FES-6110

Flexible Embedded System

2.5" SATA Hard Disk Drive Bay

1 Gigabit Ethernet/

1 COM/ 6 USB2.0

HD Audio Codec (2CH Audio)

Copyright Notice

Acknowledgments

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Packing List

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

- ● 1 FES-6110

- ● 1 CD-ROM for manual (in PDF format) and drivers

- ● 1 60W AC-DC Power Adapter

- ● 1 Wallmount Kit

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

FES-6110 adopts the Intel® Atom™ N270 Processor, up to 1.6GHz. The chipset is equipped with Intel® 945GSE & ICH7M. Moreover, the system memory features 200-pin DDRII 400/533 SODIMM socket up to 2GB.   It deploys one RJ-45 port that features 10/100/1000Base-TX Ethernet LAN.   In addition, it equips one optional 802.11b/g Mini-PCIe module for a wireless LAN. FES-6110 condensed appearance features desktop and wallmount form factor that fits nicely into a space-limited environment.

This compact FES-6110 equipped with one internal 2.5" Hard Disk Drive with SATA interface.   In addition, it features one RS-232/422/485 COM and six USB2.0 ports. Furthermore, the VIA HD VT-1708B supports optional 5.1 audio channel and 2W amplifier for speaker out.

With the increasing demands of high performance in audio and video, AAEON released the specific Digital Signage platform to fulfill the needs of multimedia and digital signage applications.

1.2 Features

- Intel$^®$ Atom™ N270 1.6 GHz

- Intel$^®$ 945GSE + ICH7M Chipset

- 200-Pin Non-ECC DDRII 400/533 SODIMM x 1, Up To 2 GB

- Dual-View With VGA & DVI

- Realtek PCI-Express 10/100/1000Base-TX Ethernet x 1

- 2.5" SATA Hard Disk Drive Bay x 1

- USB 2.0 x 6, COM x 1, CompactFlash™ x 1

- Optional WiFi Module

- Cost-Effective and Fanless Solution

1.3 Specifications

System

Form Factor	Compact size for Desktop/Wallmount
Processor	Intel$^®$ Atom N270 1.6GHz
System Memory	200-pin DDRII 400/533 SODIMM Socket x 1, Max. 2GB
Chipset	Intel$^®$ 945GSE & ICH7M
Ethernet	10/100/1000Base-TX Ethernet x 1 Wireless LAN: 802.11b/g Mini-PCIe module x 1 (optional) ROM
BIOS	Award BIOS 4 Mb Flash EEPROM
Audio	VIA HD codec VT1708B 2W amplifier for speaker out
I/O Chip	ITE 8712F I/O Controller
Hard Disk Drive	2.5" Hard Disk Drive bay x 1 (SATA II interface)
Solid Storage Disk	CompactFlash™ Type II socket x 1
LED	Two indicators for Power and HDD
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	Single DC 12V input
Dimension (WxHxD)	9.4" x 1.77" x 5.7" (240mm x 45mm x

145mm)

Weight   3.6 lb (1.62 Kg)

External I/O

Serial Port   RS-232/422/485 x 1

KB & Mouse   Keyboard /Mouse x 1

Universal Serial Bus USB2.0 x 6 (2 on the front panel and 4 at I/O)

Audio   Audio jack x 2 (Mic-in, Line-out)

Ethernet   RJ-45 x 1

Display   VGA x 1, DVI-D x 1

Environment

Operating Temperature $32^{o}F \sim 113^{o}F$ ($0^{o}C \sim 45^{o}C$) (Industrial grade SSD only)

Storage Temperature $4^{o}F \sim 140^{o}F$ ($-20^{o}C \sim 60^{o}C$)

Operating Humidity 10~80%

Storage Humidity   10~80%, non-condensing

Vibration   0.5 gms/ 5~500Hz/ Random Operation (2.5" HDD)

