WADE-8656

Mini-ITX Board

User's Manual

P/N: B8981600 Version 1.0

Table of Contents

How to Use This Manual

How to Use This Manual

The manual describes how to configure your WADE-8656 system board to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

Chapter 1 : System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main memory and Compact Flash to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get WADE-8656 running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. **Portwell** may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://www.portwell.com.tw/.

Chapter 1
System Overview

1.1 Introduction

Portwell Inc., a world-leading innovator in the Industrial PC (IPC) market and a member of the Intel® Communications Alliance, has launched its new WADE-8656 in response to market demand for a simplified embedded system board (ESB) that combines robust computing power, a smaller footprint and lower power consumption with increased product longevity. The WADE-8656 Mini-ITX ESB utilizes the latest Intel® Q965 and ICH8DO chipset to support Intel® Core™ 2 Quad/ Intel® Core™ 2 Duo and Pentium® 4/Celeron® D processors. Its features include dual GbE LAN port, PCI Express x 16 slot, six SATA ports, two COM ports, RAID (0,1,5,10) and eight USB 2.0 ports in a compact 170 mm x 170 mm (6.69˝ x 6.69˝) form factor that weighs a mere 0.43 kg (0.94 lbs).

Robust computing power and reliability

"With its implementation of Intel® Active Management Technology (AMT), the new WADE-8656 ESB offers robust computing power and reliability for embedded applications in which the IT manager needs to discover, heal or protect the operation and customers who are seeking increased computing, lower power consumption and a longer product lifespan," says Don Chang, President of Vertical Market Service Business Unit, Portwell, Inc.

Keeping the size and the operating costs down

"The compact design of WADE-8656 Mini-ITX form factor does more than just keep the size down, it also helps reduce energy consumption," explains Victor Liao, product manager of Advanced Product Research Dept.. "This means that companies with 24/7 operating applications can actually save money."

"While we kept one eye on current needs, we also kept the other on future requirements," continues Victor. "For example, the expansion option is PCI Express x 16 slot which can have the capability for the graphic card and suitable for the application like medical equipment, storage device control, gaming machines, digital signage, kiosks, semiconductor equipment and automation control equipment.

Intel Q965 GMCH and Watchdog timer

Mini-ITX ESB of WADE-8656 supports Intel® Core™ 2 Quad/ Intel® Core™ 2 Duo and Pentium® 4/Celeron® D processors, adopts Intel® Q965 chipset, includes GPIO and Watchdog timer.

"This is the latest chipset and supports the Intel® Core 2 Quad processor, which has speeds of up to 1066 MHz," explains Victor. "The Q965 chipset is also embedded with the fourth generation Intel integrated graphics controller and a Graphics Media Accelerator 3000 that supports widescreen LCD displays and accelerated DirectX 9.0c," Victor adds.

1.2 Check List

The WADE-8656 package should cover the following basic items

- ✓ One WADE-8656 Mini ITX Main Board
- ✓ Two Serial ATA cable
- ✓ One Serial port cable for COM2
- ✓ One I/O Shield bracket
- ✓ One Installation Resources CD-Title

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

- **Main processor**
  - Support Intel Core 2 Quad/ Core 2 Duo and Pentium 4 processor / Celeron D processor
  - CPU bus clock: 1066/800/533 MHz
- **Chipset**
  Intel® Q965 GMCH & ICH8DO
- **Main Memory**
  - Support dual-channel & signal channel DDR memory interface
  - Up to 4GB DDR2 800 SDRAM on two 240pin DIMM sockets
- **System BIOS**
  AWARD BIOS
- **Expansion Interface**
  One PCI-E x 16 expansion slot
- **SATA Interface**
  Six SATA ports

- **Serial Ports**
  Support two serial ports, one RS-232, one RS-232/422/485 selectable
- **IR Interface**
  N/A
- **Parallel Port**
  N/A
- **USB Interface**
  Support eight USB (Universal Serial Bus) ports (four at rear, four on-board for internal devices)
- **PS/2 Mouse and Keyboard Interface**
  Support dual 6-pin mini-DIN connector at rear I/O panel for PS/2 keyboard/mouse
- **Audio Interface**
  Connector of Line-in/Line-out/MIC
- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/Calendar
- **Watchdog Timer**
  - Support WDT function through software programming for enable/disable and interval setting
  - Generate system reset
- **On-board VGA**
  - Intel Q965 GMCH Integrated GMA 3000 Graphics device
  - Intel DVMT 4.0 supports up to 384MB video memory
- **On-board Ethernet LAN**
  Dual Gigabit Ethernet (10/100/ 1000 Mbits/sec) LAN port
- **High Driving GPIO**
  Onboard programmable 8-bit Digital I/O interface
- **Cooling Fans**
  Support one 4-pin power connector for CPU cooler and one 3-pin power connector for system fan
- **System Monitoring Feature**
  Monitor system temperature and major power sources, etc
- **Outline Dimension (L X W):**
  170mm (6.69") X 170mm (6.69")

- **Power Requirements:**
- **Configuration:**

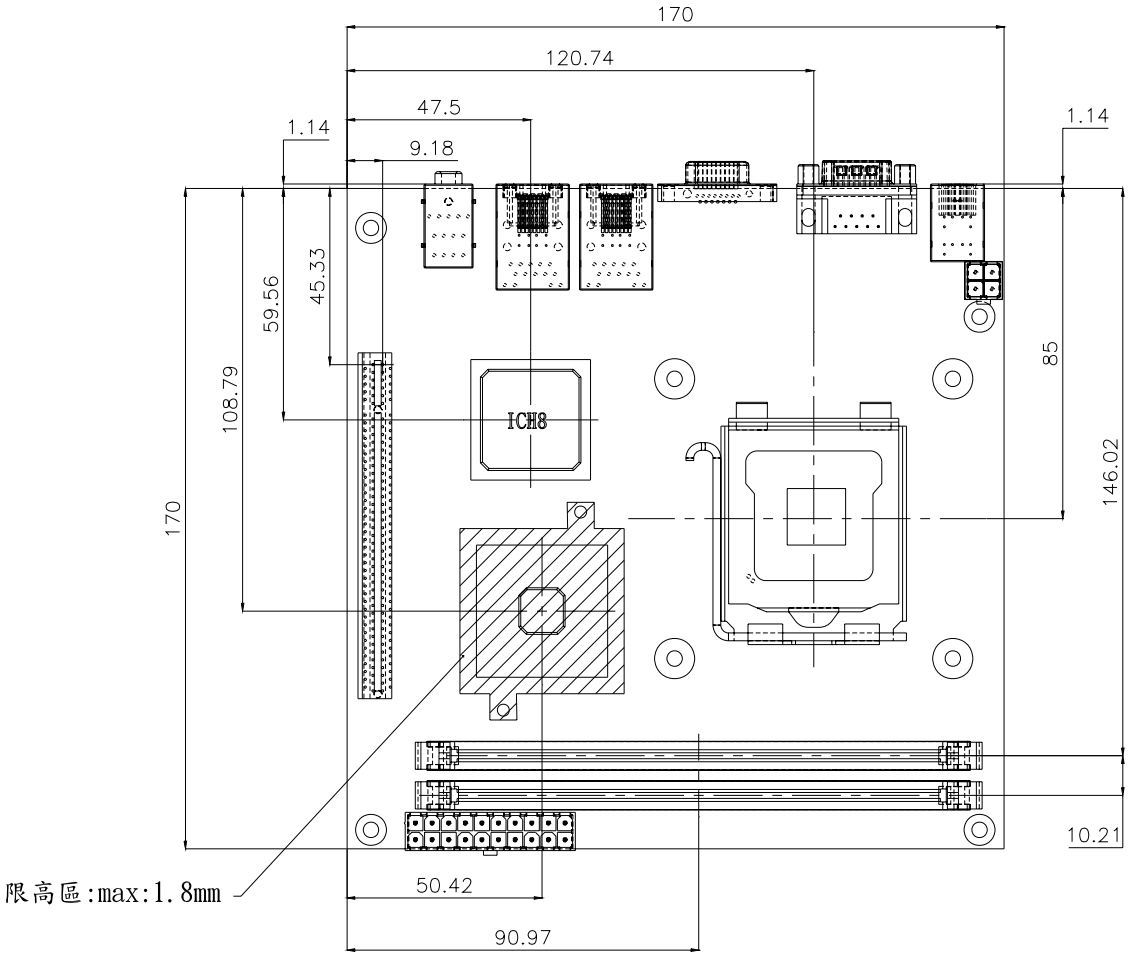
CPU Type	Intel Core 2 Dou 2.13GHz (FSB:1066 / 2MB)
SBC BIOS	Portwell, Inc. WADE-8656 BIOS Rev.:R1.00.W0.T0(06042007)
Memory	Transcend DDR2 667 1GB (ELPIDA E5108AG-6E-E)
VGA Card	Onboard Intel Q965
VGA Driver	Intel Q965/Q963 Express Chipset Family Ver: 6.14.10.4785
LAN Card	Onboard Intel 82566DM
LAN Driver	Intel 82566DM Gigabit Network Connection Ver:9.5.12.0
LAN Card	Onboard Realtek RTL8111B Gigabit Ethernet Controller
LAN Driver	Realtek RTL8168/8111 PCI-E Gigabit Ethernet NIC
Audio Card	Onboard Realtek ALC260
Audio Driver	Realtek High Definition Audio Ver:5.10.0.5345
Chipset Driver	Intel Chipset Software Installation Utility Ver:8.1.11.1001
SATA HDD	Seagate ST3120813AS
SATA DVD-ROM	PIONEER DVD-227D
Power Supply	PW-330ATXE-12V

Run Burning Test V4.0.
RUN time: 10 / 30 Minutes.

