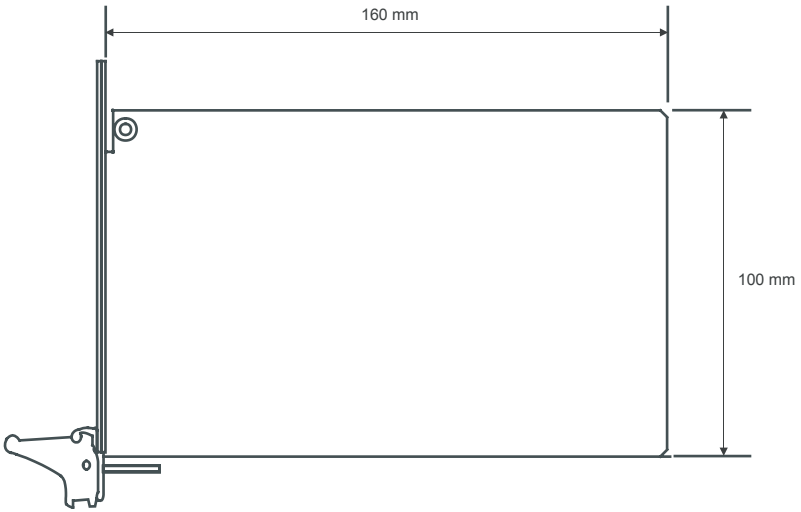
Figure 1.2: MIC-3321 Board Dimensions

1.5 Dip Switch Settings

Since MIC-3321 is composed of one main board and one daughter board, for ease of understanding and a convenient naming, we will use 1F (1st level) to represent the main board, and 2F (2nd level) to represent the daughter board hereafter in this manual. Before setting the switches, you need to disassemble the MIC-3321 to 1F and 2F as in Figures 1.3 and 1.4.

1.5.1 Switch Locations

Table 1.1 lists the switch functions of MIC-3321 (be sure that the switch is white one). Figure 1.3 and Figure 1.4 show the locations of S1 and S2, respectively.

Table 1.1: MIC-3321 Switch Descriptions		
DIP-SW Mode	**Setting**	**Function**
1F-S1 Mode		Bit-1 : ON LAN1 on Rear I/O
		Bit-2 : OFF CF : Slave
		Bit-1 : OFF LAN1 on Front I/O
		Bit-2 : ON CF : Master
2F-S2 Mode		Bit-1 : ON LAN2 on Rear I/O
		Bit-2 : OFF N/C
		Bit-1 : OFF LAN2 on Front I/O
		Bit-2 : ON N/C
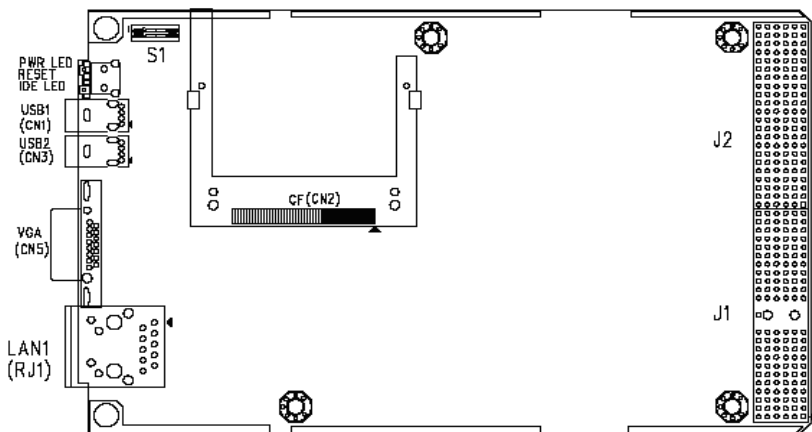
Figure 1.3: MIC-3321 S1 Location (1F)
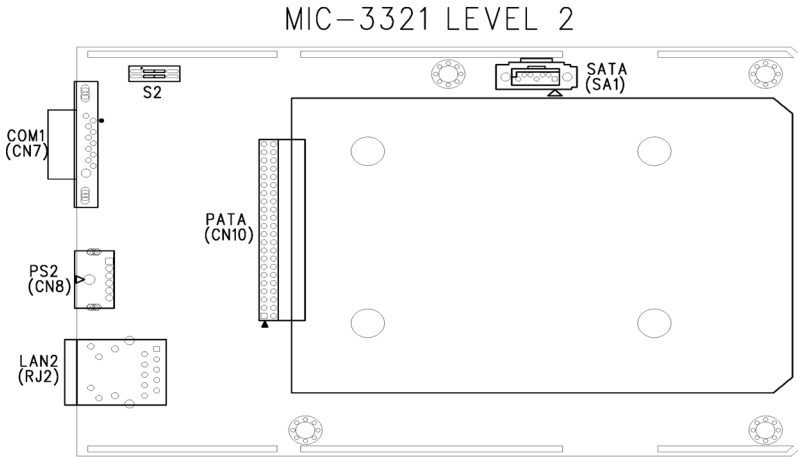
Figure 1.4: MIC-3321 S2 Location (2F)

1.6 Safety Precautions

Follow these simple precautions to protect yourself and the products.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.

2. Disconnect power before making any configuration changes. The sudden rush of power as you adjust a switch or install a card may damage sensitive electronic components.

3. Always ground yourself to remove any static charge before you touch your CPU card. Be particularly careful not to touch the chip connectors. Modern integrated electronic devices, especially CPUs and memory chips, are extremely sensitive to static electrical discharges and fields. Keep the card in its antistatic packaging when it is not installed in the PC, and place it on a static dissipative mat when you are working with it. Wear a grounding wrist strap for continuous protection.