Shock   15G peak acceleration (11 m sec. duration), operation

1.4 General System Information

Front Panel

Rear Panel

Chapter

2

Hardware Installation

2.1 Location of Jumpers and Connectors

Main board
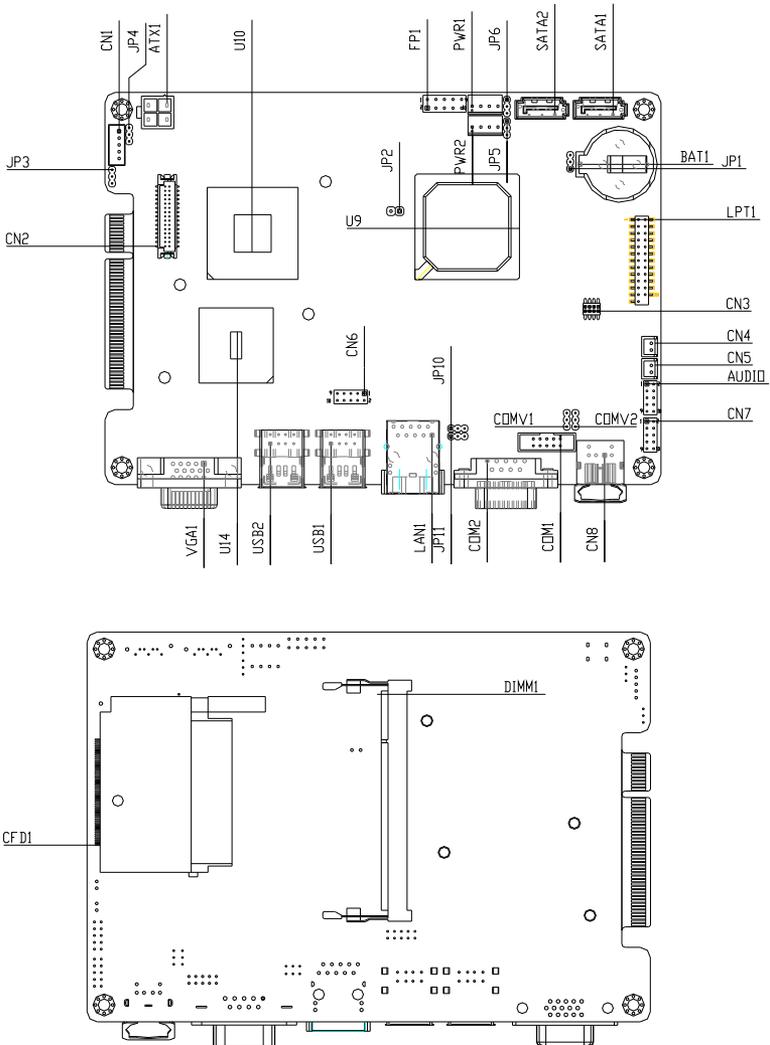
2.2 Mechanical Drawing

DIO Pin Definition

PIN	1	2	3	4	5	6	7	8	9	10
Signal	DIO1	DIO2	DIO3	DIO4	DIO5	DIO6	DIO7	DIO8	+5V	GND
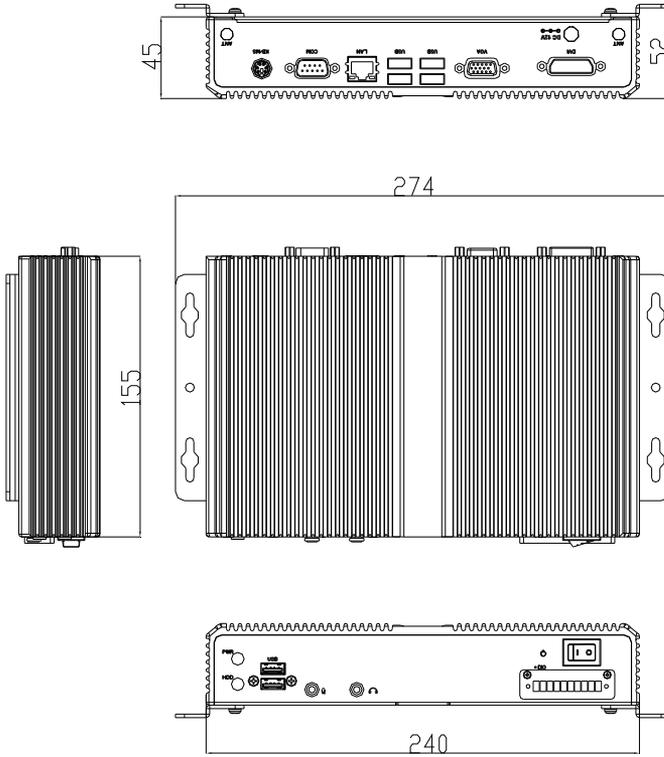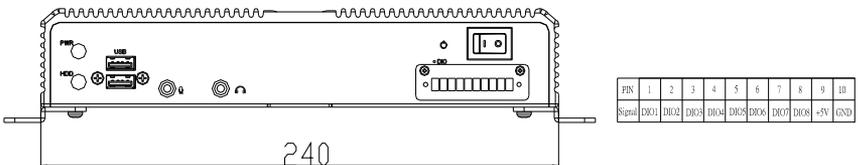
2.3 List of Jumpers