Item	Power ON	Full Loading 10Min	Full Loading 30Min
CPU +12V	2.49A	2.96A	2.98A
System +12V	2.32A	0.85A	0.92A
System +3.3V	0.22A	0.19A	0.26A
System +5V	5.53A	7.05A	6.95A

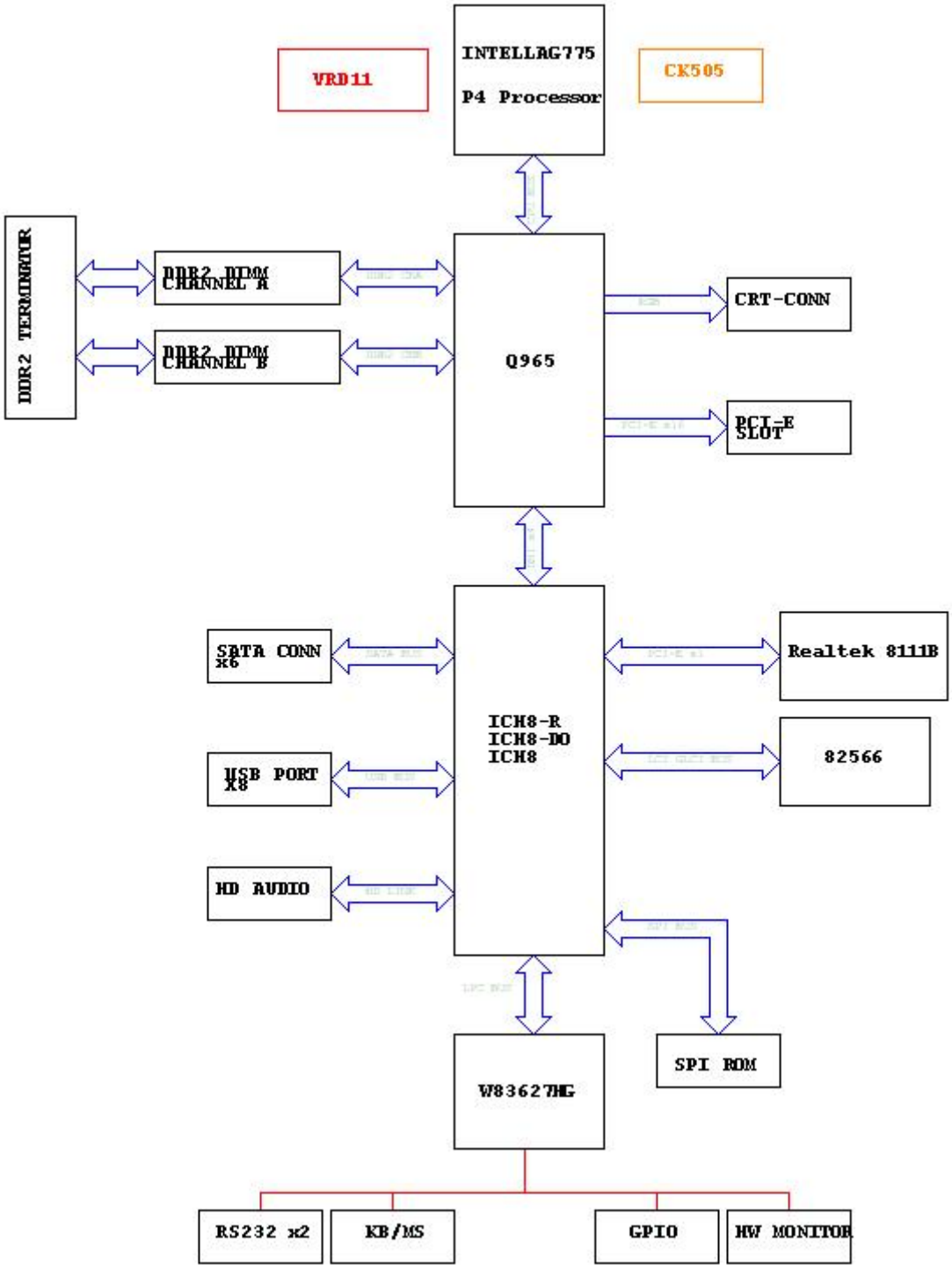
- **Operating Temperature:**
  0°C ~ 55°C
- **Storage Temperature:**
  -20°C ~ 80°C
- **Relative Humidity:**
  5% ~ 90%, non-condensing

1.3.1 Mechanical Drawing



1.4 System Architecture

All of details operating relations are shown in WADE-8656 series System Block Diagram.



WADE-8656 System Block Diagram

Chapter 2
Hardware Configuration

This chapter indicates jumpers', headers' and connectors' locations. Users may find useful information related to hardware settings in this chapter. The default settings are indicated with a star sign (★).

2.1 Jumper Setting

In the following sections, **Short** means covering a jumper cap over jumper pins; **Open** or **N/C** (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 2-1 & Figure 2-2 for the Jumper locations.