CHAPTER **2**

**Connecting
Peripherals**

Chapter 2 Connecting Peripherals

2.1 Connectors

Figure 2.1 and 2.2 show MIC-3321 connector locations. Figure 2.3 shows MIC-3521 connector location.
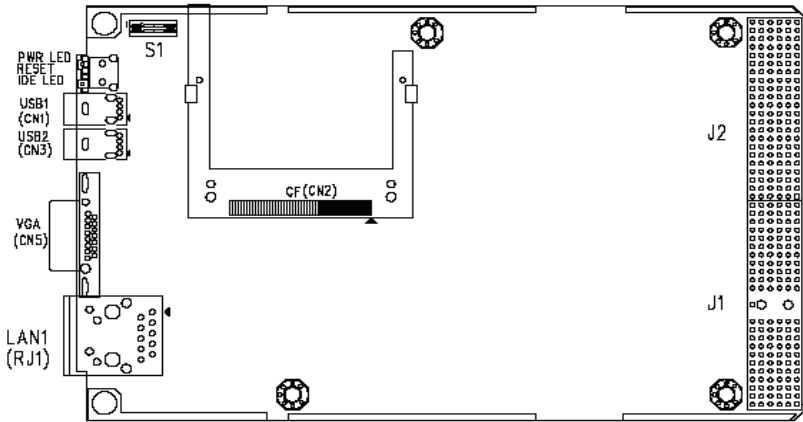
Figure 2.1: MIC-3321 Connector Locations (1F)
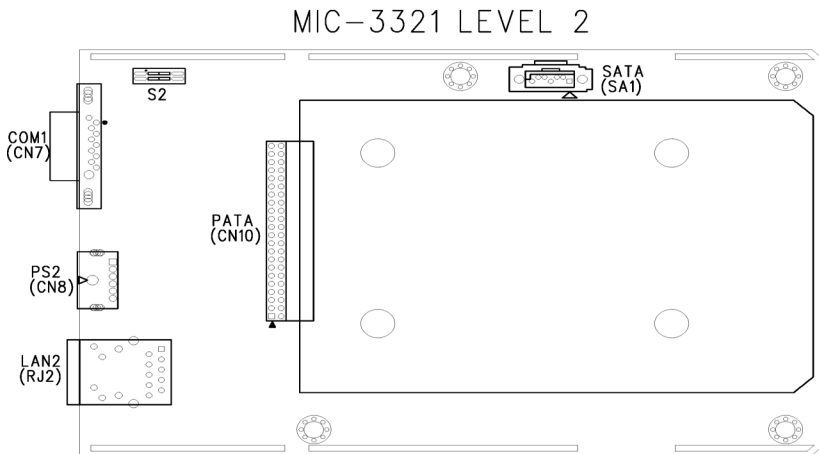
Figure 2.2: MIC-3321 Connector Locations (2F)
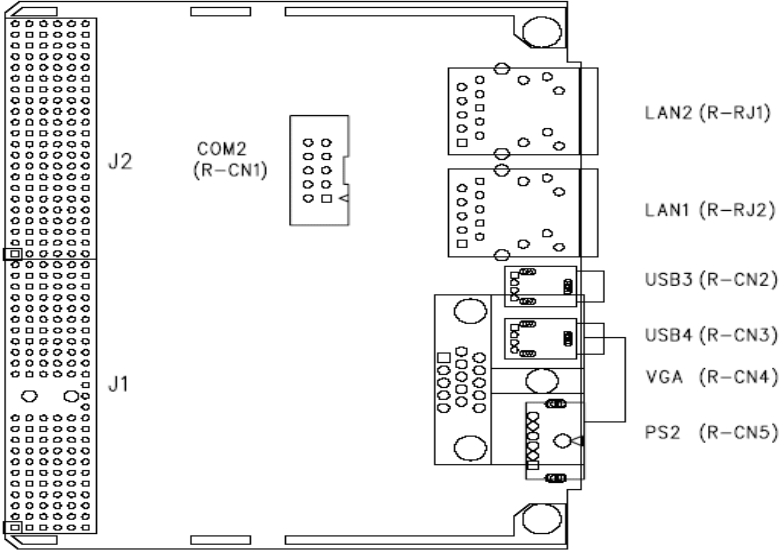
Figure 2.3: MIC-3521 Connectors

Table 2.1: MIC-3321 Connectors Overview		
Number	**Function**	**Description**
1F-CN1	USB1	USB1 Type-A Female on Front side panel.
1F-CN3	USB2	USB2 Type-A Female on Front side panel.
1F-CN2	CF	CompactFlash socket
1F-CN5	VGA	D-Sub 15-pin (Female) on Front side panel.
1F-RJ1	LAN1	10/100/1000Base-TX Ethernet on Front side panel.
1F-S1	LAN1 MODE, CF MODE	Bit-1 Setting: LAN1 Front I/O or Rear I/O Bit-2 Setting: CF master or slave mode
2F-CN7	COM1	Serial port: RS-232 on Front I/O
2F-CN8	PS2	Standard Mini-DIN 6-pin supports K/B and Mouse on Front I/O.
2F-CN10	PATA	Internal IDE 44pin(2mm) 2.5îHDD connector
2F-SA1	SATA	Serial ATA0 (7pin connector)
2F-RJ2	LAN2	10/100/1000Base-TX Ethernet on Front side panel.
2F-S2	LAN2 MODE	Bit-1 Setting: LAN2 Front I/O or Rear I/O Bit-2 Setting: N/C
1R-CN1	COM2	Serial port2: RS-232 on Rear I/O
1R-CN2	USB3	USB3 Type-A Female on Rear I/O
1R-CN3	USB4	USB4 Type-A Female on Rear I/O
1R-CN4	VGA	D-Sub 15-pin (Female) on Rear I/O
1R-CN5	PS2	Standard Mini-DIN 6-pin supports K/B and Mouse on Rear I/O
1R-RJ1	LAN1	10/100/1000Base-TX Ethernet on Rear I/O
1R-RJ2	LAN2	10/100/1000Base-TX Ethernet on Rear I/O

2.2 Card Installation

The CompactPCI connectors are firm and rigid, but require careful handling while plugging and unplugging. Improper installation of a card can easily damage the backplane of the chassis.

The inject/eject handle of MIC-3321 helps you install and remove the card easily and safely. Follow the procedure below to install the MIC-3321 into a chassis:

To install a card:

1. Hold the card vertically. Be sure that the card is pointing in the correct direction. The components of the card should be pointing to the right-hand side.

2. Holding the lower handle, pull out the red portion in the middle of the handle to unlock it.

Caution: *Keep your fingers away from the hinge to prevent them from getting pinched.*

3. Insert the card into the chassis by sliding the upper and lower edges of the card into the card guide.

4. Push the card into the slot gently by sliding the card along the card guide until the handles meet the rectangular holes of the cross rails.

