

AIS-Q454

Advanced System Controller

2 3.5" Hard Disk Drive Bay

2 Gigabit Ethernet/ 2 COM/

6 USB2.0

HD Audio Codec

Copyright Notice

This document is copyrighted, 2010. All rights are reserved. The original manufacturer reserves the right to make improvements to the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of the original manufacturer. Information provided in this manual is intended to be accurate and reliable. However, the original manufacturer assumes no responsibility for its use, or for any infringements upon the rights of third parties that may result from its use.

The material in this document is for product information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, AAEON assumes no liabilities resulting from errors or omissions in this document, or from the use of the information contained herein.

AAEON reserves the right to make changes in the product design without notice to its users.

Acknowledgments

All other products' name or trademarks are properties of their respective owners.

- Award is a trademark of Award Software International, Inc.
- CompactFlash™ is a trademark of the Compact Flash Association.
- Microsoft Windows® is a registered trademark of Microsoft Corp.
- Intel®, Core™ 2 Duo, Core™ 2 Quad are trademarks of Intel Corporation.
- PC/AT, PS/2, and VGA are trademarks of International Business Machines Corporation.

All other product names or trademarks are properties of their respective owners.

Packing List

Before you begin operating your PC, please make sure that the following materials are enclosed:

- 4 S221005030 HDD Screws
- 8 S225006010 Wallmount Bracket Screws
- 2 M04Q452020 Wallmount Brackets
- 4 1990666615 Rubber Feet
- 1 AIS-Q454
- 1 CD-ROM for manual (in PDF format) and drivers

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

Safety & Warranty

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a firm surface during installation. Dropping it or letting it fall could cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
12. Never pour any liquid into an opening. This could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. If any of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.

- d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20°C (-4°F) OR ABOVE 65°C (149°F). IT MAY DAMAGE THE EQUIPMENT.

FCC

Warning!



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

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Below Table for China RoHS Requirements
 产品中有毒有害物质或元素名称及含量
 AAEON Boxer/ Industrial System

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	×	○	○	○	○	○
外部信号 连接器及线材	×	○	○	○	○	○
外壳	×	○	○	○	○	○
中央处理器 与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
电源	×	○	○	○	○	○

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在
SJ/T 11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出
SJ/T 11363-2006 标准规定的限量要求。

备注:
 一、此产品所标示之环保使用期限，系指在一般正常使用状况下。
 二、上述部件物质中央处理器、内存、硬盘、电源为选购品。

Contents

Chapter 1 General Information

1.1 Introduction.....	1-2
1.2 Features	1-3
1.3 Specifications	1-4

Chapter 2 Hardware Installation

2.1 Location of Connectors	2-2
2.2 Mechanical Drawing	2-4
2.3 List of Jumpers	2-6
2.4 List of Connectors	2-7
2.5 Setting Jumpers	2-8
2.6 Clear CMOS (JP1)	2-9
2.7 ME_TP1	2-9
2.8 Front Panel Connector (FP1)	2-9
2.9 Front Panel Connector (FP2).....	2-9
2.10 USB Connector (USB1)	2-9
2.11 CD-IN (J1)	2-10
2.12 RS232 Serial Port Connector (COM2).....	2-10
2.13 Digital I/O (CN2)	2-10
2.14 Power Connector (CN8)	2-11
2.15 List of Connectors of PER-R04X.....	2-12
2.16 Power Connector of PER-R04X (CN3)	2-12
2.17 FAN Connector of PER-R04X (FAN1)	2-12

2.18 Installing the Hard Disk Drive 2-13

Chapter 3 Award BIOS Setup

3.1 System Test and Initialization. 3-2

3.2 Award BIOS Setup 3-3

Chapter 4 Driver Installation

4.1 Installation 4-3

Appendix A Programming The Watchdog Timer

A.1 ProgrammingA-2

A.2 ITE8718 Watchdog Timer Initial ProgramA-5

Appendix B I/O Information

B.1 I/O Address MapB-2

B.2 Memory Address Map.....B-3

B.3 IRQ Mapping Chart.....B-4

B.4 DMA Channel Assignments..... B-4

Chapter

1

**General
Information**

1.1 Introduction

AIS-Q454 adopts the Intel® Core™ 2 Duo/ Quad LGA 775 Processors. The chipset is equipped with Intel® Q45 + ICH10DO. Moreover, the system memory features two 240-pin DDRIII 800/1066 SDRAM up to 4GB. It deploys two PCI-Express LAN ports that consist of 10/100/1000Base-TX Ethernet RJ-45 ports. AIS-Q454 condensed appearance features desktop and wallmount form factor that fits nicely into a space-limited environment.

This AIS-Q454 equipped with two 3.5" Hard Disk Drive with SATA II interface and one optional CompactFlash™ Type II socket. Moreover, the flexible expansion interfaces feature one PCI-Express [x16] , one PCI-Express [x4] , and two PCI slots. In addition, this model supports two COM ports and six USB2.0 (four ports at I/O interfaces and two ports on the front panel). Furthermore, the Realtek ALC888 supports HD audio codec and the AIS-Q454 can support dual displays with VGA and DVI via Intel® Q45.

With the increasing demands of high performance in audio and video, AAEON released the specific Advanced System Controller to fulfill the needs of the applications, such as Factory Automation, Building Automation, and etc.