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
JP3	LVDS Power Selection
JP4	LVDS Inverter Power Selection
JP5	CFD Voltage 3.3V/5V Selection
JP6	Auto Power on Selection
JP10	COM1 Port Power/Ring Selection
JP11	COM2 Port Power/Ring Selection
COMV1~2	COM1, 2 Port Power Selection

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
VGA1	VGA Display Connector
COM1、3、4	RS-232 Serial Port Connector
COM2	RS-232/422/485 Serial Port Connector
CFD1	Compact Flash Slot (Master)
LPT1	LPT Port Connector
USB1~2	USB Connector
LAN1	10/100 or 100/1000Base-TX Ethernet Connector
DIMM1	DDRII SODIMM Slot
CN1	LVDS Inverter Power Connector
CN2	LVDS Connector
CN4	Audio Pin Header (right channel)
CN5	Audio Pin Header (left channel)
CN6	USB Pin Header
CN7	Digital I/O Connector
CN8	PS2 Keyboard/Mouse Connector
ATX1	+12V Power Connector
PWR1~2	SATA POWER Connector
SATA1~2	Serial ATA Connector
AUDIO1	Audio 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.

Open   **Closed**   **Closed 2-3**
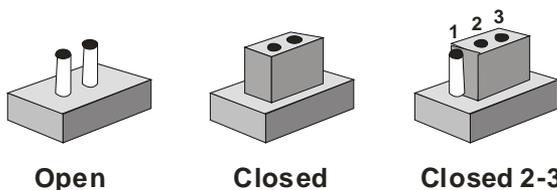
A pair of needle-nose pliers may be helpful when working with jumpers.

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	Normal (Default)
2-3	Clear CMOS

2.7 LVDS Power Selection (JP3)

JP3	Function
1-2	+5V
2-3	+3V (Default)

2.8 LVDS Inverter Voltage Selection (JP4)

JP4	Function
1-2	+5V
2-3	+12V (Default)

2.9 CFD Voltage 3.3V/5V Selection (JP5)

JP5	Signal
1-2	+3.3V
2-3	+5V (Default)

2.10 Auto Power Selection (JP6)

JP6	Function
Close 1-2	Enable
Close 2-3	Disable (Default)

2.11 COM1 Port Power/Ring Selection (JP10)

JP10	Function
Close 1-2	COM1 Power Selection (Default)
Close 2-3	RI1

2.12 COM2 Port Power/Ring Selection (JP11)

JP11	Function
Close 1-2	COM2 Power Selection (Default)
Close 2-3	RI1

2.13 COM2 Port Power Selection (COMV1)

COMV1	Function
Close 1-2	+12V (Default)
Close 2-3	+5V

2.14 COM1 Port Power Selection (COMV2)

COMV2	Function
Close 1-2	+12V (Default)
Close 2-3	+5V

2.15 Front Panel Connector (FP1)

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

9	Reset Switch (-)	10	Reset Switch (+)

2.16 RS-232 Serial Port Connector (COM1, COM3, COM4)

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

2.17 RS-232/422/485 Serial Port Connector (COM2)
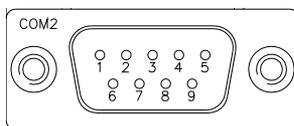
Pin	Signal	Pin	Signal
1	DCD (422TXD-/485DATA-)	2	RXD (422RXD+)
3	TXD (422TXD+/485DATA+)	4	DTR (422RXD-)
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N.C