Note: *If the card is correctly positioned and has been slid all the way into the chassis, the handle should match the rectangular holes. If not, remove the card from the card guide and repeat step 3 again. Do not try to install a card by forcing it into the chassis.*

5. Lift the lower handle up to push the card into place.

To remove a card:

1. Unscrew the four screws on the front panel.
2. Press the lower handle down to release the card from the backplane.
3. Slide the card out.
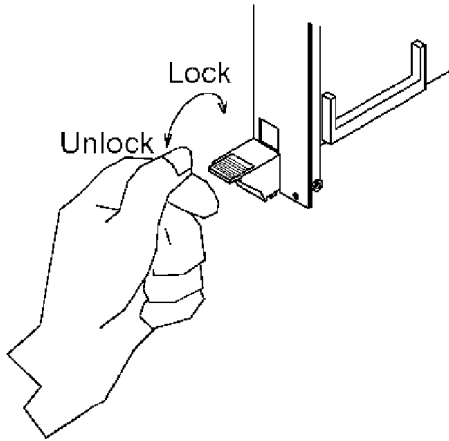
Figure 2.4: Chassis Installation/Removal

Software Configuration

Chapter 3 Software Configuration

3.1 Overview

MIC-3321 has a CD-ROM with utilities and drivers. Please install the Chipset INF driver, VGA graphics driver, and LAN driver.

3.2 Utilities and Drivers

The following utilities and drivers are provided with the MIC-3321 series. You can also find updated description of the utilities and drivers in the ReadMe.txt file on the CD-ROM.

Windows 2000/XP are fully supported by the MIC-3321 series.

3.2.1 Intel Chipset Software Installation Utility

Path: Driver\Inf\I915GM

Available for the operating systems listed below:

• Microsoft Windows 2000
• Microsoft Windows XP

3.2.2 Intel VGA Graphics Driver

Path: Driver\VGA\915GM

Available for the operating systems listed below:

• Microsoft Windows 2000
• Microsoft Windows XP

3.2.3 Intel Gigabit LAN Driver

Path: \Driver\Lan\82573E

Available for the operating systems listed below:

• Microsoft Windows 2000
• Microsoft Windows XP

CHAPTER **4**

Award BIOS Setup

Chapter 4 Award BIOS Setup

4.1 Introduction

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu (Figure 4-1) will appear on the screen. The Main Menu allows you to select between nine setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept or enter the submenu.

```
              Phoenix - AwardBIOS CMOS Setup Utility

  ▶ Standard CMOS Features          ▶ Spread Spectrum Control

  ▶ Advanced BIOS Features             Load Optimized Defaults

  ▶ Advanced Chipset Features          Set Password

  ▶ Integrated Peripherals             Save & Exit Setup

  ▶ PnP/PCI Configurations             Exit Without Saving

  ▶ PC Health Status


  Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←  : Select Item
  F10 : Save & Exit Setup

                  Time, Date, Hard Disk Type...
```
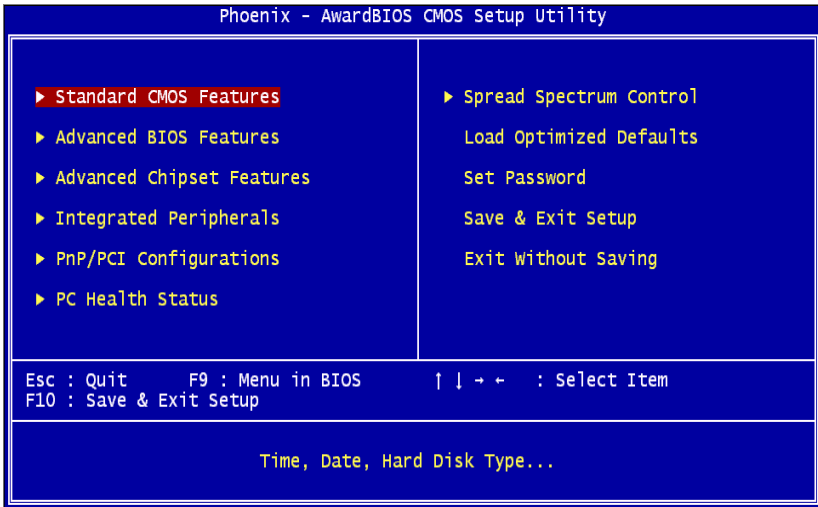
Figure 4.1: Setup Program Initial Screen

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

4.2 Entering Setup

Turn on the computer and press <Del> to allow you to enter the BIOS setup. (Figure 4.1)

4.2.1 Standard CMOS Setup

```
           Phoenix - AwardBIOS CMOS Setup Utility
                   Standard CMOS Features
┌──────────────────────────────────────────┬──────────────────┐
│  Date (mm:dd:yy)        Sat, May 29 1999  │    Item Help     │
│  Time (hh:mm:ss)        11 : 46 : 19      ├──────────────────┤
│                                           │  Menu Level   ▶  │
│ ▶ IDE Primary Master    [ None]           │                  │
│ ▶ IDE Secondary Master                    │  Change the day, month, │
│ ▶ IDE Secondary Slave                     │  year and century │
│                                           │                  │
│  Video                  [EGA/VGA]         │                  │
│  Halt On                [All Errors]      │                  │
│                                           │                  │
│  Base Memory                    1K        │                  │
│  Extended Memory                1K        │                  │
│  Total Memory                 512K        │                  │
│                                           │                  │
│                                           │                  │
│                                           │                  │
├──────────────────────────────────────────┴──────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│       F5:Previous Values        F7: Optimized Defaults       │
└──────────────────────────────────────────────────────────────┘
```

Figure 4.2: Standard CMOS Setup Screen.

Date

The date format is <week>, <month>, <day>, <year>.

Time

The time format is <hour> <minute> <second>, based on the 24-hour clock.

IDE Primary Master/ Secondary Master/ Secondary Slave

IDE HDD Auto-Detection:

Press "Enter" to select this option for automatic device detection.

IDE Device Setup:

Auto: Automatically detects IDE devices during POST

None: Select this when no IDE device is used. The system will skip the auto-detection step to make system start up faster.

Halt On

This category determines whether system start-up will halt when an error is detected during power up.

The options are: No Errors/All Errors/All, But Keyboard/All, But Diskette/ All, But Disk/Key

Memory

This category displays base, extended, and total memory detected during the POST (Power On Self Test).