1.2 Features

- Intel® Core™ 2 Duo/ Quad LGA775 Processors
- DDRIII 800/1066 Memory x 2, Up To 4GB
- Intel® Integrated Graphics Engine 4500 Supports Dual Views With VGA & GVI
- Dual Intel® PCI-Express Gigabit Ethernet
- 3.5" SATA II Hard Disk Drive x 2 and Slim Type Combo x 1 (Optional)
- USB2.0 x 6, COM x 2
- Multiple Extended Bus Up To Four Slots

1.3 Specifications

System

Form Factor	Compact size for Desktop/Wallmount
Main Board	IMBI-Q45
Processor	Intel® Core™ 2 Duo/ Quad LGA775 CPU, FSB 800/1066/ 1333 MHz, TDP 95W; Intel® ECG item: Q9400, E8400, E7400, E6500, E6400, E5300, E4300, E3400, E2160
System Memory	Dual-channel with 240-pin DDRIII 800/1066 SDRAM x 2, Max. 4GB
Chipset	Intel® Q45 + ICH10DO
Ethernet	Dual Intel® PCI-Express 10/100/1000Base-TX, RJ-45 x 2; LAN1: Intel® 82567LM, LAN 2: Intel® 82574L
BIOS	Award BIOS SPI ROM – 16Mb
I/O Chip	ITE IT8718F I/O Controller
Storage	One bay for 3.5" Hard Disk Drive x 2 (SATA II interface)
Optical ROM	Optional Slim Type ROM x 1 (with DVD/DVD-RW)
Solid Storage Disk	CompactFlash™ Type II socket x 1 (optional)
Audio	HD Audio Codec with Realtek ALC888
LED	Two indicators for Power and HDD on the front panel

Expansion	PCI-Express [x16] x 1, PCI-Express [x4] x 1, PCI x 2
Watchdog Timer	Reset: 1 sec.~255 min. and 1 sec. or 1 min./step
H/W Status Monitor	Monitoring system temperature, voltage, and cooling fan status
Power Supply	Flex ATX 275W input 90~264V AC
Dimension (WxHxD)	14.17" x 3.94" x 11.81" (360mm x 100mm x 300mm)

External I/O

Serial Port	RS-232 x 2
KB & Mouse	Keyboard x 1 & Mouse x 1
Universal Serial Bus	USB2.0 x 6 (4 at I/O and 2 on the front panel)
Audio	Audio jack x 3 (Mic-in, Line-in, Line-out)
Ethernet	RJ-45 x 2
Display	VGA x 1, DVI-D x 1
Power Switch	ATX power switch x 1

Environment

Operating Temperature	32°F~104°F (0°C ~40°C)
Storage Temperature	-4°F~140°F (-20°C ~60°C)

Operating Humidity	10~80%
Storage Humidity	10~80%, non-condensing
Vibration	0.5G/ 5~500Hz/ operating
Shock	15G peak acceleration (11 m sec. duration), operating
EMI	CE & FCC Class A