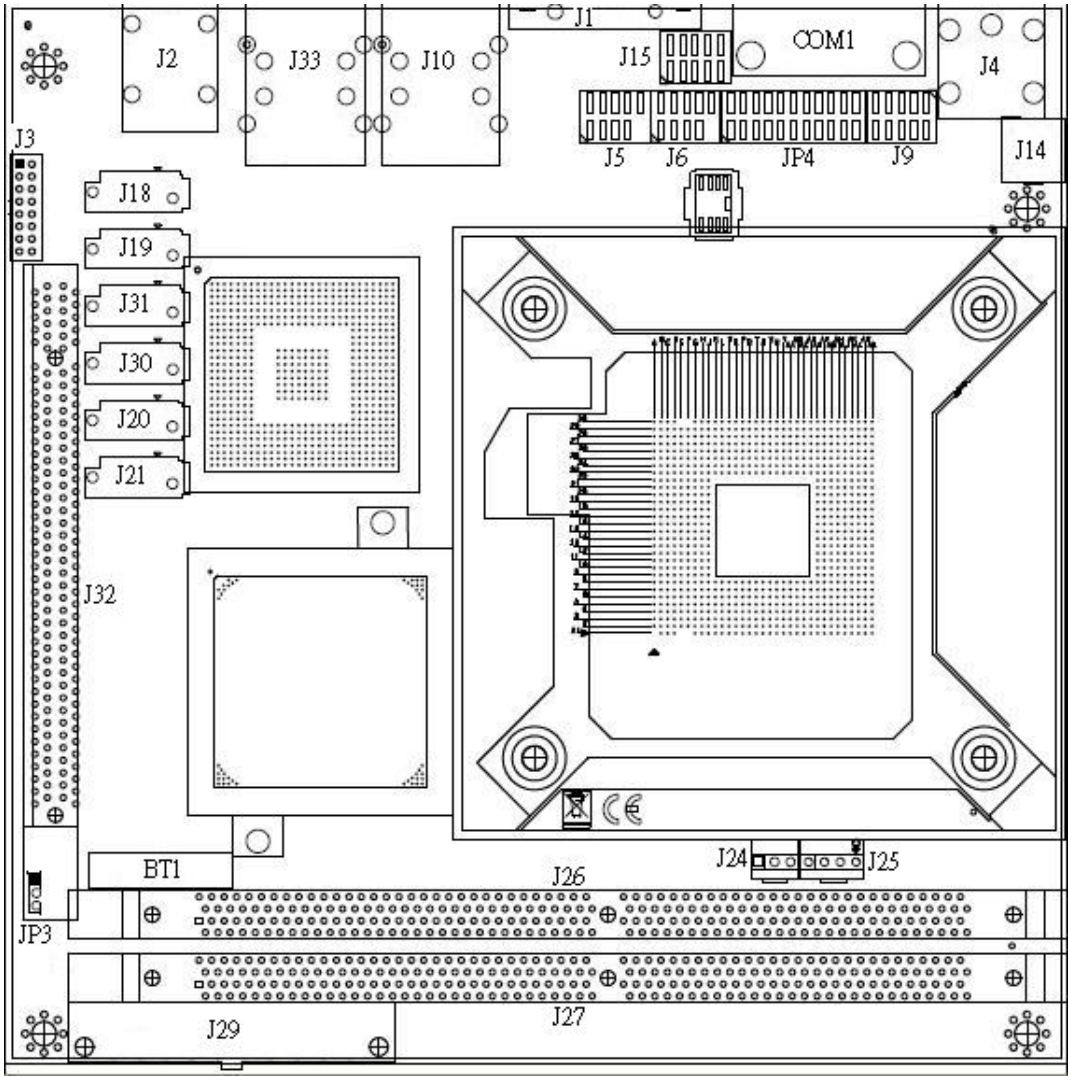


Figure 2-1 WADE-8656 Jumper and Connector Locations

JP3: CMOS Clear

JP3	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents

JP4: RS232, 422, 485 Selection

JP3	Function
5-6,9-11,10-12,15-17,16-18 Short	RS-232 ★
3-4,7-9,8-10,13-15,14-16,21-22 Short	RS-422
1-2,7-9,8-10,19-20 Short	RS-485

2.2 Connector Allocation

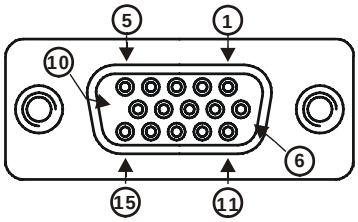
I/O peripheral devices are connected to the interface connectors.

Connector Function List

Connector	Function	Remark
J1	VGA Connector	
J2	AUDIO Connector	
J3	POWER Switch	
J4	PS2/KB&MS	
J5, J6	USB Connector	
J9	COM2 Connector	
J10, J33	GLAN+USBx2 Connector	
J14	CPU PWR CONN	
J15	GPIO Connector	
J18, J19, J20, J21, J30, J31	SATA Connector	
J32	PCI-E X16 Slot	
J24	SYSTEM FAN Connector	
J25	CPU FAN Connector	
J26, J27	DDRII Socket	
J29	PWR CONN	
BT1	VBAT Connector	
COM1	COM1 Connector	

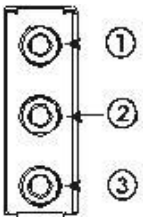
Pin Assignments of Connectors

J1: VGA Connector



PIN No.	Signal Description	PIN No.	Signal Description
1	RED	2	GREEN
3	BLUE	4	ID0
5	Ground	6	Ground
7	Ground	8	Ground
9	NC	10	Ground
11	ID1	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

J2: Audio Jack Connector



PIN No.	Signal Description
1 (Blue)	Line In
2 (Lime)	Line Out
3 (Pink)	Mic In

J3: Power/LED Header

PIN No.	Signal Description	PIN No.	Signal Description
1	Speaker Signal	2	POWER_LED+ (5V)
3	NC	4	NC
5	NC	6	POWER_LED-
7	+5V	8	KEYLOCK
9	PWRBTN	10	Ground
11	PWRBTN	12	NC
13	RESET	14	HDD_LED+ 5V (1K ohm)
15	RESET	16	HDD_LED-

J5 & J6: USB Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	USB power (5V)	2	USB power (5V)
3	USB DATA A-	4	USB DATA B-
5	USB DATA A+	6	USB DATA B+
7	GND	8	GND
9	N/C	10	N/C

J15: 8-bit GPIO

PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO10	2	GPIO11
3	GPIO12	4	GPIO13
5	Ground	6	GPIO14
7	GPIO15	8	GPIO16
9	GPIO17	10	5V

J24: SYSTEM Fan Connector

Pin No.	Signal Description
1	PWM_CONTROL
2	+12V
3	SENSE

J25: CPU Fan Connector

Pin No.	Signal Description
1	GND
2	+12V
3	SENSE
4	PWM_CONTROL

COM1 & J9 : COM PORT Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Data Carrier Detect	6	Data Set Ready
2	Receive Data	7	Request To Send
3	Transmit Data	8	Clear To Send
4	Data Terminal Ready	9	Ring Indicator
5	Ground	10	N/C

Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you set up onboard PCI device and handle Watch Dog Timer (WDT) and operation of GPIO in software programming.

3.1 Intel® LGA 775 Processor

Installing LGA775 CPU

1) Lift the handling lever of CPU socket outwards and upwards to the other end. Following step A position to step B position.

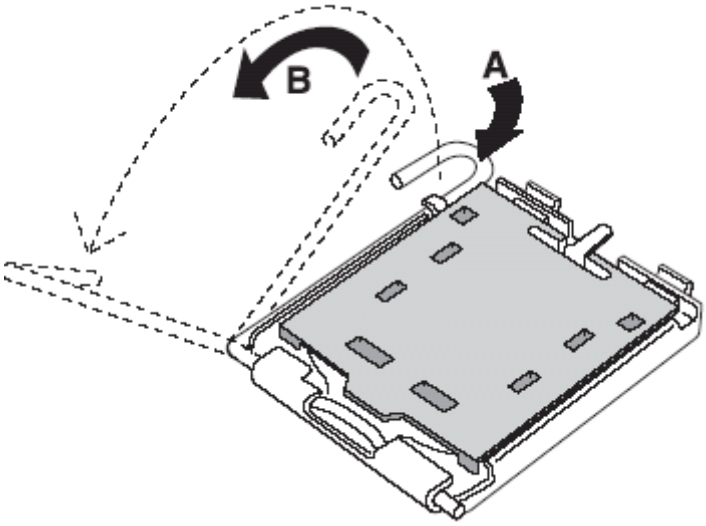


Figure 3-1

2) Align the processor pins with pinholes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place (see Fig.3-4). If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.

Triangle mark is meaning first pin position; kindly assemble and take aim at notch of top and bottom between CPU and socket.

Figure 3-2

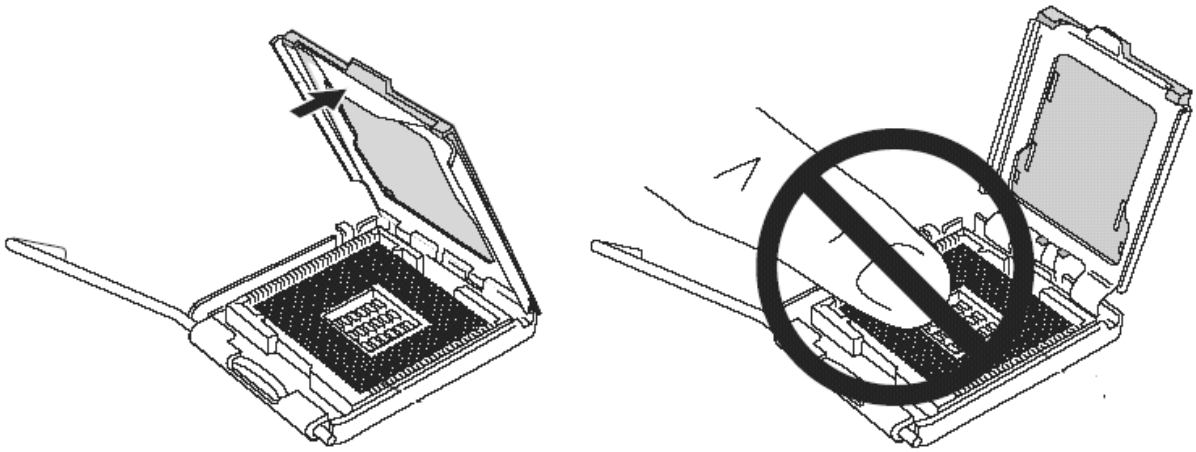


Figure 3-3

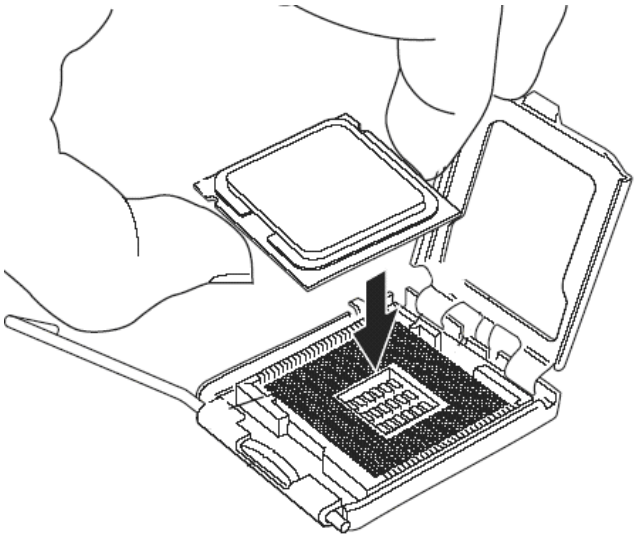


Figure 3-4

Precaution! (See fig.3-3) Don't touch directly by your hand or impacts internal align balls of CPU socket to avoid motherboard destruction, it is a precise actuator.