4.2.2 Advanced BIOS Features Setup

The "Advanced BIOS FEATURES" screen will appear after the BIOS FEATURES SETUP item from the CMOS SETUP UTILITY Menu was chosen. This screen allows the user to configure the board according to particular requirements. Below are some major items that are provided in the BIOS FEATURES SETUP screen:

```
            Phoenix - AwardBIOS CMOS Setup Utility
                      Advanced BIOS Features

 ▶ Hard Disk Boot Priority      [Press Enter]          Item Help
   CPU Thermal Monitor          [Enabled]
   Virus Warning                [Disabled]       Menu Level    ▶
   CPU L1 & L2 Cache            [Enabled]
   CPU L3 Cache                 [Enabled]        Select Hard Disk Boot
   Quick Power On Self Test     [Enabled]        Device Priority
   First Boot Device            [USB-CDROM]
   Second Boot Device           [Hard Disk]
   Third Boot Device            [CDROM]
   Boot Other Device            [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]


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

Figure 4.3: Advanced BIOS features setup screen

Hard Disk Boot Priority

Set hard disk boot device priority.

CPU Thermal Monitor

The Intel Thermal MonitorAutomatic Mode. There are two Automatic modes called Intel Thermal Monitor 1 (TM1) and Intel Thermal Monitor 2 (TM2). And MIC-3321 Auto dete C-M or P-M.When CPU was C-M BIOS running in TM1,another running TM2.

TM1: When Intel Thermal Monitor 1 is enabled, and a high temperature situation exists, the clock will be modulated by alternately turning the clock off and on at a 50% duty cycle. Cycle times are processor speed dependent, and will decrease linearly as processor core frequencies increase. After the temperature has returned to a non-critical level, modulation ceases and the TCC goes inactive.

TM2: When Intel Thermal Monitor 2 is enabled, and a high temperature situation exists, the processor will perform an Enhanced Intel SpeedStep technology transition to a lower operating point. When the processor temperature drops below the critical level, the processor will make an Enhanced Intel SpeedStep technology transition to the last requested operating point. Intel Thermal Monitor 2 is the recommended mode on the Intel Pentium M processor

Enabled (default)	Enable Thermal Monitor
Disabled	Disable Thermal Monitor

Virus Warning

This will occur during and after the system boot up, or during any attempt to sector or partition the hdd. While the message displays, an anti-virus program will attempt to locate the problem. If the Virus Warning is disabled, no warning message will ever appear.

CPU L1 & L2 Cache

Enabled (default)   Enable cache

Disabled   Disable cache

Note: The internal cache is built into the processor.

Quick Power On Self Test

This category speeds up Power On Self Test (POST) after you power on the computer. If this is set to Enabled, BIOS will shorten or skip some check items during POST.

Enabled (default)   Enable quick POST

Disabled Normal   Normal POST

First/Second/Third Boot Device and Boot Other Device

The BIOS attempts to load the operating system from the devices in the

sequence selected in these items. The settings are Hard Disk, CDROM, USB-FDD, USB-ZIP, USB-CD-ROM, LAN 1, LAN 2 and Disabled.

First boot device (default)   USB-CD-ROM

Second boot device   Hard Disk

Third boot device   CD-ROM

*Note: When you boot by USB-CD-ROM, please install
              WinXP with SP1 or Win 2000 with SP3.*

Boot Up NumLock Status

On (default): Keypad: numeric keys

Off: Keypad: arrow keys

Gate A20 Options

Normal: A20 signal is controlled by keyboard or chipset hardware.

Fast (default): A20 signal is controlled by port 92 or chipset method

Typematic Rate Setting

Keystrokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected. The settings are: Enabled/Disabled. The default setting is Disabled.

Typematic Rate (Chars/Sec)

Set the number of times a second to repeat a keystroke key down.

The settings are: 6, 8, 10, 12, 15, 20, 24, 30.

Typematic Delay (Msec)

Sets the delay time after the key is held down before it the keystroke.

The settings are: 250, 500, 750, 1000.

Security Option

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

Setup(default)

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

System

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

OS Select For DRAM > 64MB

Allows OS2 to be used with > 64 MB of DRAM. Settings are Non-OS/2 (default) and OS2. Set to OS/2 if using more than 64MB and running OS/2.

4.2.3 Advanced Chipset Features Setup

The Advanced Chipset Features Setup option is used to change the values of the chipset registers. These registers control most of the system options in the computer. Choose the "Advanced Chipset Features" from the main menu and the following screen will appear.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      Advanced Chipset Features

    DRAM Timing Selectable     [By SPD]              Item Help
    CAS Latency Time           [Auto]
    DRAM RAS# to CAS# Delay    [Auto]        Menu Level    ▶
    DRAM RAS# Precharge        [Auto]
    Precharge Delay (tRAS)     [Auto]
    System Memory Frequency    [Auto]
    System BIOS Cacheable      [Enabled]
    Video  BIOS Cacheable      [Disabled]
    Memory Hole At 15M-16M     [Disabled]
    PCI-E Compliancy Mode      [v1.0a]

    ** VGA Setting **
    On-Chip Frame Buffer Size  [ 8MB]
    DVMT Mode                  [DVMT]
    DVMT/FIXED Memory Size     [ 128MB]




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

Figure 4.4: Advanced Chipset Features setup screen

DRAM Timing Configuration

This field lets you select system memory timing data. Manual and BY

SPD are two options. Default is "BY SPD"

CAS Latency Time

When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. The settings are: 3,4,5 and Auto.

DRAM RAS# to CAS# Delay

This field is used to 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 have been installed in the system. The settings are: 2,3,4,5 and auto.

DRAM RAS# Precharge

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. The settings are: 2,3,4,5 and Auto.

Precharge delay (tRAS)

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. The settings are: Auto and 2,3,4,5,6,7,8,9,10

System Memory Frequency

Default auto :The bios detect memory frequency is by SPD. The settings are: Auto and 333MHz,400MHz,533MHz.

System BIOS Cache-able

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. The settings are: Enabled (Default) and Disabled.

Video BIOS Cacheable

Select Enabled allows caching of the video BIOS, resulting in better system performance. However, if a program writes to this area, a system error may result. The settings are: Enabled and Disabled (Default).

Memory Hole At 15M-16M

You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached. The user information of peripherals that need to use this area of system memory usually discusses their memory requirements. The settings are: Enabled and Disabled (Default).

PCI-E Compliancy Mode

This allows the user to select the PCI-E compliant mode. The options are [v1.0], and [v1.0a].

On-Chip Video Memory Size

This field let you select On-Chip buffer size. The settings are: 1 and 8.

DVMT Mode

We have three options (Fixed, DVMT and Both). The default is DVMT.

DVMT/FIXED memory Size

We have 64Mb and 128MB. The default is 128MB.

4.2.4 Integrated Peripherals