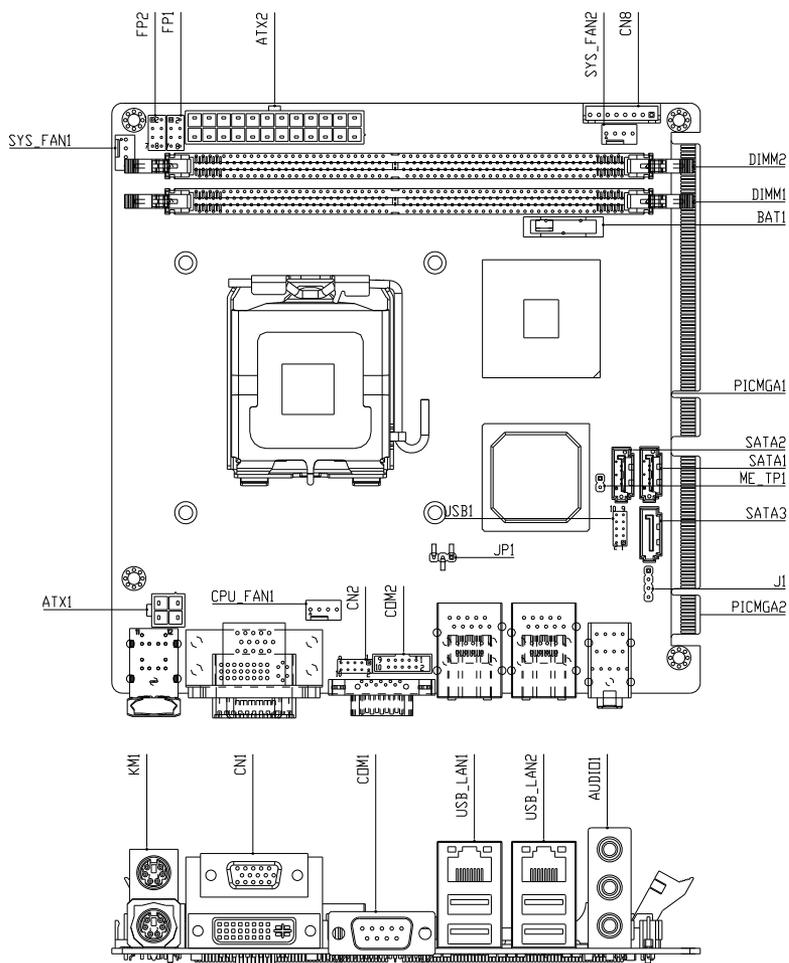
Chapter

2

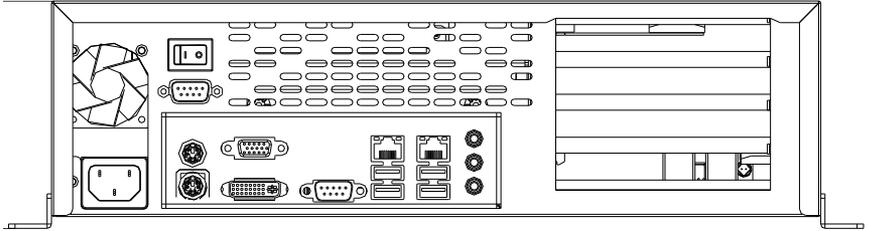
**Hardware
Installation**

2.1 Location of Connectors

Main Board

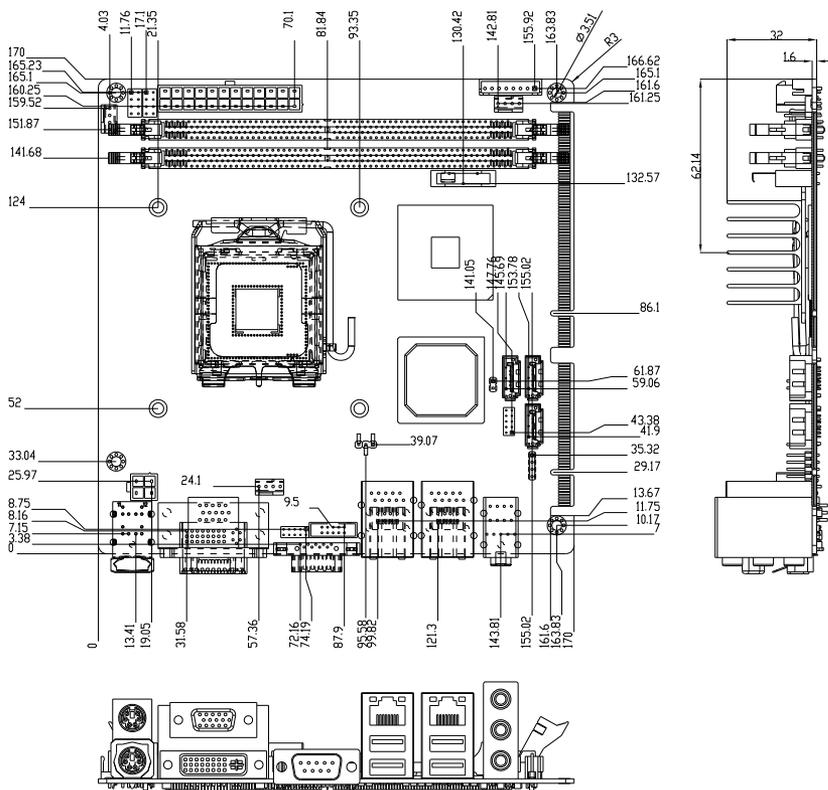


AIS-Q454

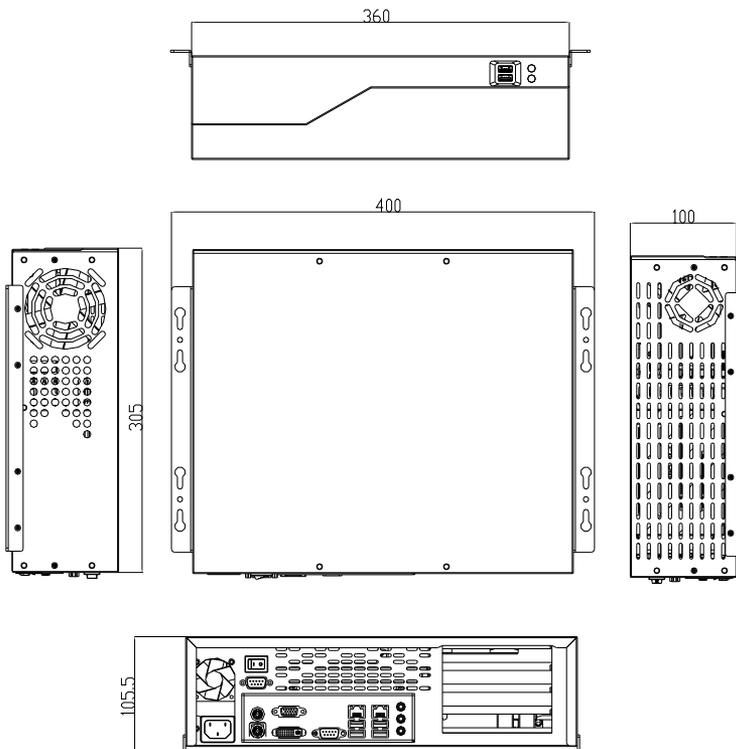


2.2 Mechanical Drawing

Main Board



AIS-Q454



2.3 List of Jumpers

The board has a number of jumpers that allow you to configure your system to suit your application.