2.18 LPT Port Connector (LPT1)

Pin	Signal	Pin	Signal
1	#STROBE	2	#AFD
3	DATA0	4	#ERROR
5	DATA1	6	#INIT
7	DATA2	8	#SLIN
9	DATA3	10	GND

11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	#ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SELECT	26	GND

2.19 LVDS Inverter (CN1)

Pin	Signal
1	12V / 5V
2	VCON
3	+5V
4	GND
5	BKL_EN

2.20 LVDS (CN2)

Pin	Signal	Pin	Signal
1	BKLTEN	2	BKLTCL
3	VLCD	4	GND
5	LA_CLK#	6	LA_CLK
7	VLCD	8	GND
9	LA_TX0#	10	LA_TX0
11	LA_TX1#	12	LA_TX1
13	LA_TX2#	14	LA_TX2
15	N.C.	16	N.C.
17	N.C.	18	N.C.

19	LB_TX0#	20	LB_TX0
21	LB_TX1#	22	LB_TX1
23	LB_TX2#	24	LB_TX2
25	N.C.	26	N.C.
27	VLCD	28	GND
29	LB_CLK#	30	LB_CLK

2.21 Audio Pin Header (Right Channel) (CN4)

Pin	Signal	Pin	Signal
1	SPK_RO+	2	SPK_RO-

2.22 Audio Pin Header (Left Channel) (CN5)

Pin	Signal	Pin	Signal
1	SPK_LO+	2	SPK_LO-

2.23 USB Connector (CN6)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD1-	4	GND
5	USBD1+	6	USBD2+
7	GND	8	USBD2-
9	GND	10	+5V

2.24 Digital I/O (CN7) (Address: 802h, 803h, 804h)

Pin	Signal	Pin	Signal
1	In1/Out1	2	In2/Out2
3	In3/Out3	4	In4/Out4
5	In5/Out5	6	In6/Out6

7	In7/Out7	8	In8/Out8
9	+5V	10	GND

2.25 PS/2 Keyboard/Mouse Connector (CN8)

Pin	Signal
1	KB_DATA
2	MS-DATA
3	GND
4	+5V
5	KB_CLK
6	MS_CLK

2.26 SATA Power Connector (PWR1, 2)

Pin	Signal	Pin	Signal
1	+12V	2	GND
3	GND	4	+5V

2.27 Audio Connector (AUDIO1)

Pin	Signal	Pin	Signal
1	MIC1-CL	2	GND
3	MIC1-CR	4	NC
5	Front-R	6	GND
7	NC	8	NC
9	Front-L	10	GND

2.28 Installing the Hard Disk Drive

Step 1: Unfasten the five screws on the bottom case of FES-6110.
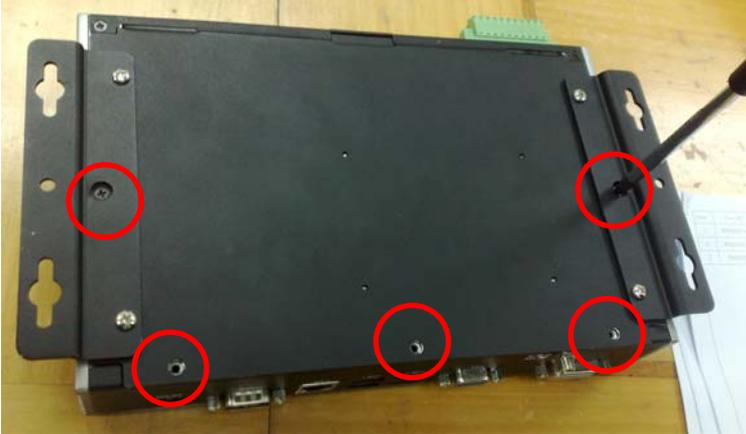
Step 2 : Fasten the four HDD rubbers(Blue) on the HDD bracket
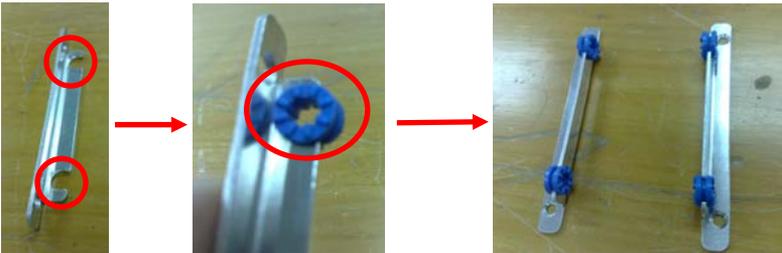
Step3 : Fasten the 4 screws to connect HDD bracket and HDD
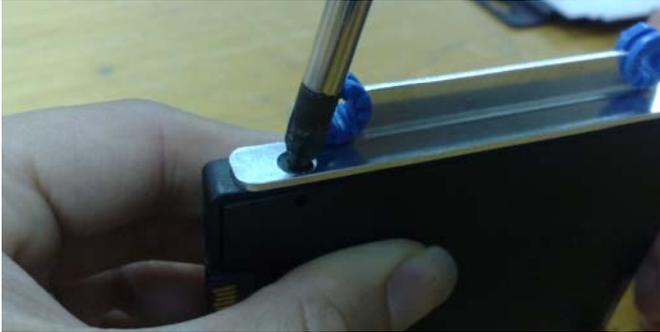
Step 4 : Put HDD on the bottom case of FES-6110 and then fasten 4 screws to fix on it.