3) Push down the lever to lock processor chip into the socket once CPU fits.

4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the LGA 775.

Removing CPU

1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lifts up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

Configuring System Bus

WADE-8656 will automatically detect the CPU used. CPU speed of Intel P4 /Celeron D can be detected automatically.

3.2 Main Memory

WADE-8656 provides Two DIMM sockets which supports 800/667/533 DDR2-SDRAM as main memory, Non-ECC (Error Checking and Correcting), non-register functions. The maximum memory size can be up to 4GB capacity. Memory clock and related settings can be detected by BIOS via SPD interface.

For system compatibility and stability, do not use memory module without brand. Memory configuration can be either one double-sided DIMM in either one DIMM socket or two single-sided DIMM in both sockets.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

Dual Channel DDR DIMMs

Supporting dual-channel & signal channel DDR2 memory technology, adequate for higher bandwidth of memory than processor would increase system performance. To enable Dual Channel DDR2 memory technology, install two identical memory modules in both memory sockets is required. Following tables show bandwidth information of different processor and memory configurations.

Following tables have not thing to do with the Dual Channel DDR2 DIMMs, may be cancel them or have new topic.

CPU FSB	Bandwidth
1066MHz	8.5GB/s
800MHz	6.4GB/s
533MHz	4.2GB/s

Memory Frequency	Dual Channel DDR Bandwidth	Single Channel DDR Bandwidth
800MHz	6.4 GB/s	3.2 GB/s
677MHz	5.4 GB/s	2.7 GB/s
533 MHz	4.2 GB/s	2.1 GB/s

Note:
To maintain system stability, don't change any of DRAM parameters in BIOS setup to upgrade system performance without acquiring technical information.

Memory frequency / CPU FSB synchronization

WADE-8656 supports different memory frequencies depending on the CPU front side bus and the type of DDR2 DIMM.

CPU FSB	Memory Frequency
1066MHz	800/667/533MHz
800MHz	667/533MHz
533 MHz	533MHz

3.3 Installing the Single Board Computer

To install your WADE-8656 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position
Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place WADE-8656 into the dedicated position in the system
Step 4 : Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that SBC is properly inserted and fixed by mechanism.

Note:
Please refer to section 3.3.1 to 3.3.4 to install INF/VGA/LAN/Audio drivers.

3.3.1 Chipset Component Driver

The chipset used on WADE-8656 is relatively new which operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows-2000/XP, please install its INF before any of other Drivers are installed.

3.3.2 Intel Integrated Graphics GMCH Chip

Using Intel® Q965 GMCH with Media Accelerator (GMA) 3000 High performance graphic integrated chipset is aimed to gain an outstanding graphic performance. It is accompanied by shared up to 384MB video memory with Intel DVMT 4.0. This combination makes WADE-8656 an excellent piece of multimedia hardware.

With no additional video adaptor, this onboard video will usually be the system display output. By adjusting the BIOS setting to disable on-board VGA, an add-on PCI VGA card can take over the system display.

Drivers Support

Please find Springdale GMC driver in the WADE-8656 CD-title. Drivers support Windows-2000, Windows XP and Linux.

3.3.3 Gigabit Ethernet Controller

Drivers Support

Please find Intel 825660M LAN driver in /Ethernet directory of WADE-8656 CD-title. The drivers support Windows-2000 and Windows-XP.

LED Indicator (for LAN status)

WADE-8656 provides two LED indicators to report Intel 825660M controller and Realtek RTL8111B controller Gigabit Ethernet interface status. Please refer to the table below as a quick reference guide.

<table>
<tr><th rowspan="2">825660M</th><th rowspan="2">Color</th><th rowspan="2">Name of LED</th><th colspan="3">Operation of Ethernet Port</th></tr>
<tr><th colspan="2">ON</th><th>OFF</th></tr>
<tr><td>Status LED</td><td>Green</td><td>LAN Linked & Active LED</td><td colspan="2">Linked</td><td>Active (Blinking)</td></tr>
<tr><td rowspan="2">Speed LED</td><td>Orange</td><td rowspan="2">LAN speed LED</td><td>Giga Mbps</td><td>100 Mbps</td><td>10 Mbps</td></tr>
<tr><td>Green</td><td>Orange</td><td>Green</td><td>Off</td></tr>
</table>

3.3.4 Audio Controller

Please find Realtek ALC260 Audio driver form WADE-8656 CD-title. The drivers support Windows 2000 and XP.

3.4 Clear CMOS Operation

The following table indicates how to enable/disable Clear CMOS Function hardware circuit by putting jumpers at proper position.

JP3	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS contents

To correctly operate CMOS Clear function, user must turn off the system, move JP3 jumper to short pin 2 and 3. To clear CMOS contents, please turn the power back on and turn it off again for AT system, or press the toggle switch a few times for ATX system. Move the JP3 back to 1-2 position (Normal Operation) and start the system. System will then produce a "CMOS Check Sum Error" message and hold up. Users may then follow the displayed message to load BIOS default setting.

3.5 WDT Function

The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

WADE-8656 allows users control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to non-maskable interrupt (NMI), when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process. A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset or NMI signal unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately. To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed.

Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to Winbond W83627HG-AW data sheet.

There are two PNP I/O port addresses that can be used to configure WDT,
1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

Below are some example codes, which demonstrate the use of WDT.

```
//Step1. Enter W83627HG configuration registers mode:
outportb(0x2E, 0x87);
outportb(0x2E, 0x87);

//* Step2. Pin89 to be WDTO
outportb(0x2E, 0x2b);
outportb(0x2E + 1, 0x04);

//* Step3. Select logic device 8:
outportb(0x2E, 0x07);
outportb(0x2E + 1, 0x08);

//* Step4. Config WDT using second to be unit:
outportb(0x2E, 0xf5);
outportb(0x2E + 1, 0x00);

//* Step5. Set WDT time-out time:
outportb(0x2E, 0xf6);
outportb(0x2E + 1, time_out);

//* Step6. Exit configuration registers mode:
outportb(0x2E, 0xaa);
```

3.6 GPIO

The WADE-8656 provides 8 programmable input or output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

3.6.1 Pin assignment

J15: General Purpose I/O Connector

PIN No.	Signal Description
1	General Purpose I/O Port 0 (GPIO0)
2	General Purpose I/O Port 1 (GPIO1)
3	General Purpose I/O Port 2 (GPIO2)
4	General Purpose I/O Port 3 (GPIO3)
5	Ground
6	General Purpose I/O Port 4 (GPIO4)
7	General Purpose I/O Port 5 (GPIO5)
8	General Purpose I/O Port 6 (GPIO6)
9	General Purpose I/O Port 7 (GPIO7)
10	+5V

All General Purpose I/O ports can only apply to standard TTL ± 5% signal level (0V/5V), and each source sink capacity up to 12mA.

3.6.2 WADE-8656 GPIO Programming Guide

There are 8 GPIO pins on WADE-8656. These GPIO pins are from SUPER I/O (W83627GH-AW) GPIO pins, and can be programmed as Input or Output direction.

J15 pin header is for 8 GPIO pins and its pin assignment as following :

J15_Pin1=GPIO0:from SUPER I/O_GPIO10 with Ext. 4.7K PH
J15_Pin2=GPIO1:from SUPER I/O_GPIO11 with Ext. 4.7K PH
J15_Pin3=GPIO2:from SUPER I/O_GPIO12 with Ext. 4.7K PH
J15_Pin4=GPIO3:from SUPER I/O_GPIO13 with Ext. 4.7K PH
J15_Pin6=GPIO4:from SUPER I/O_GPIO14 with Ext. 4.7K PH
J15_Pin7=GPIO5:from SUPER I/O_GPIO15 with Ext. 4.7K PH
J15_Pin8=GPIO6:from SUPER I/O_GPIO16 with Ext. 4.7K PH
J15_Pin9=GPIO7:from SUPER I/O_GPIO17 with Ext. 4.7K PH

<<<<< Be careful Pin5=GND , Pin10=VCC >>>>>

There are several Configuration Registers (CR) of W83627HG-AW needed to be programmed to control the GPIO direction, and status(GPI)/value(GPO). CR00h ~ CR2F are common (global) registers to all Logical Devices (LD) in W83627HG. CR07h contains the Logical Device Number that can be changed to access the LD as needed. LD7 contains the GPIO10~17 registers.

Programming Guide:

Step1: CR2A_Bit [7.2]. P [1,1,1,1,1,1]; to select multiplexed pins as GPIO10~17 pins
Step2: LD7_CR07h.P [07h]; Point to LD7
Step3: LD7_CR30h_Bit0.P1; Enable LD7
Step4: Select GPIO direction, Get Status or output value.

LD7_CRF0h; GPIO17 ~ 10 direction, 1 = input, 0 = output pin
LD7_CRF2h.P [00h]; Let CRF1 (GPIO data port) non-invert to prevent from confusion
LD7_CRF1h; GPIO17~10 data port, for input pin, get status from the related bit, for output pin, write value to the related bit.

For example,

LD7_CRF0h_Bit4.P0; Let GPIO14 as output pin
LD7_CRF2h_Bit4.P0; Let CRF1_Bit4 non-inverted
LD7_CRF1h_Bit4.P0; Output "0" to GPIO14 pin (J25_Pin6)

LD7_CRF0h_Bit0.P1; Let GPIO10 as input pin
LD7_CRF2h_Bit0.P0; Let CRF1_Bit0 non-inverted
Read LD7_CRF1h_Bit0; Read the status from GPIO10 pin (J25_Pin1)

How to access W83627HG CR?

In WADE-8656, the EFER = 002Eh, and EFDR = 002Fh.
EFER and EFDR are 2 IO ports needed to access W83627HG-AW CR.
EFER is the Index Port, EFDR is the Data Port.
CR index number needs to be written into EFER first,
Then the data will be read/written from/to EFDR.

To R/W W83627HG-AW CR, it is needed to Enter/Enable Configuration Mode first. When completing the programming, it is suggested to Exit/Disable Configuration Mode.

Enter Configuration Mode: Write 87h to IO port EFER twice.
Exit Configuration Mode: Write AAh to IO port EFER.

3.6.3 Example

```
void enter_Superio2_CFG(void)
{
   outportb(0x2E, 0x87);
   outportb(0x2E, 0x87);
}


void exit_Superio2_CFG(void)
{
   outportb(0x2E, 0xAA);
}


void Set_CFG2(unsigned char Addr2,unsigned char Value2)
{
  unsigned char d2;
   outportb(0x2E, Addr2);
   delay(2);
   outportb(0x2E +1, Value2);
   delay(2);
}


unsigned char Get_CFG2(unsigned char Addr2)
{
  unsigned char d2;
   outportb(0x2E, Addr2);
   delay(2);
   d2 = inportb(0x2E +1);
   delay(2);
   return(d2);
}

int main(void)
{

   unsigned char d2;
```

```
   enter_Superio2_CFG();
   /* CR2A B7 = 1 selet GPIO Port 1*/
   d2 = Get_CFG2(0x2A);
   d2 = (d2 & 0x7F) | 0x80;
   Set_CFG2(0x2A, d2);

   /* IO test loop 1 */
   /* Set GPIO Port 1 of Superio 2 Enable */

   Set_CFG2(0x07, 0x07);    /* Select logic device 07 of Superio2*/
   Set_CFG2(0x30, 0x01);    /* Enable GPIO Port 1 of Superio2*/



   /* IO test loop 1 */

   /* Set GPIO Port 1 of Superio2 Enable */
   Set_CFG2(0x07, 0x07);    /* Select logic device 07*/
   Set_CFG2(0xF0, 0x0F);      /* GPIO Port 1 of Superio2 is [ooooiiii], o: output, i:input
*/
   Set_CFG2(0xF2, 0x00);      /* GPIO Port 1 of Superio2 is non-inversed*/



   Set_CFG2(0x07, 0x07);    /* Select logic device 07*/
   Set_CFG2(0xF1, 0xFF);    /* Initial back all GPIO Port1 of Superio 2 to hi */

   Set_CFG2(0x07, 0x07);    /* Select logic device 07*/
   Set_CFG2(0xF1, 0xEF);    /* GP14 of Superio2 -> ~GP10 of Superio2 */
   Set_CFG2(0x07, 0x07);    /* Select logic device 07 of Superio2*/
   d2 = Get_CFG2(0xF1);     /* get GPIO Port 2 data */

   if (d2 == 0xEE )

     printf("\n GPIO14->10 test ok");
   else
     printf("\n GPIO14->10 test fail ");
```

Chapter 4
BIOS Setup Information

WADE-8656 is equipped with the AWARD BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, WADE-8656 communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

4.1 Entering Setup

Turn on or reboot the computer. When the message "Hit <DEL> if you want to run SETUP" appears, press <Del> key immediately to enter BIOS setup program.

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

Press <F1> to Run SETUP or Resume

In HIFLEX BIOS setup, you can use the keyboard to choose among options or modify the system parameters to match the options with your system. The table below will show you all of keystroke functions in BIOS setup.

General Help	
↑ ↓ → ←	: Move
Enter	: Select
+ / - /PU /PD	: Value
ESC	: Exit
F1	: General Help
F2	: Item Help
F5	: Previous Values
F6	: Fail-Safe Defaults
F7	: Optimized Defaults
F9	: Menu in BIOS
F10	: Save

4.2 Main Menu

Once you enter WADE-8656 AWARD BIOS CMOS Setup Utility, a Main Menu is presented. The Main Menu allows user to select from eleven setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the sub-menu.

Phoenix- AwardBIOS CMOS Setup Utility

▶ **Standard CMOS Features** ▶ **Advanced BIOS Features** ▶ **Advanced Chipset Features** ▶ **Integrated Peripherals** ▶ **Power Management Setup** ▶ **PnP/PCI Configurations** ▶ **PC Health Status**	▶ **Frequency/Voltage Control** **Load Fail-Safe Defaults** **Load Optimized Defaults** **Set Supervisor Password** **Set User Password** **Save & Exit Setup** **Exit Without Saving**
ESC : Quit F9 : Menu in BIOS F10 : Save & Exit Setup	↑ ↓ → ← : Select Item
Time, Date, Hard Disk Type …	

Note:
It is strongly recommended to reload Optimal Setting if CMOS is lost or BIOS is updated.

4.3 Standard CMOS Setup Menu

This setup page includes all the items in standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number you want in each item and press <Enter> key to certify it.

Follow command keys in CMOS Setup table to change **Date**, **Time**, **Drive type**, and **Boot Sector Virus Protection Status**.

Phoenix- AwardBIOS CMOS Setup Utility
Standard CMOS Features

Date (mm:dd:yy)	Fri, Mar 30 2007	Item Help
Time (hh:mm:ss)	10 : 20 : 30	
▶ IDE Channel 0 Master	[None]	Menu Level ▶
▶ IDE Channel 0 Slave	[None]	Change the day, month, year and century
▶ IDE Channel 1 Master	[None]	
▶ IDE Channel 1 Slave	[None]	
▶ IDE Channel 2 Master	[None]	
▶ IDE Channel 3 Master	[None]	
▶ IDE Channel 4 Master	[None]	
▶ IDE Channel 4 Slave	[None]	
Video	[EVG/VGA]	
Halt On	[All, But Keyboard]	
Base Memory	640K	
Extended Memory	*252928K*	
Total Memory	*253952K*	

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

Note:
Oblique items are base on memory capacity which user adopts on single board.

■ **Menu Selections**

Item	Options	Description
Date	mm:dd:yy	Change the day, month, year and century
Time	hh:mm:ss	Change the internal clock
IDE Channel 0 Master	Options are in its sub menu (described in Table of section 4.4)	Press <Enter> to enter the sub menu of detailed options
IDE Channel 0 Slave		
IDE Channel 1 Master		
IDE Channel 1 Slave		
IDE Channel 2 Master		
IDE Channel 3 Master		
IDE Channel 4 Master		
IDE Channel 4 Slave		
Video	EGA/VGA CGA 40 CGA 80 MONO	Select the default video device
Halt On	All Errors No Errors All, but Keyboard	Select the situation in which you want the BIOS to stop the POST process and notify you
Base Memory	640K	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up
Total Memory	N/A	Displays the total memory available in the system

4.4 IDE Adaptors Setup Menu

The IDE adapters control the IDE devices, such as hard disk drive or CD-ROM drive. It uses a separate sub menu to configure each hard disk drive.

Phoenix- AwardBIOS CMOS Setup Utility
IDE Channel Master (&Slave)

IDE HDD Auto-Detection	[Press Enter]	Item Help
IDE Channel 0 Master	[Auto]	
Access Mode	[Auto]	Menu Level ►
Capacity	*0 MB*	
Cylinder	*0*	To atuo-detect the HDD's size, head … on this channel
Head	*0*	
Precomp	*0*	
Landing Zone	*0*	
Sector	*0*	

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

Note:
The oblique items are meaning base on what kind of storage device user employs.

■ **Menu Selections**

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.
IDE Channel 0 Master	None Auto Manual	Selecting 'manual' lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE !
Access Mode	CHS, LBA Large, Auto	Choose the access mode for this hard disk
Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk checking program.
The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'		
Cylinder	Min=0, Max=65535	Set the number of cylinders for hard disk
Head	Min=0, Max=255	Set the number of read/write heads
Precomp	Min=0, Max=65535	**** Warning: Setting a value of 65535 means no hard disk

Landing zone	Min=0, Max=65535	****
Sector	Min=0, Max=255	Number of sectors per track

4.5 Advanced BIOS Features

This section allows user to configure your system for basic operation. The system's default speed, boot-up sequence, keyboard operation, shadowing and security may be modified accordingly.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced BIOS Features

▶ CPU Feature	[Press Enter]	Item Help
▶ Hard Disk Boot Priority	[Press Enter]	
Virus Warning	[Disabled]	Menu Level ▶
CPU L1 & L2 Cache	[Enabled]	
CPU L3	[Enabled]	
Quick Power On Self Test	[Enabled]	
First Boot Device	[Hard Disk]	
Second Boot Device	[CDROM]	
Third Boot Device	[USB-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]	
APIC Mode	[Enabled]	
MPS Version Control For OS	[1.4]	
OS Select For DRAM > 64MB	[Non-OS2]	
Console Redirection	Disabled	
X Baud Rate	19200	
Agent after boot	Enabled	
Report No FDD For WIN 95	[No]	
Small Logo(EPA) Show	[Disabled]	
ASF Support	[Enabled]	
DMI Event Log	[Enabled]	
Clear All DMI Event Log	[Yes]	
View DMI Event Log	[Enter]	
Mark DMI Events as Read	[Enter]	
Event Log Capacity	Space Available	
Event Log Validity	Valid	

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

Phoenix- AwardBIOS CMOS Setup Utility
CPU Feature

Limit CPUID MaxVal	[Disabled]	Item Help
C1E Function	[Auto]	
Execute Disabled Bit	[Enabled]	Menu Level ▶
Virtualization Technology	[Enabled]	Set Limit CPUID MaxUal to 3, Should Be "Disabled" for WinXP
Core Multi-Processor	[Enabled]	

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

Limit CPUID MaxVal

Set limit CPUID MaxVal to 3, should be "Disabled" for WinXP.

The choice: Enabled, Disabled.

C1E Function

CPU C1E Function Select

The choice: Auto, Disabled.

Execute Disabled Bit

The choice: Enabled, Disabled.

When disabled, forces the XD feature flag to always return 0.

Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by vanderpool technology.

The choice: Enabled, Disabled.

Core Multi-Processor

The choice: Enabled, Disabled.

Hard Disk Boot Priority

Select Hard Disk Boot Device Priority. Use < ↑ > or < ↓ > to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.

Bootable Add-in Cards	Select SCSI Boot
Ch x M (S).	Select IDE Channel 0,1 Master or Salve Boot
Ch x M.	Select IDE Channel 2 or 3 Master Boot

Virus Warning

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

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

CPU L1/L2/L3 Cache

These two categories speed up memory access. However, it depends on CPU/chipset design.

Enabled	Enable cache
Disabled	Disable cache

Quick Power On Self Test

Allows the system skip certain tests while booting. This will decrease the time needed to boot the system.

Enabled	Enable quick POST
Disabled	Normal POST

First/Second/Third Boot Device

Select your Boot Device Priority.

The choice: Floppy, LS120, Hard Disk, CDROM, ZIP 100, USB-FDD, USB-ZIP, USB-CDROM, LAN and Disabled.

Boot Other Device

Select your Boot Device Priority.

The choice: Enabled, Disabled.

Boot Up Floppy Seek

Enabled tests floppy drives to determine whether they have 40 or 80 tracks.

The choice: Enabled, Disabled.

Boot Up NumLock Status

Select power on state for NumLock.

The choice: Off, On.

Gate A20 Option

Fast-lets chipsets control Gate A20 and Normal – a pin in the keyboard controller controls Gate A20. Default is fast.

The choice: Normal, Fast.

Typematic Rate Setting

Keyboard repeat at a rate determined by the keyboard controller, when enabled, the typematic delay can de select.

The choice: Enabled, Disabled.

※Typematic Rate (Chars/sec)

The rate is which character repeats when you hold down a key at.

The choice: 6, 8, 10, 12, 15, 20, 24, and 30. (Default 6)

※Typematic delay (Msec)

The delay before keystrokes begin to repeat.

The choice: 250, 500, 750, and 1000. (Default 250)

Security Option

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

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

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

APIC Mode

The choice: Enabled, Disabled.

MPS Version Control For OS

The choice: 1.1, 1.4

OS Select For DRAM > 64MB

Select OS/2 only if you are running OS/2 operating system with greater than 64MB of RAM on the system.

The choice: Non-OS2, OS2.

※Console Redirection

The choice: Enabled, Disabled. (Default Disabled)

※Buad Rate

The choice: 9600, 19200, 38400, 57600, 115200. (Default 19200)

※Agent after boot

The choice: Enabled, Disabled. (Default Enabled)

Report No FDD for WIN 95

The choice: No, Yes.

Small Logo (EPA) Show

Enabled	The EPA logo will appear during system boot-up.
Disabled	The EPA logo will not appear during system boot-up.

ASF support

The choice: Enabled, Disabled.

DMI Event Log

[Enabled] To Store POST error messages to the DMI Event log. [Disabled] Don't store POST error messages to the DMI log.

The choice: enabled, Disabled.

Clear All DMI Event Log

Description When this item is select to [Yes], the DMI event log will be cleared at next POST stage, and then set this item to [No] automatic.
The choice: Yes, No.

View DMI Event Log

Press [Enter] to show ALL DMI event logs.

Mark DMI Event as Read

Description: Clear all DMI event logs immediately. Press [Enter] will pop up a confirm screen. Hit [Y] and [Enter], then clear all DMI event logs right now.

※Event Log Capacity

Default setting is Space Available.

※Event Log Validity

Default setting is Valid.

4.6 Advanced Chipset Features

This section allows user to configure the system based on the specific features of the Intel Q965 GMCH and 82801HB ICH8 chipsets for WADE-8656. This chipset manages bus speeds and access to system memory resources, such as DRAM (DDR2 SDRAM) and the external cache. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for the system. The only time user might consider making any changes would be if you discovered that data was being lost while during system operation.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced Chipset Features

System BIOS Cacheable	[Enabled]	Item Help
Memory Hole At 15M-16M	[Disabled]	
▶ PCI Express Root Port Func.	[Press Enter]	Menu Level ▶
▶ Advanced Fan Speed Control	[Press Enter]	
AMT BIOS support	[Enabled]	
GbE	Enabled	
SOL Support	Enabled	
IDE-R Support	Enabled	
*** VGA Setting ***		
PEG/OnChip VGA Control	[Auto]	
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 F6: Fail-Safe Defaults F7: Optimized Defaults

System BIOS Cacheable

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

The choice: Enabled, Disabled.

Memory Hole At 15-16M

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

The choice: Enabled, Disabled.

PCI Express Root Port Func.

Phoenix- AwardBIOS CMOS Setup Utility
PCI Express Root Port Func

PCI Express Port 1 [Enabled] PCI Express Port 6 [Enabled] PCI-E Compliancy Mode [v1.0a]	Item Help Menu Level ▶
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults	

Advanced Fan Speed Control

Phoenix- AwardBIOS CMOS Setup Utility
Advanced Fan Speed Control

CPU Fan Speed [Enabled] System Fan Speed [Enabled]	Item Help Menu Level ▶
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults	

AMT BIOS Support

The choice: Enabled, Disabled

GbE LAN

The choice: Enabled, Disabled

※SOL Support

Default setting is Enabled

※IDE-R Support

Default setting is Enabled

PEG/Onchip VGA Control

The choice: Onchip VGA, PEG Port, Auto.

On-Chip Frame Buffer Size

Users can set the display memory size that shared from main memory.

The choice: 1MB, 8MB, 16MB.

DVMT Mode

The choice: Fixed, DVMT

DVMT/FIXED Memory Size

The choice: 128MB, 256MB, MAX.