```
         Phoenix - AwardBIOS CMOS Setup Utility
                  Integrated Peripherals
  IDE HDD Block Mode         [Enabled]          Item Help
  On-Chip Primary  PCI IDE   [Enabled]
  IDE Primary Master PIO     [Auto]        Menu Level   ▶
  IDE Primary Master UDMA    [Auto]
  On-Chip Secondary PCI IDE  [Enabled]     If your IDE hard drive
  IDE Secondary Master PIO   [Auto]        supports block mode
  IDE Secondary Slave  PIO   [Auto]        select Enabled for
  IDE Secondary Master UDMA  [Auto]        automatic detection of
  IDE Secondary Slave  UDMA  [Auto]        the optimal number of
  USB Controller             [Enabled]     block read/writes per
  USB 2.0 Controller         [Enabled]     sector the drive can
  USB Keyboard Support       [Enabled]     support
  USB Mouse Support          [Disabled]
  AC97 Audio                 [Auto]
  Onboard LAN 1 Controller   [Enabled]
  Onboard LAN 2 Controller   [Enabled]
  Onboard Serial Port 1      [3F8/IRQ4]
  Onboard Serial Port 2      [2F8/IRQ3]
  Onboard FDC Controller     [Enabled]

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

Figure 4.5: Integrated Peripherals Setup

IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

The settings are: Enabled (Default), Disabled.

On-Chip Primary (SATA) / Secondary (PATA) PCI IDE

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

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device. The settings are: Auto (Default), Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33 and Ultra DMA/66 and Ultra DMA/100, select Auto to enable BIOS support. The settings are: Auto (Default), Disabled.

Note: *Because CF Socket and 2.5"HDD Connector are the same IDE Channel (PATA).CF and HDD had a lot of Compatibility issues of timing and loading effect, when you need two devices in MIC-3321.Setting IDE HDD Block Mode and Secondary Master/Slave UDMA Disabled.You must test compatibility in your system.*

USB Controller

Select enabled if your system contains a Universal Serial Bus (USB) 1.1 controller. The settings are: Enabled (Default), Disabled.

USB 2.0 Controller

Select enabled if your system contains a Universal Serial Bus (USB) 2.0 controller. The settings are: Enabled (Default), Disabled.

USB Keyboard Support

Select enabled if you use USB Keyboard in DOS mode. Enable (Default)

USB Mouse Support

Select enabled if you use USB Mouse in DOS mode. Disabled (Default)

AC97 Audio

Select "Disable" if you do not want to use AC-97 audio. Options are "Auto", and "Disabled".

Onboard LAN1 Control

Options are "Enabled" and "Disabled". Select "Disabled" if you don't want to use onboard LAN controller1.

Onboard LAN2 Control

Options are "Enabled" and "Disabled". Select Disabled if you don't want to use the onboard LAN controller2.

Onboard Serial Port 1

The settings are "3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/IRQ3", and "Disabled" for the onboard serial connector.

Onboard Serial Port 2

The settings are "3F8/IRQ4", "2F8/IRQ3", "3E8/IRQ4", "2E8/IRQ3", and "Disabled" for the onboard serial connector.

4.2.5 PNP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system that allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced make any changes to the default settings.

```
                Phoenix - AwardBIOS CMOS Setup Utility
                        PnP/PCI Configurations

      Init Display First       [PCI Slot]          Item Help
      Reset Configuration Data [Disabled]
                                               Menu Level    ▶
      Resources Controlled By  [Auto(ESCD)]
    x IRQ Resources             Press Enter

      PCI/VGA Palette Snoop    [Disabled]

      ** PCI Express relative items **
      Maximum Payload Size      [4096]




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

Figure 4.6: PNP/PCI configuration screen

Init Display Fiest

The Default is PCI Slot.Select PCI Slot to boot VGA in extended VGA Card.

Reset Configuration Data

The default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) if you have installed a new add-on card, and system configuration is in such a state that the OS cannot boot.

Resource Controlled By

The Award Plug and Play BIOS has the capacity to automatically config-
ure all the boot and Plug and Play compatible devices. However, this
capability means absolutely nothing unless you are using a Plug and Play
operating system such as Windows 95/98. If you set this field to "man-
ual," choose specific resources by going into each of the sub menus that
follow this field (a sub menu is preceded by a "Y").

The settings are: Auto (ESCD) (Default), Manual.

IRQ Resources

When resources are controlled manually, assign each system interrupt a

type, depending on the type of device using the interrupt.

PCI/VGA Palette Snoop

Leave this field at Disabled. The settings are Enabled, Disabled (Default).

Maximum Payload Size

This allows you to set the maximum TLP payload size for PCI Express
devices.

The options are [128 bytes], [256 bytes], [512 bytes], [1024 bytes], [2048
bytes], and [4096 bytes].

4.2.6 PC Health Status

This section shows the Status of you CPU, System Temp, Warning for
overall system status. This is only available if there is Hardware Monitor
onboard.

```
            Phoenix - AwardBIOS CMOS Setup Utility
                     PC Health Status
 ┌──────────────────────────────────────┬──────────────────────┐
 │  CPU Warning Temperature   [Disabled] │      Item Help       │
 │  Current System Temp.                 │                      │
 │  Current CPU Temperature              │  Menu Level    ▶     │
 │  Vcore                                │                      │
 │  1.5 V                                │                      │
 │  3.3 V                                │                      │
 │  + 5 V                                │                      │
 │  +12 V                                │                      │
 │  -12 V                                │                      │
 │  VBAT(V)                              │                      │
 │                                       │                      │
 │                                       │                      │
 │                                       │                      │
 │                                       │                      │
 │                                       │                      │
 │                                       │                      │
 └──────────────────────────────────────┴──────────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
            F5:Previous Values              F7: Optimized Defaults
```
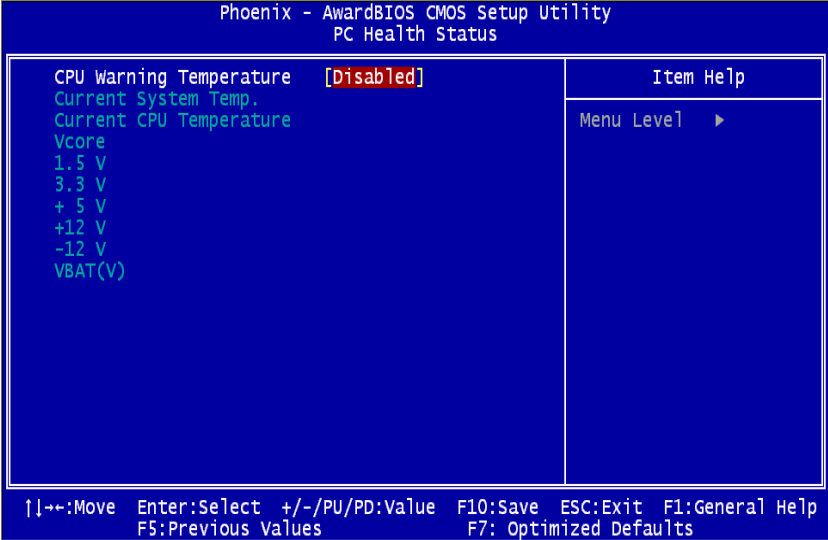
Figure 4.7: PC Health Status setup screen

CPU Warning Temperature

This item will prevent the CPU from overheating. The choices are "Disabled", "50C/122F", "53C/127F", "56C/133F", "60C/140F", "63C/145F", "66C/151F", "70C/158F", "75C/167F", "80C/176F", "85C/185F", "90C/194F", and "95C/205F".

Current System/CPU Temp./ Vcore/1.5V/3.3V/5V/12V/-12V/Vbat

This shows system health status.

4.2.7 Spread Spectrum Control