Step 5: Put the bottom case back to the system and plug in SATA cable and power cable.

Step 6: Close and screw the bottom case of the FES-6110

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 m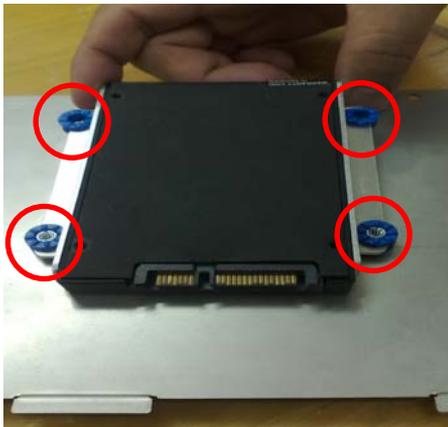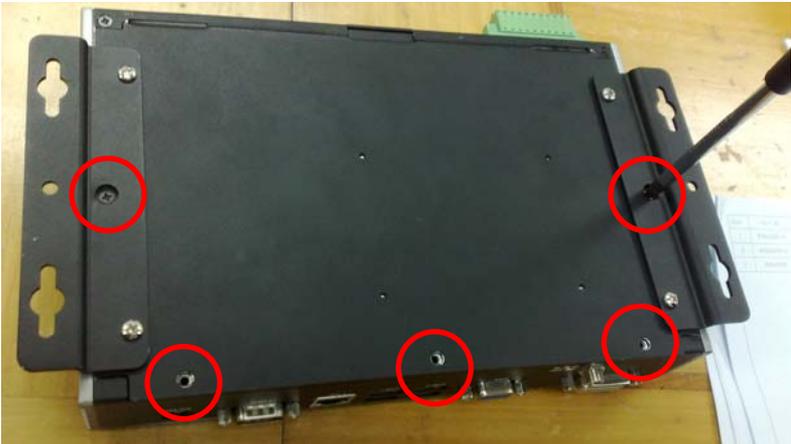essage on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors. Non-fatal error messages usually appear on the screen along with the following instructions:

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 FES-6110 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 <Del> 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 FES-6110 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 Audio Driver

　　　Step 4 – Install LAN Driver

　　　Step 5 – Install Video Decoder

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 FES-6110 CD-ROM into the CD-ROM drive and install the drivers from Step 1 to Step 5 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 **Setup.exe** 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 Audio Driver

1.   Click on the **Step 3-Audio** 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 4 – Install LAN Driver

1.   Click on the **Step 4 –LAN** folder and select the OS your

system is

2.　Double click on *setup.exe* located in each OS folder

3.　Follow the instructions that the window shows

4.　The system will help you install the driver automatically

Step 5 – Install Video Decoder

1.　Click on the *Step 5-Video Decoder* 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

Appendix

A

Programming the Watchdog Timer

A.1 Programming

FES-6110 utilizes ITE 8718 chipset as its watchdog timer controller.
(K version)

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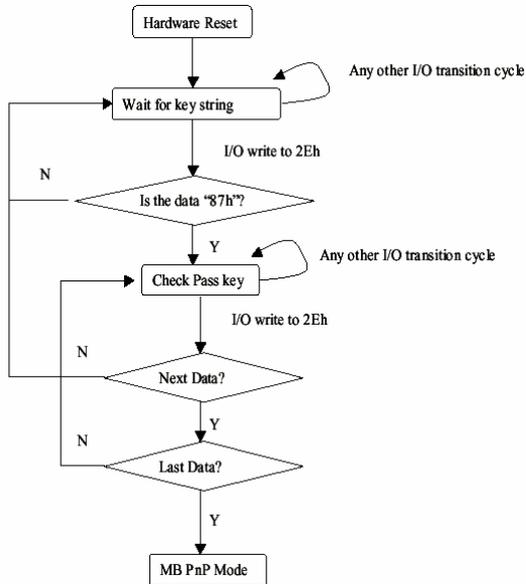
There are three steps to complete the configuration setup: (1) Enter
the MB PnP Mode; (2) Modify the data of configuration registers; (3)
Exit the MB PnP Mode. Undesired result may occur if the MB PnP
Mode is not exited normally.

(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 opera-tions 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
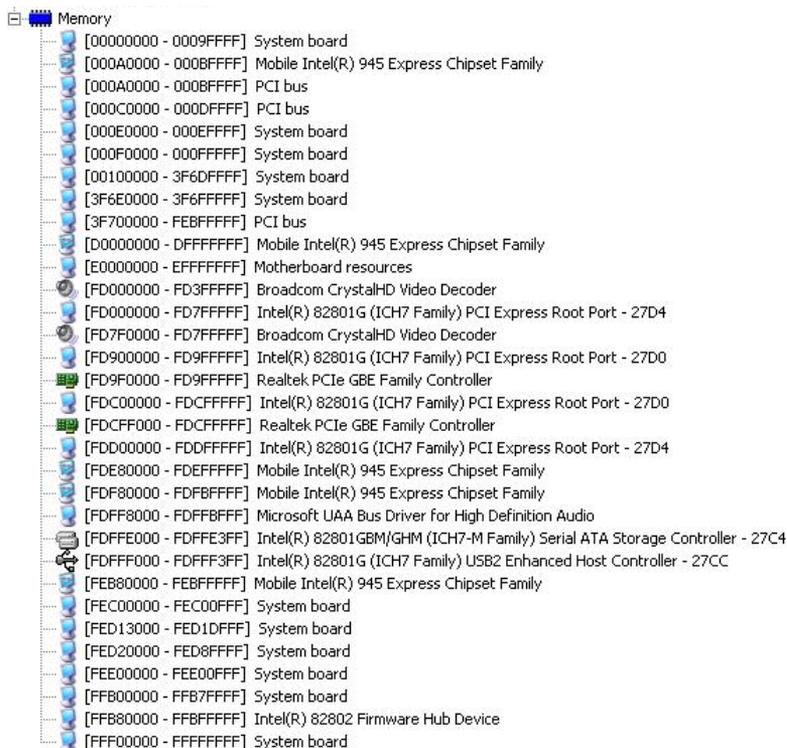>
> 01h: IRQ1
> 00h: no interrupt selected

Appendix

B

I/O Information

B.1 I/O Address Map

Input/output (IO)
- [00000000 - 0000000F] Direct memory access controller
- [00000000 - 00000CF7] 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
- [000001F0 - 000001F7] Primary IDE Channel
- [00000274 - 00000277] ISAPNP Read Data Port
- [00000279 - 00000279] ISAPNP Read Data Port
- [000003B0 - 000003BB] Mobile Intel(R) 945 Express Chipset Family
- [000003C0 - 000003DF] Mobile Intel(R) 945 Express Chipset Family
- [000003F6 - 000003F6] Primary IDE Channel
- [000003F8 - 000003FF] Communications Port (COM2)
- [00000400 - 000004BF] Motherboard resources
- [000004D0 - 000004D1] Motherboard resources
- [00000500 - 0000051F] Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
- [00000880 - 0000088F] Motherboard resources
- [00000A79 - 00000A79] ISAPNP Read Data Port
- [00000D00 - 0000FFFF] PCI bus
- [0000C000 - 0000CFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
- [0000CE00 - 0000CEFF] Realtek PCIe GBE Family Controller
- [0000E000 - 0000EFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4
- [0000F500 - 0000F50F] Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
- [0000F600 - 0000F603] Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
- [0000F700 - 0000F707] Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
- [0000F800 - 0000F803] Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
- [0000F900 - 0000F907] Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
- [0000FA00 - 0000FA0F] Intel(R) 82801G (ICH7 Family) Ultra ATA Storage Controllers - 27DF
- [0000FB00 - 0000FB1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
- [0000FC00 - 0000FC1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
- [0000FD00 - 0000FD1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
- [0000FE00 - 0000FE1F] Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
- [0000FF00 - 0000FF07] Mobile Intel(R) 945 Express Chipset Family

B.2 Memory Address Map

```
Memory
    [00000000 - 0009FFFF] System board
    [000A0000 - 000BFFFF] Mobile Intel(R) 945 Express Chipset Family
    [000A0000 - 000BFFFF] PCI bus
    [000C0000 - 000DFFFF] PCI bus
    [000E0000 - 000EFFFF] System board
    [000F0000 - 000FFFFF] System board
    [00100000 - 3F6DFFFF] System board
    [3F6E0000 - 3F6FFFFF] System board
    [3F700000 - FEBFFFFF] PCI bus
    [D0000000 - DFFFFFFF] Mobile Intel(R) 945 Express Chipset Family
    [E0000000 - EFFFFFFF] Motherboard resources
    [FD000000 - FD3FFFFF] Broadcom CrystalHD Video Decoder
    [FD000000 - FD7FFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4
    [FD7F0000 - FD7FFFFF] Broadcom CrystalHD Video Decoder
    [FD900000 - FD9FFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
    [FD9F0000 - FD9FFFFF] Realtek PCIe GBE Family Controller
    [FDC00000 - FDCFFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
    [FDCFF000 - FDCFFFFF] Realtek PCIe GBE Family Controller
    [FDD00000 - FDDFFFFF] Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4
    [FDE80000 - FDEFFFFF] Mobile Intel(R) 945 Express Chipset Family
    [FDF80000 - FDFBFFFF] Mobile Intel(R) 945 Express Chipset Family
    [FDFFF8000 - FDFFBFFF] Microsoft UAA Bus Driver for High Definition Audio
    [FDFFE000 - FDFFE3FF] Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    [FDFFF000 - FDFFF3FF] Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
    [FEB80000 - FEBFFFFF] Mobile Intel(R) 945 Express Chipset Family
    [FEC00000 - FEC00FFF] System board
    [FED13000 - FED1DFFF] System board
    [FED20000 - FED8FFFF] System board
    [FEE00000 - FEE00FFF] System board
    [FFB00000 - FFB7FFFF] System board
    [FFB80000 - FFBFFFFF] Intel(R) 82802 Firmware Hub Device
    [FFF00000 - FFFFFFFF] System board
```

B.3 IRQ Mapping Chart

```
Interrupt request (IRQ)
    (ISA) 0    System timer
    (ISA) 1    Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
    (ISA) 4    Communications Port (COM2)
    (ISA) 8    System CMOS/real time clock
    (ISA) 9    Microsoft ACPI-Compliant System
    (ISA) 13   Numeric data processor
    (ISA) 14   Primary IDE Channel
    (PCI) 15   Intel(R) 82801G (ICH7 Family) SMBus Controller - 27DA
    (PCI) 16   Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D0
    (PCI) 16   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CB
    (PCI) 16   Microsoft UAA Bus Driver for High Definition Audio
    (PCI) 16   Mobile Intel(R) 945 Express Chipset Family
    (PCI) 16   Realtek PCIe GBE Family Controller
    (PCI) 18   Broadcom CrystalHD Video Decoder
    (PCI) 18   Intel(R) 82801G (ICH7 Family) PCI Express Root Port - 27D4
    (PCI) 18   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27CA
    (PCI) 19   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C9
    (PCI) 19   Intel(R) 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
    (PCI) 23   Intel(R) 82801G (ICH7 Family) USB Universal Host Controller - 27C8
    (PCI) 23   Intel(R) 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
```

B.4 DMA Channel Assignments

```
Direct memory access (DMA)
    4    Direct memory access controller
```