4.7 Integrated Peripherals

Phoenix- AwardBIOS CMOS Setup Utility
Integrated Peripherals

▶ OnChip IDE Device	[Press Enter]	Item Help
CPU Relative Temperature	xxx ℃	
CPU FAN Speed	xxx RPM	Menu Level ▶
System FAN Speed	x RPM	
▶ Super IO Device	[Press Enter]	
Watch Dog Timer Select	[Disabled]	
▶ USB Device Setting	[Press Enter]	

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

Phoenix- AwardBIOS CMOS Setup Utility
OnChip IDE Device

		Item Help
IDE HDD Block Mode	[Enabled]	Menu Level ▶
IDE DMA transfer access	[Enabled]	
IDE Primary Master PIO	[Auto]	If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.
IDE Primary Slave PIO	[Auto]	
IDE Primary Master UDMA	[Auto]	
IDE Primary Slave UDMA	[Auto]	
On-Chip Secondary PCI IDE	[Enabled]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Secondary Master UDMA	[Auto]	
IDE Secondary Slave UDMA	[Auto]	
Serial ATA Mode	[IDE]	
LEGACY Mode Support	[Disabled]	

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

IDE HDD Block Mode

If IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

The choice: Enabled, Disabled.

IDE DMA transfer access

The choice: Enabled, Disabled.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields allow 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 choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Primary/Secondary Master/Slave UDMA

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

The choice: Auto, Disabled.

On-Chip Secondary PCI IDE

The choice: Enabled, Disabled

SATA Mode

The choice: IDE, RADI, AHCI.

Legacy Mode Support

The choice: Enabled, Disabled

SuperIO Device

Phoenix- AwardBIOS CMOS Setup Utility
SuperIO Device

Onboard Serial Port 1	[3F8/IRQ4]	Item Help
Onboard Serial Port 2	[2F8/IRQ3]	
PWRON after PWR-Fail	[Off]	Menu Level ►

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

PWRON After PWR-Fail

This item allows user to configure the power status of using ATX power supply after a serious power loss occurs.

On	System automatically restores Power back
Off	System stays at Power-Off

Watch Dog Timer Select

The choice: Disabled, 10/20/30/40 sec, 1/2/4 Min.

USB device Setting

Phoenix- AwardBIOS CMOS Setup Utility
USB Device Setting

USB 1.0 Controller	[Enabled]	Item Help
USB 2.0 Controller	[Enabled]	
USB Operation Mode	[High Speed]	Menu Level ▶
USB Keyboard Function	[Enabled]	
USB Mouse Function	[Disabled]	
USB Storage Function	[Enabled]	
*** USB Mass Storage Device Boot Setting ***		

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

USB 1.0/2.0 Controller

[Enabled] or [Disabled] universal host controller interface for universal serial bus.

The choice: Enabled, Disabled.

USB Operation Mode

Auto decides USB device operation mode. [High speed]: If USB device was high speed device, then it operated on high speed mode. If USB device was full/low speed device, then it operated on full/low speed mode; [Full/Low speed]: All of USB device operated on Full/Low speed mide.

The choice: High Speed, Full/Low Speed.

USB Keyboard/Mouse Function

Legacy support of USB keyboard or mouse.

The choice: Disabled, Enabled.

4.8 Power Management Setup

The Power Management Setup allows configuration of the system to most effectively save energy while operating in a manner consistent with your own style of computer use.

Phoenix- AwardBIOS CMOS Setup Utility
Power Management Setup

ACPI Function	[Enabled]	Item Help
ACPI Suspend Type	[S3(STR)]	
Run VGABIOS if S3 Resume	[Auto]	Menu Level ▶
Power Management	[User Define]	
Video Off Method	[DPMS]	
Video Off In Suspend	[Yes]	
Suspend Type	[Stop Grant]	
MODEM Use IRQ	[3]	
Suspend Mode	[Disabled]	
HDD Power Down	[Disabled]	
Soft-Off by PWR-BTTN	[Instant-Off]	
Wake-Up by PCI card	[Enabled]	
Power On by Ring	[Enabled]	
USB KB Wake-Up From S3	[Disabled]	
Resume by Alarm	[Disabled]	
X Date(of Month) Alarm	0	
X Time(hh:mm:ss) Alarm	0 : 0 :0	
** Reload Global Timer Events **		
Primary IDE 0	[Disabled]	
Primary IDE 1	[Disabled]	
Secondary IDE 0	[Disabled]	
Secondary IDE 1	[Disabled]	
FDD,COM,LPT Port	[Disabled]	
PCI PIRQ[A-D]#	[Disabled]	

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

ACPI Function

This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI).

The choice: Enabled, Disabled.

ACPI Suspend Type

To decide which ACPI suspend mode to use.

The choice: S3 (STR) only.

Run VGA BIOS if S3 Resume

The choice: Auto, Yes, No.

Power Management

This category allows selecting the type (or degree) of power saving and is directly related to "HDD Power Down", "Suspend Mode".

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

Min. Power Saving	Minimum power management. Suspend Mode = 1 Hour, and HDD Power Down = 15 Min.
Max. Power Saving	Maximum power management. Suspend Mode = 1 Min., and HDD Power Down = 1 Min.
User Defined	Allows you to set each mode individually. When not disabled, Suspend Mode ranges from 1 min. to 1 Hour and HDD Power Down ranges from 1 Min. to 15 Min.

Video off Method

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

Video Off In Suspend

This allows user to enable/disable video off in Suspend Mode.

The choice: Yes, No.

Suspend Type

Two options are available : Stop Grant and PWROn Suspend.

The choice: Stop Grant, PWROn Suspend.

MODEM Use IRQ

The choice: NA, 3,4,5,7,9,10,11.

Suspend Mode

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

The choice: Disabled, 1 Min, 2 Min, 4 Min, 8 Min, 12 Min, 20 Min, 30 Min, 40 Min, 1 Hour.

HDD Power Down

When enabled and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

The choice: Disabled, 1 Min, 2 Min, 3 Min, 4 Min, 5 Min, 6 Min, 7 Min, 8 Min, 9 Min, 10 Min, 11 Min, 12 Min, 13 Min, 14 Min, 15 Min.

Soft-Off by PWR-BTTN

This item allows users to set the time to remove the power after the power button is pressed.

The choice: Instant-Off, Delay 4 Sec.

Wake-Up By PCI card

The choice: Disabled, Enabled.

Power On by Ring

When select "Enabled", a system that is at soft-off mode will be alert to Wake-On-Modem or Wake-On LAN.

The choice: Enabled, Disabled.

USB KB Wake-Up From S3

The choice: Enabled, Disabled.

Resume by Alarm

This item allows users to enable/disable the resume by alarm function. When "Enabled" is selected, system using ATX power supply could be powered on if a customized time and day is approached.

The choice: Enabled, Disabled.

※Date(of Month) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the date parameter of the timing dateline on which to power on the system.

The choice: 0 ~ 31.

※Time (hh:mm:ss) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the time parameter of the timing dateline on which to power on the system.

The choice: hh (0~23), mm (0~59), ss (0 ~59).

Primary/Secondary IDE 0/1

This item is to configure IDE devices being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

FDD, COM, LPT Port

This item is to configure floppy device, COM ports, and parallel port being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

PCI PIRQ[A-D]#

This option can be used to detect PCI device activities. If they are activities, the system will go into sleep mode.

The choice: Enabled, Disabled.

4.9 PnP/PCI Configurations

This section describes configuring the PCI bus system. PCI, or **P**eripheral **C**omputer **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components.

This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

Phoenix- AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

Init Display First	[PCI Slot]	Item Help
Reset Configuration Data	[Disabled]	
Resources Controlled By	[Auto(ESCD)]	Menu Level ►
X IRQ Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
*** PCI Express relative items ***		
Maximum Payload Size	[128]	

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

Init Display First

The choice: PCI Slot, Onboard.

Reset Configuration Data

Default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.

The choice: Enabled, Disabled.

Resource Controlled By

BIOS can automatically configure the entire boot and plug and play compatible devices. If set to Auto, IRQ DMA and memory base address fields can not be selected, since BIOS automatically assigns them.

The choice: Auto (ESCD), Manual.

※IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

The choice: Press Enter.
IRQ-3/IRQ-4/IRQ-5/IRQ-7/IRQ-9/IRQ-10/IRQ-11/IRQ-12/IRQ-14/IRQ-15 assigned to.

The choice: PCI/ISA PnP, Legacy ISA.

PCI/VGA Palette Snoop

Legacy ISA for devices compliant with the original PC AT bus specification, PCI PnP for devices compliant with the plug and play standard whether designed for PCI bus architecture.
The choice: Enabled, Disabled.

Maximum Payload Size.

Default 128.