```
           Phoenix - AwardBIOS CMOS Setup Utility
                    Spread Spectrum Control
┌─────────────────────────────────────────────┬─────────────────────┐
│  Spread Spectrum           [Enabled]         │      Item Help      │
│                                              ├─────────────────────┤
│                                              │  Menu Level    ▶    │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
│                                              │                     │
├──────────────────────────────────────────────┴─────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│           F5:Previous Values              F7: Optimized Defaults              │
└──────────────────────────────────────────────────────────────────┘
```
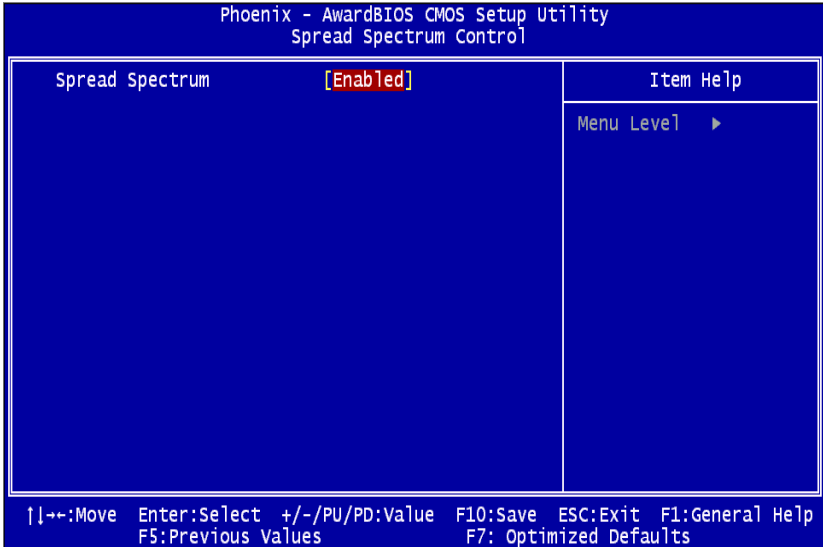
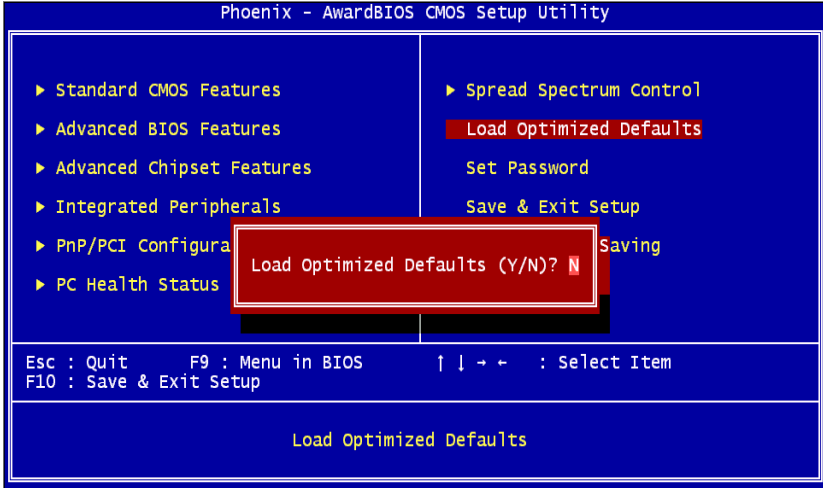***Figure 4.8: PC Health Status setup screen***

Spread Spectrum

This allows the enable spread spectrum function. Default is "Dis-abled."
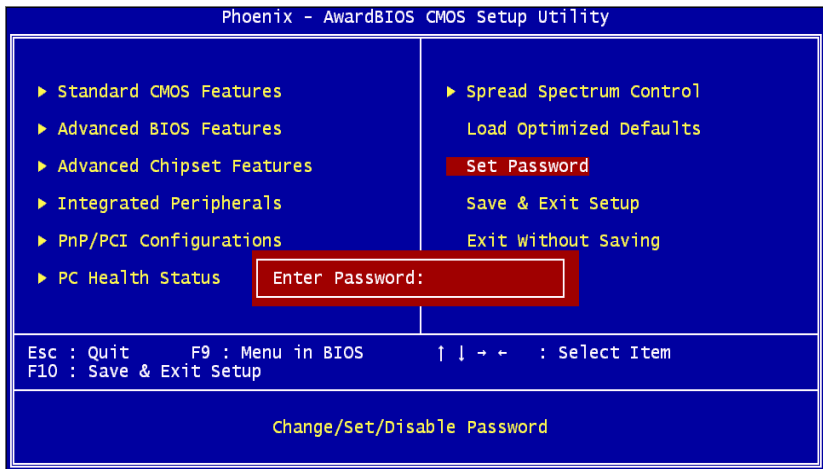
4.2.8 Load Optimized Defaults

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.
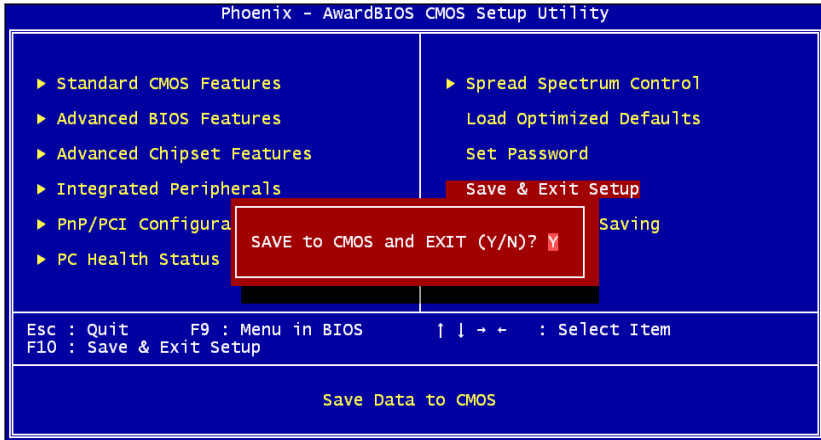
```
            Phoenix - AwardBIOS CMOS Setup Utility