The table below shows the function of each of the board's jumpers:

Label	Function
JP1	Clear CMOS

2.4 List of Connectors

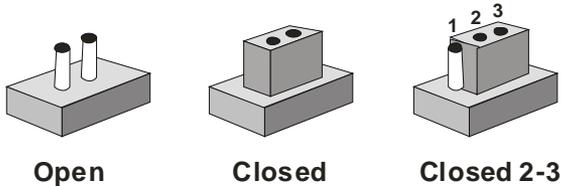
The board has a number of connectors that allow you to configure your system to suit your application. The table below shows the function of each board's connectors:

Label	Function
FP1	Front Panel Connector 1
FP2	Front Panel Connector 2
CN1	DVI-I & VGA Port Connector
COM1	RS-232 Serial Port Connector
COM2	RS-232 Serial Port Connector
KM1	PS2 Keyboard/Mouse Connector
USB_LAN1	100/1000Base-TX Ethernet & Dual USB Connector
USB_LAN2	100/1000Base-TX Ethernet & Dual USB Connector
AUDIO1	Audio Lin-in/Lin-out/MIC
DIMM1, DIMM2	DDR3 DIMM Slot
USB1	USB Connector
CPU_FAN1,	4-Pin CPU Fan Connector
SYS_FAN1, SYS_FAN2	4-Pin System Fan Connector
ATX1	4-Pin ATX Power +12V Connector
ATX2	24-Pin ATX Power
SATA1~SATA3	SATA Connector
J1	CD-IN
CN2	Digital I/O
PICMGA1, PICMGD1	Expansion Interface
CN8	Expansion Power Connector

2.5 Setting Jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip.

To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change.

Generally, you simply need a standard cable to make most connections.

2.6 Clear CMOS (JP1)

JP1	Function
1-2	Clear CMOS
2-3	Normal (Default)

2.7 ME_TP1

TP1	Function
Open	Enable iAMT setup (Default)
1-2	Disable iAMT setup

2.8 Front Panel Connector (FP1)

Pin	Signal	Pin	Signal
1	Power On Button (+)	2	Reset Switch (+)
3	Power On Button (-)	4	Reset Switch (-)
5	IDE LED (+)	6	Power LED (+)
7	IDE LED (-)	8	Power LED (-)

2.9 Front Panel Connector (FP2)

Pin	Signal	Pin	Signal
1	External Speaker (+)	2	Key Board Lock (+)
3	NC	4	GND
5	Internal Buzzer (-) (Default)	6	I2C Bus SMB Clock
7	External Speaker (-) (Default)	8	I2C Bus SMB Data

*Internal Buzzer Enable: Close Pin 5,7

2.10 USB Connector (USB1)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD1-	4	GND

5	USBD1+	6	USBD2+
7	GND	8	USBD2-
9	GND	10	+5V

2.11 CD-IN (J1)

Pin	Signal
1	CD-R
2	CD-GND
3	CD-GND
4	CD-L

2.12 RS232 Serial Port Connector (COM2)

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

2.13 Digital I/O (CN2)

This connector offers 4-pair of digital I/O functions and address is 801H. The pin definitions are illustrated below:

Pin	Signal	Pin	Signal
1	Digital- IN/OUT (Bit 7)	2	Digital- IN/OUT (Bit 6)
3	Digital- IN/OUT (Bit 5)	4	Digital- IN/OUT (Bit 4)
5	Digital- IN/OUT (Bit 3)	6	Digital- IN/OUT (Bit 2)
7	Digital- IN/OUT (Bit 1)	8	Digital- IN/OUT (Bit 0)
9	+5V	10	GND

The pin definitions and registers mapping are illustrated below:

Address: 801H

4 in / 4 out

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
GPI 27	GPI 26	GPI 25	GPI 24	GPO 23	GPO 22	GPO 21	GPO 20
MSB							LSB

8 in

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
GPI 27	GPI 26	GPI 25	GPI 24	GPI 23	GPI 22	GPI 21	GPI 20
MSB							LSB

8 out

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Pin7	Pin8
GPO27	GPO 26	GPO25	GPO 24	GPO 23	GPO 22	GPO 21	GPO 20
MSB							LSB

2.14 Power Connector (CN8)

Pin	Signal
1	GND
2	3.3V
3	3.3V
4	3.3V
5	5V
6	12V
7	12V
8	GND

2.15 List of Connectors of PER-R04X

Label	Function
CN3	POWER Connector
FAN1	FAN Connector
SATA1	SATA Connector

2.16 Power Connector of PER-R04X (CN3)

Pin	Signal
1	GND
2	+3.3V
3	+3.3V
4	+3.3V
5	+5V
6	+12V
7	+12V
8	GND

2.17 FAN Connector of PER-R04X (FAN1)

Pin	Signal
1	GND
2	+12V
3	N.C

2.18 Installing the Hard Disk Drive

Step 1: Unfasten the four screws on the left and right side of the AIS-Q454



Step 2: Unfasten the screw of the HDD bracket and pull out the bracket

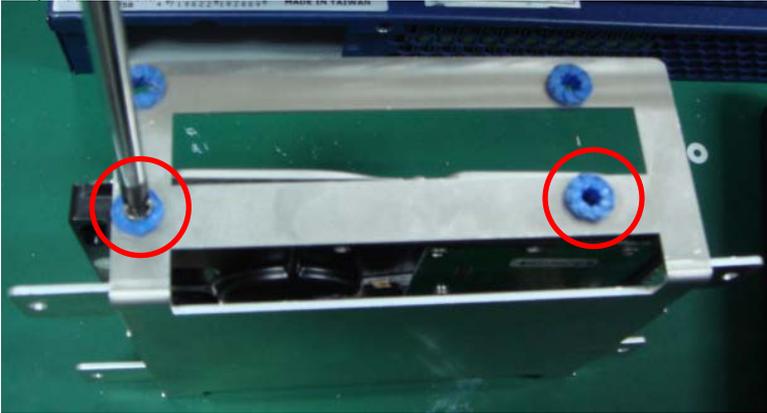




Step 3: Get the HDD ready and place the HDD to the HDD bracket



Step 4: Fasten the two screws on the HDD bracket



Step 5: Place the HDD back to the chassis



Step 6: Fasten the two screws to lock the HDD bracket



Step 7: Plug the SATA cable and power cable to the HDD



Step 8: Close the upper HDD bracket to the HDD and fasten the screws to lock the HDD kit



Step 9: Close and screw the case of the AIS-Q454 to finish the installation



Chapter

3

**Award
BIOS Setup**

3.1 System Test and Initialization

These routines test and initialize board hardware. If the routines encounter an error during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors. Non-fatal error messages usually appear on the screen along with the following instructions:

Press <F1> to RESUME

Write down the message and press the F1 key to continue the boot up sequence.

System configuration verification

These routines check the current system configuration against the values stored in the CMOS memory. If they do not match, the program outputs an error message. You will then need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

1. You are starting your system for the first time
2. You have changed the hardware attached to your system
3. The CMOS memory has lost power and the configuration information has been erased.

The AIS-Q454 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

3.2 Award BIOS Setup

Awards 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 RAM so that it retains the Setup information when the power is turned off.

Entering Setup

Power on the computer and press immediately. This will allow you to enter Setup.

Standard CMOS Features

Use this menu for basic system configuration. (Date, time, IDE, etc.)

Advanced BIOS Features

Use this menu to set the advanced features available on your system.

Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system performance.

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals. (Primary slave, secondary slave, keyboard, mouse etc.)

Power Management Setup

Use this menu to specify your settings for power management. (HDD power down, power on by ring, KB wake up, etc.)

PnP/PCI Configurations

This entry appears if your system supports PnP/PCI.

PC Health Status

This menu allows you to set the shutdown temperature for your system.

Frequency/Voltage Control

Use this menu to specify your settings for auto detect DIMM/PCI clock and spread spectrum.

Load Fail-Safe Defaults

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

Load Optimized Defaults

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

Set Supervisor/User Password

Use this menu to set Supervisor/User Passwords.

Save and Exit Setup

Save CMOS value changes to CMOS and exit setup.

Exit Without Saving

Abandon all CMOS value changes and exit setup.

You can refer to the "AAEON BIOS Item Description.pdf" file in the CD for the meaning of each setting in this chapter.

Chapter

4

**Driver
Installation**

The AIS-Q454 comes with an AutoRun CD-ROM that contains all drivers and utilities that can help you to install the driver automatically.

Insert the driver CD, the driver CD-title will auto start and show the installation guide. If not, please follow the sequence below to install the drivers.

Follow the sequence below to install the drivers:

- Step 1 – Install INF Driver
- Step 2 – Install VGA Driver
- Step 3 – Install LAN Driver
- Step 4 – Install Audio Driver

USB 2.0 Drivers are available for download using Windows[®] Update for both Windows[®] XP and Windows[®] 2000. For additional information regarding USB 2.0 support in Windows[®] XP and Windows[®] 2000, please visit www.microsoft.com/hwdev/usb/.

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the AIS-Q454 CD-ROM into the CD-ROM drive and install the drivers from Step 1 to Step 4 in order.

Step 1 – Install INF Driver

1. Click on the **step 1-INF** folder and double click on the **Setup.exe**
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 2 – Install VGA Driver

1. Click on the **step 2 –VGA** folder and select the OS your system is
2. Double click on **.exe** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 – Install LAN Driver

1. Click on the **step 3 –LAN** folder and select the OS your system is
2. Double click on **.exe** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 4 – Install Audio Driver

1. Click on the **step 4 –AUDIO** folder and select the OS your system is
2. Double click on **.exe** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Appendix

A

Programming the Watchdog Timer

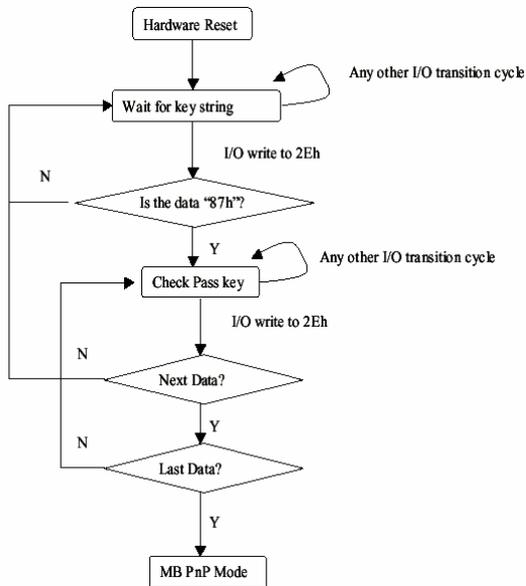
A.1 Programming

AIS-Q454 utilizes ITE 8718 chipset as its watchdog timer controller. (K version)

Below are the procedures to complete its configuration and the AAeon initial watchdog timer program is also attached based on which you can develop customized program to fit your application.

Configuring Sequence Description

After the hardware reset or power-on reset, the ITE 8718 enters the normal mode with all logical devices disabled except KBC.



There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.

(1) Enter the MB PnP Mode

To enter the MB PnP Mode, four special I/O write operations are to be performed during Wait for Key state. To ensure the initial state of the key-check logic, it is necessary to perform four write operations to the Special Address port (2EH). Two different enter keys are provided to select configuration ports (2Eh/2Fh) of the next step.

	Address Port	Data Port
87h, 01h, 55h, 55h:	2Eh	2Fh

(2) Modify the Data of the Registers

All configuration registers can be accessed after entering the MB PnP Mode. Before accessing a selected register, the content of Index 07h must be changed to the LDN to which the register belongs, except some Global registers.

(3) Exit the MB PnP Mode

Set bit 1 of the configure control register (Index=02h) to 1 to exit the MB PnP Mode.

WatchDog Timer Configuration Registers

LDN	Index	R/W	Reset	Configuration Register or Action
All	02H	W	N/A	Configuration Control
07H	71H	R/W	00H	WatchDog Timer Control Register
07H	72H	R/W	00H	WatchDog Timer Configuration Register
07H	73H	R/W	00H	WatchDog Timer Time-out Value (LSB) Register
07H	74H	R/W	00H	WatchDog Timer Time-out Value (MSB) Register

Configure Control (Index=02h)

This register is write only. Its values are not sticky; that is to say, a hardware reset will automatically clear the bits, and does not require the software to clear them.

Bit	Description
7-2	Reserved
1	Returns to the Wait for Key state. This bit is used when the configuration sequence is completed.
0	Resets all logical devices and restores configuration registers to their power-on states.

WatchDog Timer Control Register (Index=71h, Default=00h)

Bit	Description
7	WDT is reset upon a CIR interrupt
6	WDT is reset upon a KBC (Mouse) interrupt
5	WDT is reset upon a KBC (Keyboard) interrupt
4	Reserved
3-2	Reserved
1	Force Time-out. This bit is self-clearing
0	WDT status 1: WDT value reaches 0 0: WDT value is not 0

**WatchDog Timer Configuration Register (Index=72h,
Default=00h)**

Bit	Description
7	WDT Time-out value select 1: Second 0: Minute
6	WDT output through KRST (pulse) enable
5	WDT Time-out value Extra select 1: 4s. 0: Determine by WDT Time-out value select (bit7 of this register)
4	WDT output through PWROK1/PWROK2 (pulse) enable
3	Select the interrupt level ^{note} for WDT

**WatchDog Timer Time-out Value (LSB) Register (Index=73h,
Default=00h)**

Bit	Description
-----	-------------

7-0	WDT Time-out value 7-0
-----	------------------------

**WatchDog Timer Time-out Value (MSB) Register (Index=74h,
Default=00h)**

Bit	Description
-----	-------------

7-0	WDT Time-out value 15-8
-----	-------------------------

A.2 ITE8718 Watchdog Timer Initial Program

```
.MODEL SMALL
```

```
.CODE
```

Main:

```
CALL Enter_Configuration_mode
```

```
CALL Check_Chip
```

```
mov cl, 7
```

```
call Set_Logic_Device
```

```
;time setting
```

```
mov cl, 10 ; 10 Sec
```

```
dec al
```

Watch_Dog_Setting:

```
;Timer setting
```

```
mov al, cl
```

```
mov cl, 73h
call Superio_Set_Reg
;Clear by keyboard or mouse interrupt
mov al, 0f0h
mov cl, 71h
call Superio_Set_Reg
;unit is second.
mov al, 0C0H
mov cl, 72h
call Superio_Set_Reg
; game port enable
mov cl, 9
call Set_Logic_Device
```

```
Initial_OK:
CALL Exit_Configuration_mode
MOV AH,4Ch
INT 21h
```

```
Enter_Configuration_Mode PROC NEAR
MOV SI,WORD PTR CS:[Offset Cfg_Port]
```

```
MOV DX,02Eh
MOV CX,04h
Init_1:
```

```
MOV AL,BYTE PTR CS:[SI]
OUT DX,AL
INC SI
LOOP Init_1
RET
Enter_Configuration_Mode ENDP
```

```
Exit_Configuration_Mode PROC NEAR
MOV AX,0202h
CALL Write_Configuration_Data
RET
Exit_Configuration_Mode ENDP
```

```
Check_Chip PROC NEAR
```

```
MOV AL,20h
CALL Read_Configuration_Data
CMP AL,87h
JNE Not_Initial
```

```
MOV AL,21h
CALL Read_Configuration_Data
CMP AL,12h
JNE Not_Initial
```

Need_Initial:

STC

RET

Not_Initial:

CLC

RET

Check_Chip ENDP

Read_Configuration_Data PROC NEAR

MOV DX,WORD PTR CS:[Cfg_Port+04h]

OUT DX,AL

MOV DX,WORD PTR CS:[Cfg_Port+06h]

IN AL,DX

RET

Read_Configuration_Data ENDP

Write_Configuration_Data PROC NEAR

MOV DX,WORD PTR CS:[Cfg_Port+04h]

OUT DX,AL

XCHG AL,AH

MOV DX,WORD PTR CS:[Cfg_Port+06h]

OUT DX,AL

RET

Write_Configuration_Data ENDP

Superio_Set_Reg proc near

```
push ax
MOV DX,WORD PTR CS:[Cfg_Port+04h]
mov al,cl
out dx,al
pop ax
inc dx
out dx,al
ret
Superio_Set_Reg endp.Set_Logic_Device proc near
```

```
Set_Logic_Device  proc  near
push ax
push cx
xchg al,cl
mov cl,07h
call Superio_Set_Reg
pop cx
pop ax
ret
Set_Logic_Device endp
```

```
;Select 02Eh->Index Port, 02Fh->Data Port
Cfg_Port DB 087h,001h,055h,055h
```

```
DW 02Eh,02Fh
```

END Main

Note: Interrupt level mapping

0Fh-Dh: not valid

0Ch: IRQ12

.

.

03h: IRQ3

02h: not valid

01h: IRQ1

00h: no interrupt selected

Appendix

B

I/O Information

B.1 I/O Address Map

Address Range	Device Name
[00000000 - 0000000F]	Direct memory access controller
[00000000 - 000000CF]	PCI bus
[00000010 - 0000001F]	Motherboard resources
[00000020 - 00000021]	Programmable interrupt controller
[00000022 - 0000003F]	Motherboard resources
[00000040 - 00000043]	System timer
[00000044 - 0000005F]	Motherboard resources
[00000060 - 00000060]	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000061 - 00000061]	System speaker
[00000062 - 00000063]	Motherboard resources
[00000064 - 00000064]	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
[00000065 - 0000006F]	Motherboard resources
[00000070 - 00000073]	System CMOS/real time clock
[00000074 - 0000007F]	Motherboard resources
[00000080 - 00000090]	Direct memory access controller
[00000091 - 00000093]	Motherboard resources
[00000094 - 0000009F]	Direct memory access controller
[000000A0 - 000000A1]	Programmable interrupt controller
[000000A2 - 000000BF]	Motherboard resources
[000000C0 - 000000DF]	Direct memory access controller
[000000E0 - 000000EF]	Motherboard resources
[000000F0 - 000000FF]	Numeric data processor
[00000274 - 00000277]	ISAPNP Read Data Port
[00000279 - 00000279]	ISAPNP Read Data Port
[00000290 - 0000029F]	Motherboard resources
[000002F8 - 000002FF]	Communications Port (COM2)
[000003B0 - 000003BB]	Intel(R) Q45/Q43 Express Chipset
[000003C0 - 000003DF]	Intel(R) Q45/Q43 Express Chipset
[000003F8 - 000003FF]	Communications Port (COM1)
[00000400 - 000004BF]	Motherboard resources
[000004D0 - 000004D1]	Motherboard resources
[00000500 - 0000051F]	Intel(R) ICH10 Family SMBus Controller - 3A60
[00000800 - 0000087F]	Motherboard resources
[00000880 - 0000088F]	Motherboard resources
[00000A79 - 00000A79]	ISAPNP Read Data Port
[00000D00 - 0000FFFF]	PCI bus
[0000D000 - 0000FFFF]	Intel(R) ICH10 Family PCI Express Root Port 5 - 3A78
[0000DF00 - 0000DF1F]	Intel(R) Gigabit CT Desktop Adapter
[0000EB00 - 0000EB0F]	Intel(R) ICH10 Family 2 port Serial ATA Storage Controller 2 - 3A06
[0000EC00 - 0000EC0F]	Intel(R) ICH10 Family 2 port Serial ATA Storage Controller 2 - 3A06
[0000ED00 - 0000ED03]	Intel(R) ICH10 Family 2 port Serial ATA Storage Controller 2 - 3A06
[0000EE00 - 0000EE07]	Intel(R) ICH10 Family 2 port Serial ATA Storage Controller 2 - 3A06
[0000EF00 - 0000EF03]	Intel(R) ICH10 Family 2 port Serial ATA Storage Controller 2 - 3A06
[0000F000 - 0000F007]	Intel(R) ICH10 Family 2 port Serial ATA Storage Controller 2 - 3A06
[0000F200 - 0000F20F]	Intel(R) ICH10 Family 4 port Serial ATA Storage Controller 1 - 3A00
[0000F300 - 0000F30F]	Intel(R) ICH10 Family 4 port Serial ATA Storage Controller 1 - 3A00
[0000F400 - 0000F403]	Intel(R) ICH10 Family 4 port Serial ATA Storage Controller 1 - 3A00
[0000F500 - 0000F507]	Intel(R) ICH10 Family 4 port Serial ATA Storage Controller 1 - 3A00
[0000F600 - 0000F603]	Intel(R) ICH10 Family 4 port Serial ATA Storage Controller 1 - 3A00
[0000F700 - 0000F707]	Intel(R) ICH10 Family 4 port Serial ATA Storage Controller 1 - 3A00
[0000F800 - 0000F81F]	Intel(R) ICH10 Family USB Universal Host Controller - 3A66
[0000F900 - 0000F91F]	Intel(R) ICH10 Family USB Universal Host Controller - 3A65
[0000FA00 - 0000FA1F]	Intel(R) ICH10 Family USB Universal Host Controller - 3A64
[0000FB00 - 0000FB1F]	Intel(R) ICH10 Family USB Universal Host Controller - 3A69
[0000FC00 - 0000FC1F]	Intel(R) ICH10 Family USB Universal Host Controller - 3A68
[0000FD00 - 0000FD1F]	Intel(R) ICH10 Family USB Universal Host Controller - 3A67
[0000FE00 - 0000FE1F]	Intel(R) 82567LM-3 Gigabit Network Connection
[0000FF00 - 0000FF07]	Intel(R) Q45/Q43 Express Chipset

B.2 Memory Address Map

[-]	[IMBI-2F9BCA8C48]
[+]	Direct memory access (DMA)
[+]	Input/output (IO)
[+]	Interrupt request (IRQ)
[+]	Memory
	[00000000 - 0009FFFF] System board
	[000A0000 - 000BFFFF] Intel(R) Q45/Q43 Express Chipset
	[000A0000 - 000BFFFF] PCI bus
	[000C0000 - 000DFFFF] PCI bus
	[000E0000 - 000EFFFF] System board
	[000F0000 - 000FFFFF] System board
	[00100000 - 3DC8FFFF] System board
	[3DC90000 - 3DCFFFFFF] System board
	[3DD00000 - 3DDFFFFFF] System board
	[3DE00000 - FEBFFFFFF] PCI bus
	[D0000000 - DFFFFFFF] Intel(R) Q45/Q43 Express Chipset
	[E0000000 - EFFFFFFF] Motherboard resources
	[F9800000 - FD7FFFFFF] Intel(R) ICH10 Family PCI Express Root Port 1 - 3A70
	[FD800000 - FDBFFFFFF] Intel(R) Q45/Q43 Express Chipset
	[FDE00000 - FDEFFFFFF] Intel(R) ICH10 Family PCI Express Root Port 5 - 3A78
	[FDEC0000 - FEDEFFFF] Intel(R) Gigabit CT Desktop Adapter
	[FDEF0000 - FDEFFFFFF] Intel(R) Gigabit CT Desktop Adapter
	[FDFC0000 - FDFDFFFF] Intel(R) 82567LM-3 Gigabit Network Connection
	[FDFF4000 - FDFF7FFF] Microsoft UAA Bus Driver for High Definition Audio
	[FDFFC000 - FDFFC0FF] Intel(R) ICH10 Family SMBus Controller - 3A60
	[FDFFD000 - FDFFD3FF] Intel(R) ICH10 Family USB Enhanced Host Controller - 3A6A
	[FDFFE000 - FDFFE3FF] Intel(R) ICH10 Family USB Enhanced Host Controller - 3A6C
	[FDFFF000 - FDFFFFFF] Intel(R) 82567LM-3 Gigabit Network Connection
	[FEB00000 - FEBFFFFFF] Intel(R) Q45/Q43 Express Chipset
	[FEC00000 - FEC00FFF] System board
	[FED00000 - FED000FF] System board
	[FED00000 - FED003FF] High precision event timer
	[FED13000 - FED1FFFF] System board
	[FED20000 - FED9FFFF] System board
	[FEE00000 - FEE00FFF] System board
	[FFB00000 - FFB7FFFF] System board
	[FFB80000 - FFBFFFFFF] Intel(R) 82802 Firmware Hub Device
	[FFF00000 - FFFFFFFF] System board

B.3 IRQ Mapping Chart

Device	IRQ
(ISA) 0 High precision event timer	0
(ISA) 1 Standard 101/102-Key or Microsoft Natural PS/2 Keyboard	1
(ISA) 3 Communications Port (COM2)	3
(ISA) 4 Communications Port (COM1)	4
(ISA) 8 High precision event timer	8
(ISA) 9 Microsoft ACPI-Compliant System	9
(ISA) 12 PS/2 Compatible Mouse	12
(ISA) 13 Numeric data processor	13
(PCI) 11 Intel(R) ICH10 Family SMBus Controller - 3A60	11
(PCI) 16 Intel(R) Gigabit CT Desktop Adapter	16
(PCI) 16 Intel(R) ICH10 Family PCI Express Root Port 1 - 3A70	16
(PCI) 16 Intel(R) ICH10 Family PCI Express Root Port 5 - 3A78	16
(PCI) 16 Intel(R) ICH10 Family USB Universal Host Controller - 3A67	16
(PCI) 16 Intel(R) Q45/Q43 Express Chipset	16
(PCI) 18 Intel(R) ICH10 Family USB Enhanced Host Controller - 3A6C	18
(PCI) 18 Intel(R) ICH10 Family USB Universal Host Controller - 3A66	18
(PCI) 19 Intel(R) ICH10 Family 2 port Serial ATA Storage Controller 2 - 3A06	19
(PCI) 19 Intel(R) ICH10 Family 4 port Serial ATA Storage Controller 1 - 3A00	19
(PCI) 19 Intel(R) ICH10 Family USB Universal Host Controller - 3A69	19
(PCI) 19 Intel(R) ICH10 Family USB Universal Host Controller - 3A65	19
(PCI) 20 Intel(R) 82567LM-3 Gigabit Network Connection	20
(PCI) 21 Intel(R) ICH10 Family USB Universal Host Controller - 3A68	21
(PCI) 22 Microsoft UAA Bus Driver for High Definition Audio	22
(PCI) 23 Intel(R) ICH10 Family USB Enhanced Host Controller - 3A6A	23
(PCI) 23 Intel(R) ICH10 Family USB Universal Host Controller - 3A64	23

B.4 DMA Channel Assignments

Device	DMA Channel
Direct memory access controller	4