4.10 PC Health Status

Phoenix- AwardBIOS CMOS Setup Utility
PC Health Status

Current System Temperature	*31℃/87℉*		Item Help
Vcore	*1.24*	*V*	
Vtt	*1.20 V*		Menu Level ▶
3.3 V	*3.36*	*V*	
+ 5 V	*5.18 V*		
+12 V	*12.34*	*V*	
- 12 V	*12.09 V*		
VBAT(V)	*3.47 V*		
5VSB(V)	*5.11 V*		

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

Note:
The oblique items are variable parameters which are base on power resource.

4.11 Frequency/Voltage Control

Phoenix- AwardBIOS CMOS Setup Utility
Frequency / Voltage Control

CPU Clock Ratio Unlock	[Disabled]	Item Help
X CPU Clock Ratio	[9X]	
Auto Detect PCI Clk	[Enabled]	Menu Level ▶
Spread Spectrum	[Disabled]	
CPU Host/SRC/PCI Clock	[Default]	
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults		

CPU Clock Ratio Unlock

The choice: Enabled, Disabled.

Auto Detect PCI Clk

The choice: Enabled, Disabled.

Spread Spectrum

This item allows user to enable/disable the spread spectrum modulate.

The choice: Enabled, Disabled.

CPU Host/ SRC/ PCI Clock

The choice: Default, 100/100/33MHz, 133/100/33 MHz, 166/100/33 MHz, 266/100/33 MHz, 333/100/33 MHz.

4.12 Default Menu

Selecting "Defaults" from the main menu shows two options which are described below,

Load Fail-Safe Defaults

When <Enter> is pressed, a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When <Enter> is pressed, 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.

4.13 Supervisor/User Password Setting

Either supervisor or user password can be setup, or both of then. The differences between are:

Set Supervisor Password : can enter and change the options of the setup menus.

Set User Password : just can only enter but do not have the right to change the options of the setup menus. When selecting this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will reboot and Setup can be entered freely.

PASSWORD DISABLED

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

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

User may determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

4.14 Exiting Selection

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after system off. During subsequnet booting of computer, the BIOS configures the system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit Without Saving (Y/N)? N

This allows user to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

Chapter 5
Troubleshooting

This chapter provides a few useful tips to quickly get WADE-8656 running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

5.1 Hardware Quick Installation

P4 Power Connector

WADE-8656 requires power drawing from two power connectors (J14 and J29). The CPU supplementary Power Connector (J14) has to be connected to a system all the time. Otherwise, the system won't boot up properly. If J14 isn't connected, it could cause system for failed to boot up.

Serial ATA Hard Disk Setting for IDE/RAID/AHCI

Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time; there are total two connectors, J18, J19, J20, J21, J30 and J31. The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. All you need to operate IDE, RAID and AHCI application for system, please follow up setting guide in BIOS programming (Table 5-1); Furthermore, you can consult chapter 4 partially of "OnChip IDE Device".

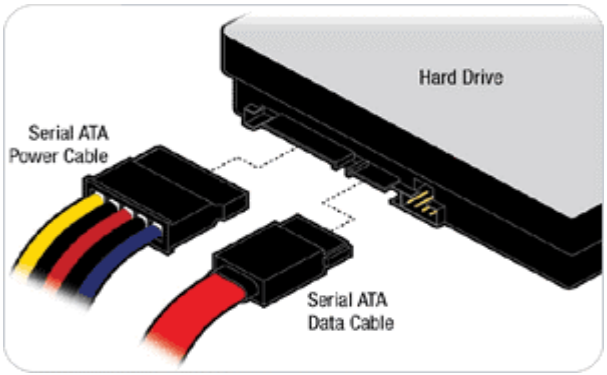
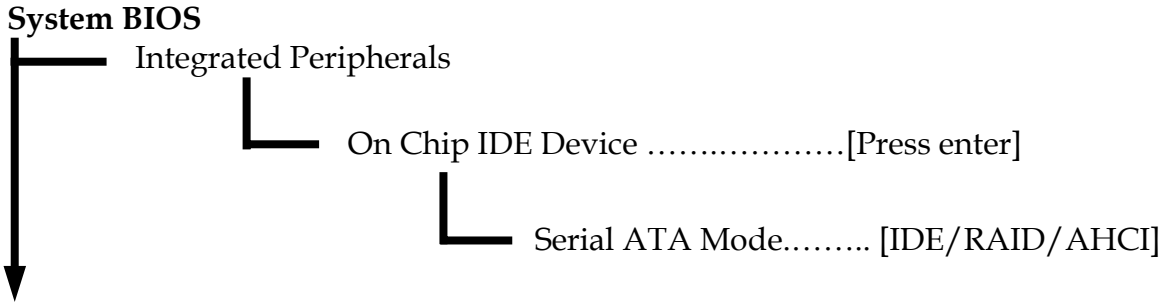


Table. 5-1 SATA Mode setting guide



5.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. CPU, CPU Fan, 240-pin DDR2 SDRAM, keyboard, mouse, floppy drive, IDE hard disk, printer, VGA connector, device cables, ATX accessories or 12V 4-pin power cable are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with WADE-8656, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and press "Enter". Setup the selected IDE port and its access mode to "Auto". This will force system to automatically pick up the IDE devices that are being connected each time system boots up.

Improper disable operation

There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the COM1/ COM2 ports, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource.

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Timer
IRQ #1	Keyboard Event
IRQ #2	Usable IRQ
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	Usable IRQ
IRQ #6	Diskette Event
IRQ #7	Usable IRQ
IRQ #8	Real-Time Clock
IRQ #9	Usable IRQ
IRQ #10	Usable IRQ
IRQ #11	Usable IRQ
IRQ #12	IBM Mouse Event
IRQ #13	Coprocessor Error
IRQ #14	Hard Disk Event
IRQ #15	Usable IRQ

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers.

5.3 FAQ

Symptom: SBC keeps beeping, and no screen has shown.

Solution: In fact, each beep sound represents different definition of error message. Please refer to table as following:

Beep sounds	Meaning	Action
One long beep with one short beeps	DRAM error	Change DRAM or reinstall it
One long beep constantly	DRAM error	Change DRAM or reinstall it
One long beep with two short beeps	Monitor or Display Card error	Please check Monitor connector whether it inserts properly
Beep rapidly	Power error warning	Please check Power mode setting

Installation Problem

Question: How do I connect my keyboard and mouse, as there is only one connector?

Answer: Users may always adopt PS/2 keyboard and mouse over the PS/2 interface, J4 on WADE-8656.

Information & Support

Question: Intel Q965 series Chipset supports Dual Channel Mode, but how can I enable this function?

Answer: you don't have to change any setting. You can simply plug in two DDR2 RAM Modules, and then system will automatically enable Dual Channel Mode.

Question:What kind of CPU supports Hyper-Threading?

Answer: All FSB 1066/800/533 MHz series CPU support Hyper-Threading mode.

Question:Why cannot I install USB 2.0 driver?

Answer: If you are using Windows 2000, you need to update your Service-Pack version to Service-Pack 4. If you are using Windows XP, you need to update Service-Pack to Service Pack 1 at least.

If you cannot find BIOS that you need, please contact with Technical Support Department to request a new BIOS to solve this problem.
Technical Support Department
Mailto: tsd@portwell.com.tw

Question: I forget my password of system BIOS, what am I supposed to do?

Answer: You can simply short 2-3 pins on JP3 to clean your password.

Note:
Please visit our technical web site at
http://www.portwell.com.tw
For additional technical information, which is not covered in this manual.

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used for your reference.

Memory Area	Size	Device Description
0000-003F	1K	Interrupt Area
0040-004F	0.3K	BIOS Data Area
0050-006F	0.5K	System Data
0070-0E2E	54K	DOS
0E2F-0F6B	5K	Program Area
0F6C-9F3F	575K	Available
= Conventional memory ends at 640K =		
9F40-9FBF	2K	Extended Bios Area
9FC0-9FFF	1K	Unused
A000-AFFF	64K	VGA Graphics
B000-B7FF	32K	Unused
B800-BFFF	32K	VGA Text
C000-CAFF	44K	Video ROM
CB00-EEFF	144K	Unused
EF00-EFFF	4K	ROM
F000-FFFF	64K	System ROM

Interrupt Request Lines (IRQ)

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

IRQ#	Current Use	Default Use
IRQ 0	System ROM	System Timer
IRQ 1	System ROM	Keyboard Event
IRQ 2	Unassigned	Usable IRQ
IRQ 3	System ROM	COM2
IRQ 4	System ROM	COM1
IRQ 5	Unassigned	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	Unassigned	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	Unassigned	Usable IRQ
IRQ 10	Unassigned	Usable IRQ
IRQ 11	Unassigned	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	Unassigned	Usable IRQ