    ▶ Standard CMOS Features          ▶ Spread Spectrum Control
    ▶ Advanced BIOS Features             Load Optimized Defaults
    ▶ Advanced Chipset Features          Set Password
    ▶ Integrated Peripherals             Save & Exit Setup
    ▶ PnP/PCI Configura            ┌──────────────Saving
    ▶ PC Health Status             │ Load Optimized Defaults (Y/N)? N │
                                   └──────────────────────────────┘

    Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←  : Select Item
    F10 : Save & Exit Setup

                       Load Optimized Defaults
```

4.2.9 Set Password

To change, confirm, or disable the password, choose the "PASSWORD SETTING" option form the Setup main menu and press [Enter]. The password can be at most 8 characters long. Remember, to enable this feature. You must first select the Security Option in the Advanced BIOS Features Setup to be either "Setup" or "System." Pressing [Enter] again without typing any characters can disable the password setting function.

```
            Phoenix - AwardBIOS CMOS Setup Utility

    ▶ Standard CMOS Features          ▶ Spread Spectrum Control
    ▶ Advanced BIOS Features             Load Optimized Defaults
    ▶ Advanced Chipset Features          Set Password
    ▶ Integrated Peripherals             Save & Exit Setup
    ▶ PnP/PCI Configurations             Exit Without Saving
    ▶ PC Health Status        ┌─────────────────────────┐
                              │ Enter Password:          │
                              └─────────────────────────┘

    Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←  : Select Item
    F10 : Save & Exit Setup

                   Change/Set/Disable Password
```
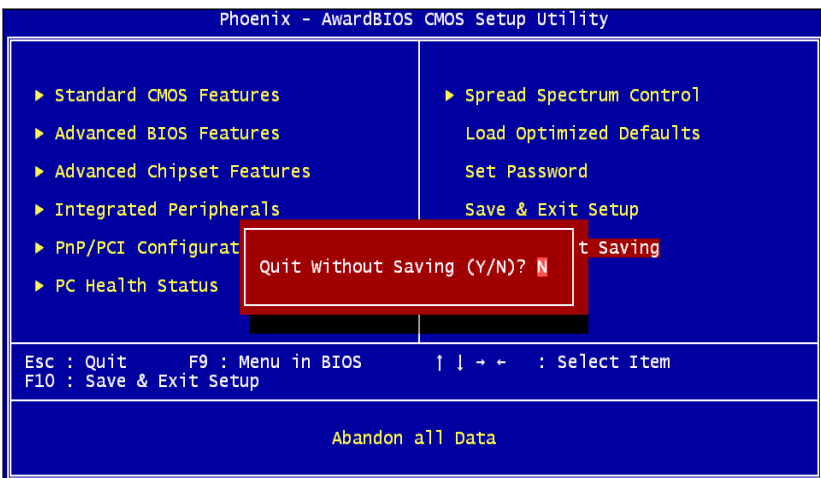
4.2.10 Save & Exit Setup

If you select this and press the [Enter] key, the values entered in the setup utilities will be recorded in the CMOS memory of the chipset. The microprocessor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.

```
              Phoenix - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features          ▶ Spread Spectrum Control
   ▶ Advanced BIOS Features             Load Optimized Defaults
   ▶ Advanced Chipset Features          Set Password
   ▶ Integrated Peripherals             Save & Exit Setup
   ▶ PnP/PCI Configura                              Saving
   ▶ PC Health Status    SAVE to CMOS and EXIT (Y/N)? Y


   Esc : Quit      F9 : Menu in BIOS     ↑ ↓ → ←   : Select Item
   F10 : Save & Exit Setup

                        Save Data to CMOS
```

4.2.11 Exit Without Saving

Selecting this option and pressing the [Enter] key lets you exit the Setup program without recording any new values or changing old ones.

```
              Phoenix - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features          ▶ Spread Spectrum Control
   ▶ Advanced BIOS Features             Load Optimized Defaults
   ▶ Advanced Chipset Features          Set Password
   ▶ Integrated Peripherals             Save & Exit Setup
   ▶ PnP/PCI Configurat                          t Saving
   ▶ PC Health Status    Quit Without Saving (Y/N)? N


   Esc : Quit      F9 : Menu in BIOS     ↑ ↓ → ←   : Select Item
   F10 : Save & Exit Setup

                        Abandon all Data
```

Programming the Watchdog Timer

Appendix A Watchdog Timer Programming

To program the watchdog timer, you must write a program which writes a value to I/O port address 443 (hex). This output value represents time interval. The value range is from 01 (hex) to FF (hex), and the related time interval is 0.25 sec. to 63.75sec.

Data Time Interval

01 0.25 sec.

02 0.50 sec.

03 0.75 sec.

04 1.00 sec.

••

••

FF 63.75 sec.

After data entry, your program must refresh the watchdog timer by rewriting the I/O port 443 (hex) while simultaneously setting it. When you want to disable the watchdog timer, your program should read I/O port 443 (hex). The following shows how to program the watchdog timer in BASIC:

```
10 REM Watchdog timer example program

20 OUT &H443, data REM Start and restart the watchdog

30 GOSUB 1000 REM Your application task #1,

40 OUT &H443, data REM Reset the timer

50 GOSUB 2000 REM Your application task #2,

60 OUT &H443, data REM Reset the timer

70 X=INP (&H443) REM, Disable the watchdog timer

80 END

1000 REM Subroutine #1, your application task

••

••

1070 RETURN

2000 REM Subroutine #2, your application task

••

••

2090 RETURN.
```

Pin Assignment

Appendix B Pin Assignment

This chapter shows the pin assignments of MIC-3321 series CPU cards.

Table B.1: MIC-3321 Connectors Overview		
Number	**Function**	**Description**
1F-CN1	USB1	USB1 Type-A Female on Front side panel.
1F-CN3	USB2	USB2 Type-A Female on Front side panel.
1F-CN2	CF	CompactFlash socket
1F-CN5	VGA	D-Sub 15-pin (Female) on Front side panel.
1F-RJ1	LAN1	10/100/1000Base-TX Ethernet on Front side panel.
1F-S1	LAN1 MODE, CF MODE	Bit-1 Setting: LAN1 Front I/O or Rear I/O Bit-2 Setting: CF master or slave mode
2F-CN7	COM1	Serial port: RS-232 on Front I/O
2F-CN8	PS2	Standard Mini-DIN 6-pin supports K/B and Mouse on Front I/O.
2F-CN10	PATA	Internal IDE 44pin(2mm) 2.5îHDD connector
2F-SA1	SATA	Serial ATA0 (7pin connector)
2F-RJ2	LAN2	10/100/1000Base-TX Ethernet on Front side panel.
2F-S2	LAN2 MODE	Bit-1 Setting: LAN2 Front I/O or Rear I/O Bit-2 Setting: N/C
1R-CN1	COM2	Serial port2: RS-232 on Rear I/O
1R-CN2	USB3	USB3 Type-A Female on Rear I/O
1R-CN3	USB4	USB4 Type-A Female on Rear I/O
1R-CN4	VGA	D-Sub 15-pin (Female) on Rear I/O
1R-CN5	PS2	Standard Mini-DIN 6-pin supports K/B and Mouse on Rear I/O
1R-RJ1	LAN1	10/100/1000Base-TX Ethernet on Rear I/O
1R-RJ2	LAN2	10/100/1000Base-TX Ethernet on Rear I/O

B.1 CompactFlash Interface

The socket accepts an IDE-compatible CompactFlash memory card.

Pin	Signal	Pin	Signal
*Table B.2: CompactFlash Interface Pin Definitions*
1	GND	26	N/C
2	PDD3	27	PDD11
3	PDD4	28	PDD 12
4	PDD5	29	PDD 13
5	PDD6	30	PDD 14
6	PDD7	31	PDD 15
7	PDCS*	32	PDCS*
8	GND	33	N/C
9	GND	34	PDIOR*
10	GND	35	PDIOW*
11	GND	36	CF-36
12	GND	37	IRQ14
13	+5V	38	+5V
14	GND	39	SANMODE
15	GND	40	N/C
16	GND	41	IDERST*
17	GND	42	PDIORDY
18	PDA2	43	N/C
19	PDA1	44	CF-44
20	PDA0	45	CFLED
21	PDD0	46	P66DET
22	PDD1	47	PDD8
23	PDD2	48	PDD9
24	N/C	49	PDD10
25	N/C	50	GND
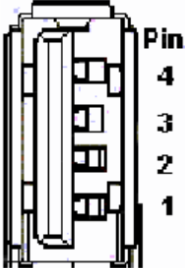
*LOW ACTIVE

B.2 USB 2.0 Ports

Table B.3: USB 1.1 Ports Pin Definitions		
Pin	Signal	
1	VCC	
2	USB_P-	
3	USB_P+	
4	GND	

B.3 VGA Connector
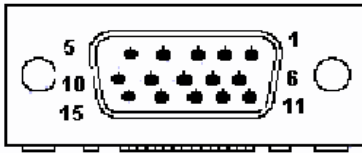
Pin	Signal
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	N/C (VGAVCC)
10	GND
11	N/ C
12	VGA_SDA
13	HSYNC
14	VSYNC
15	VGA_SCL

B.4 COM port
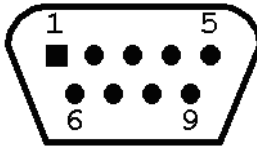
Table B.4: COM Port Pin Definitions	
PIN	**RS-232**
1	NDCD
2	NRX
3	NTX
4	NDTR
5	GND
6	NDSR
7	NRTS
8	NCTS
9	NRI

B.5 PS/2 Keyboard and Mouse Connector

PS/2 keyboard and mouse port pin definitions
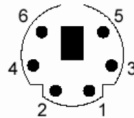
Table B.5: PS/2 Keyboard & Mouse Port Pins	
Pin	**Signal**
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

B.6 Ethernet 10/100/1000Base-T RJ-45 Connector
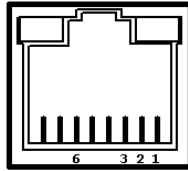
Table B.6: Ethernet Connector Definitions	
Pin	Signal
1	TD+
2	TD-
3	RD+
4	N/C
5	N/C
6	RD-
7	N/C
8	N/C

B.7 Secondary IDE 44-pin 2mm Conn.
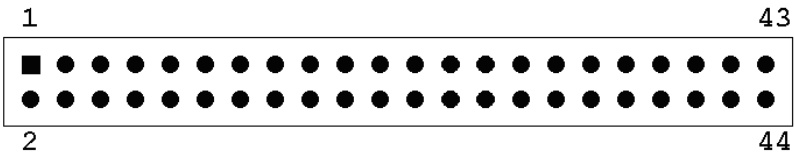
For direct installation of 2.5" IDE HDD (2F-CN17)
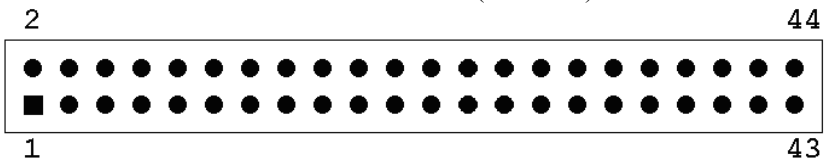
For wiring out (2F-CN18)

Table B.7: Secondary IDE Connectors (2.5" HDD)			
Pin	**Signal**	**Pin**	**Signal**
1	IDERST*	2	GND
3	SDD7	4	SDD8
5	SDD6	6	SDD9
7	SDD5	8	SDD10
9	SDD4	10	SDD11
11	SDD3	12	SDD12
13	SDD2	14	SDD13
15	SDD1	16	SDD14
17	SDD0	18	SDD15
19	GND	20	N/C
21	SDDREQ	22	GND
23	SDIOW*	24	GND
25	SDIOR*	26	GND
27	SDIORDY	28	GND
29	SDDACK*	30	GND
31	IRQ15	32	N/C
33	SDA1	34	S66DET
35	SDA0	36	SDA2
37	SDCS*1	38	SDCS*3
39	HDD_LED	40	GND
41	+5V	42	+5V
43	GND	44	N/C

*LOW ACTIVE

B.8 Serial ATA0 (7pin connector)
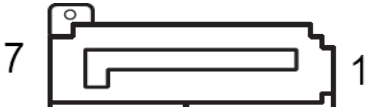
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND