AEC-6845

Fanless Embedded Controller

Intel® ULV Celeron®

400/650MHz EBGA CPU

With Single Ethernet,

8 COMs, 6 DIO, CompactFlash™

AEC-6845 Manual 2nd Ed.

December 2007

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Packing List

Before you begin operating your PC, please make sure that the following materials have been shipped:

- 1   AEC-6845 Embedded Controller
- 1   Keyboard & mouse Cable
- 1   Audio Cable
- 1   Phoenix Power Connector
- 2   Wallmount Brackets
- 1   Phoenix DIO Connector
- 1   Screw Package
- 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 60°C (140°F). IT MAY DAMAGE THE EQUIPMENT.

FCC Safety

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

AEC-6845 is the advanced upgraded version of AEC-6840. The target markets are industrial automation such as applications in factory management, building entrance guard and transportation system. AAEON primarily focuses AEC-6845 on environmental monitoring system.

Intel® ULV Celeron® chipset with low power consumption and high performance is widely acceptable and dependable in the market. USB 2.0, eight serial ports and Digital I/O communicates with diverse devices with high transferring rate. Furthermore, an optional Gigabit LAN port is a leading-edge design and also an innovation for communication in IPC industry. AEC-6845 plays a role as connecting all subsystems. AAEON not only enhances your competitive value but also gives you the excellent solution in the future.

1.2 Features

- Fanless System

- Onboard Intel® ULV Celeron® 400/650MHz EBGA processor

- Optional Dual LAN (Gigabit LAN)

- 8 serial ports / Digital IO / USB2.0

- Windows 2000 Pro, Windows XP Pro, Windows XP Embedded and Linux Red Hat are ready for applications

- Supports CompactFlash™ Memory and lockable mechanism

- Anti-vibration up to 5 g rms / Anti-shock up to 100g

1.3 Specification

System

- CPU: Intel® ULV Celeron® 400/650MHz EBGA CPU
- Construction: Rugged Aluminum Alloy Chassis
- System Memory: DDR RAM SODIMM x 1, Max. 512MB
- VGA: D-sub 15 VGA Connector
- Keyboard/Mouse: PS/2 Keyboard & Mouse
- Ethernet: 10/100Base-TX Ethernet RJ-45 connector
- SSD: Type II CompactFlash™ slot
- Hard Disk Storage: Optional 2.5" HDD Module
- Serial Port: 5 x RS-232, 3 x RS-232/422/485
- DIO: 3 in / 3 out
- USB: 3 USB 2.0 Ports
- Watchdog Timer: Generate a time-out system reset
- Power Supply: DC Input: 9V DC~30V DC (Phoenix connector) 12V AC Input: External Power Adapter (Optional), input voltage range : 100~240V AT power function

- System Control: Power on / off switch x 1
  Reset button x 1
- Indicator: Power LED x 1; HDD active LED x 1
- OS Support: Windows® 2000 / XP, Windows® CE, Windows® XP Embedded

Mechanical and Environmental

- Construction: Aluminum Alloy chassis
- Color: Dark Blue
- Mounting: Wallmount (Default), DIN-Rail (optional)
- Dimension: 8.35" (W) x 2.92" (H) x 4.21" (D) 212.15mm x 74.2mm x 107mm
- Carton size: 12" (W) x 7.87" (H) x 9.45" (D) 305mm x 200mm x 240mm
- Net Weight: 4.75lb (2.16kg)
- Gross Weight: 8.36lb (3.8kg)
- Operation Temperature: -13°F ~ 140°F (-25°C ~ 60°C) with CFD (650MHz) 5°F ~ 131°F (-15°C ~ 55°C) with HDD (650MHz)
- Operation Humidity: 5~95%@40°C, non-condensing
- Vibration: 5 g rms / 5~500Hz / random operation (With CFD);

1 g rms / 5~500Hz / operation
(With HDD)

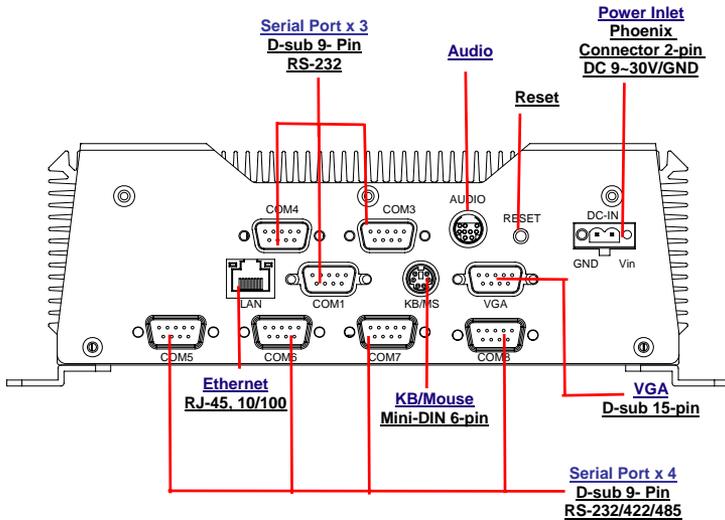- Shock: 100g peak acceleration (11
                      msec. duration) CFD;
                      15g peak acceleration (11 msec.
                      duration) HDD
- EMC: CE/FCC Class A

Front Side

- HDD LED
- Power LED
- Serial Port
  D-sub 9-pin
  RS-232/422/485
- DIO
  Phoenix Connector
  6 -Pin
- USB2.0
  port x 3
- HDD SYS COM2 USB DIO USB
- Power
- CFD
- Power Switch
- CompactFlash Slot
  With lockable design for
  anti-vibration purpose

Rear Side

- Serial Port x 3
  D-sub 9- Pin
  RS-232
- Audio
- Power Inlet
  Phoenix
  Connector 2-pin
  DC 9~30V/GND
- Reset
- COM4 COM3 AUDIO RESET DC-IN
- GND Vin
- LAN COM1 KB/MS VGA
- COM5 COM6 COM7 COM8
- Ethernet
  RJ-45, 10/100
- KB/Mouse
  Mini-DIN 6-pin
- VGA
  D-sub 15-pin
- Serial Port x 4
  D-sub 9- Pin
  RS-232/422/485

Chapter

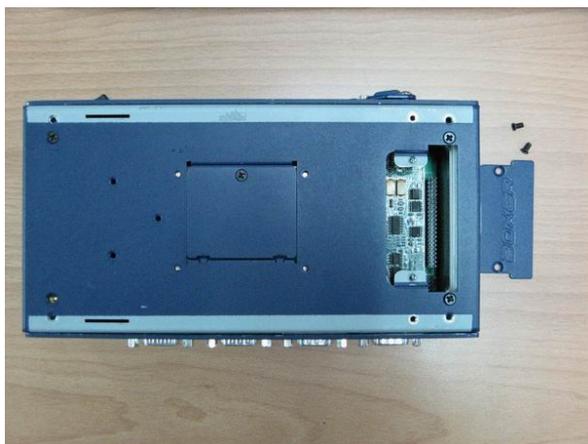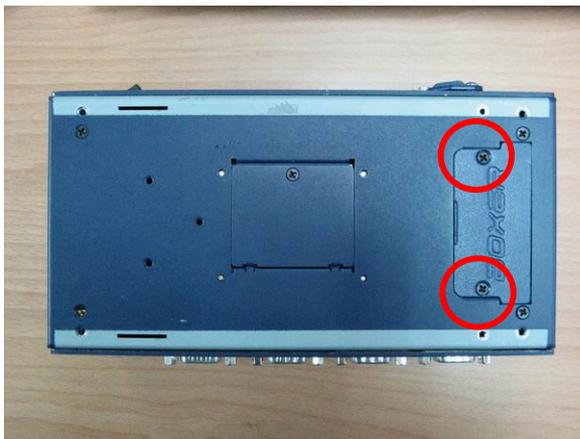# 2

Hardware Installation

2.1 Dimension
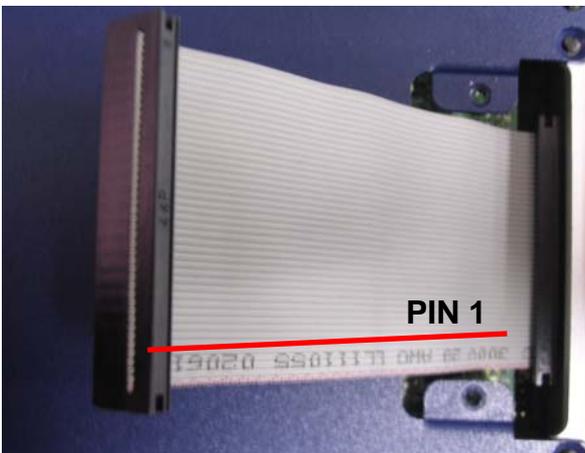

Units:mm

2.2 HDD Module Installation

Cable Insertion

Step 1: Open the HDD cover by loosening the screws on the

bottom of the chassis.

Step 2: Insert the Cable to the bottom of the chassis as the
illustration below.

PIN 1

HDD Kit Combination

Get the HDD and bracket ready.
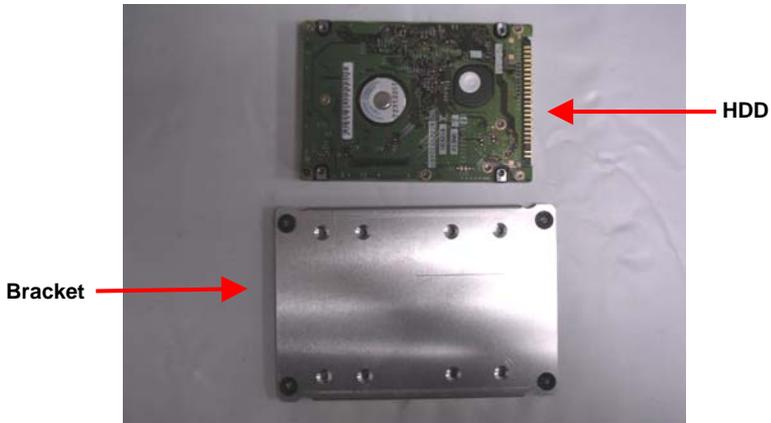
Step 1: Stack the HDD and bracket. Fasten HDD and bracket

with the screws.
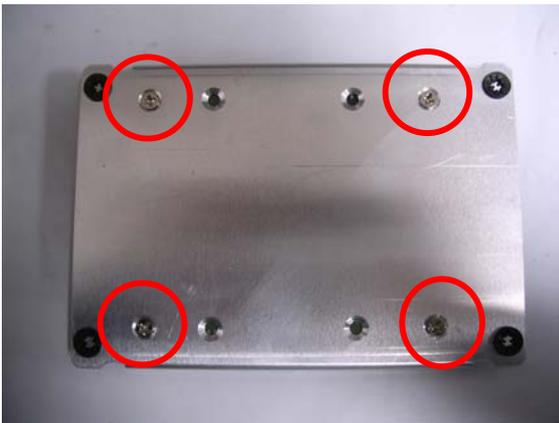
Step 2: Fasten the HDD module into the HDD kit house.

Step 3: Insert the other side of the cable to the HDD module.

Step 4: Combine the HDD kit house with the chassis and push as the illustration shown below.
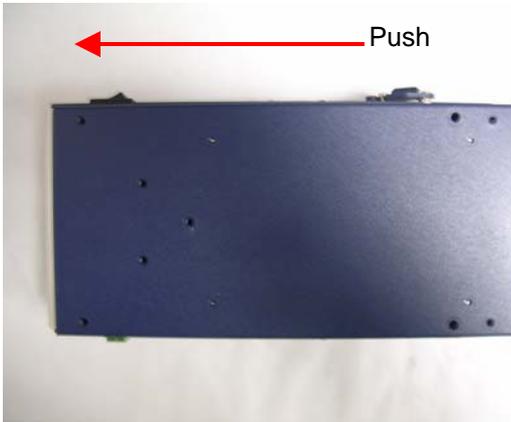
Step 5: Lock with the screws.

2.3 SDRAM Installation

Step 1: Screw the lid off the chassis.
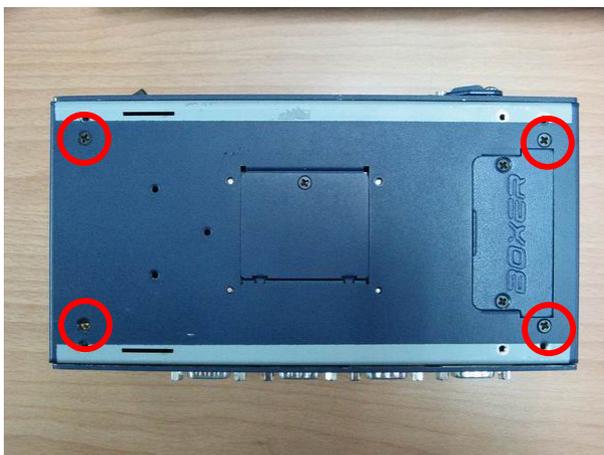
Step 2: Remove the lid after you screw the lid off the chassis and insert the DDR SDRAM SODIMM module into the slot.

SDRAM

SODIMM

module

2.4 RS-232/422/485 Setting

RS-232/422/485 Selection
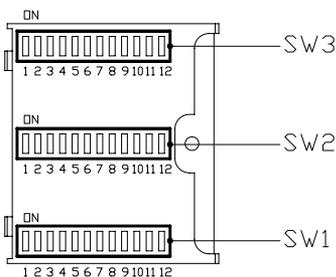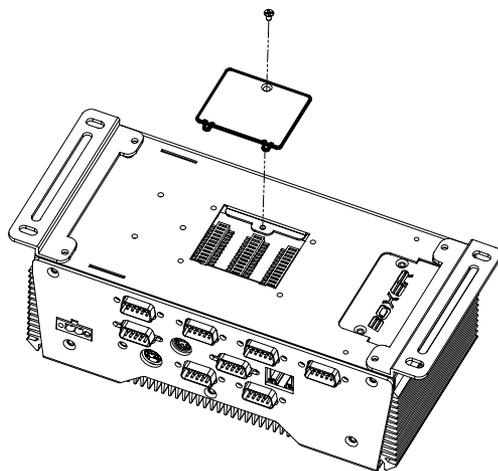
COM2 (SW1)

Type	1	2	3	4	5	6	7	8	9	10	11	12
RS-232	ON	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
RS-422	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF
RS-485	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF

COM5/ COM6 (SW2/SW3)

Type	1	2	3	4	5	6	7	8	9	10	11	12
RS-232	ON	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
RS-422	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
RS-485	OFF	ON	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF

Serial Port Pin Definition

COM2

Type	1	2	3	4	5	6	7	8	9	10
RS-232	DCD	RX	TX	DTR	GND	DSR	RTS	CTS	RI	N/A
RS-422	TX-	RX+	TX+	RX-					GND	N/A
RS-485	DATA-	DATA+							GND	N/A

COM5/ COM6

Type	1	2	3	4	5	6	7	8	9	10
RS-232	DCD	RX	TX	DTR	GND	DSR	RTS	CTS	RI	N/A
RS-422	TX-	TX+	RX+	RX-	GND					N/A
RS-485			DATA+	DATA-	GND					N/A

2.5 RS-422 & RS-485 Setting (COM5 & COM6)

Enter COM5 setting　(COM6 is the same setting as COM5)
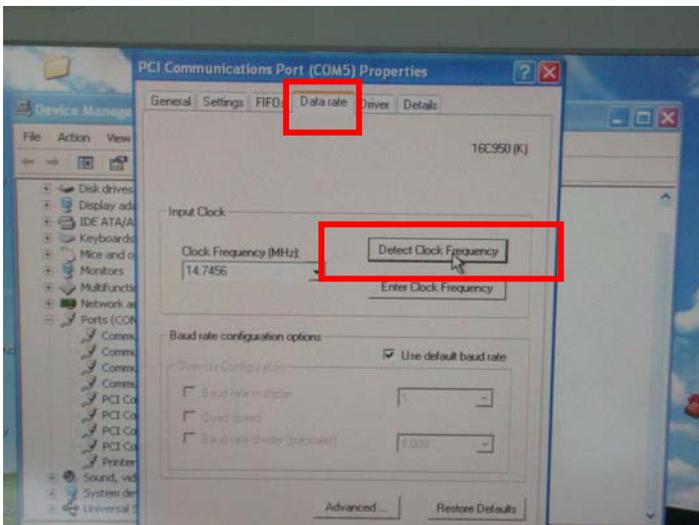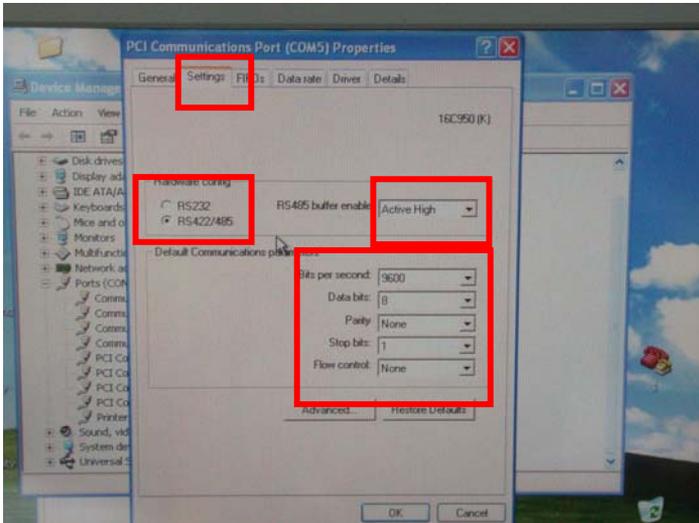
2.6 Power Linkage Installation

Step 1: Get the cable and connector ready
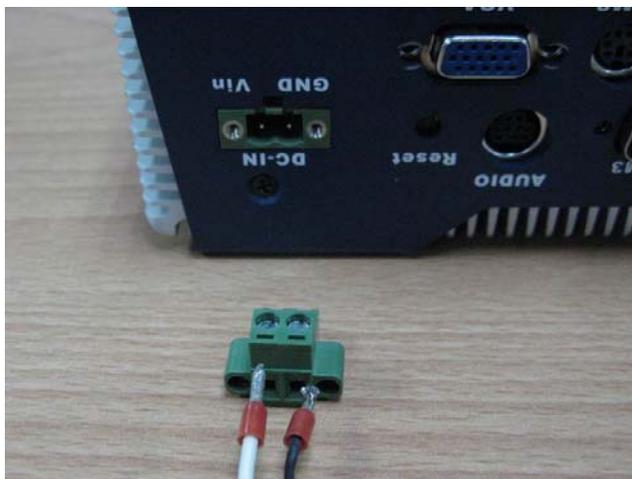
Step 2: Fix the connector to the cable with the screws.

Step 3: Insert the power cable in.

Step 4: Screw the power cable into the chassis.
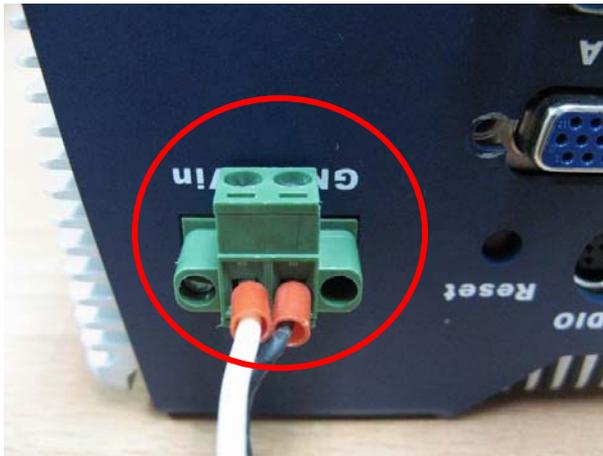
Notice:
Please make sure that pin assignment of *Power* and *Ground* on the accurate location.

2.7 Wallmount Installation

Fasten the brackets with the screws.
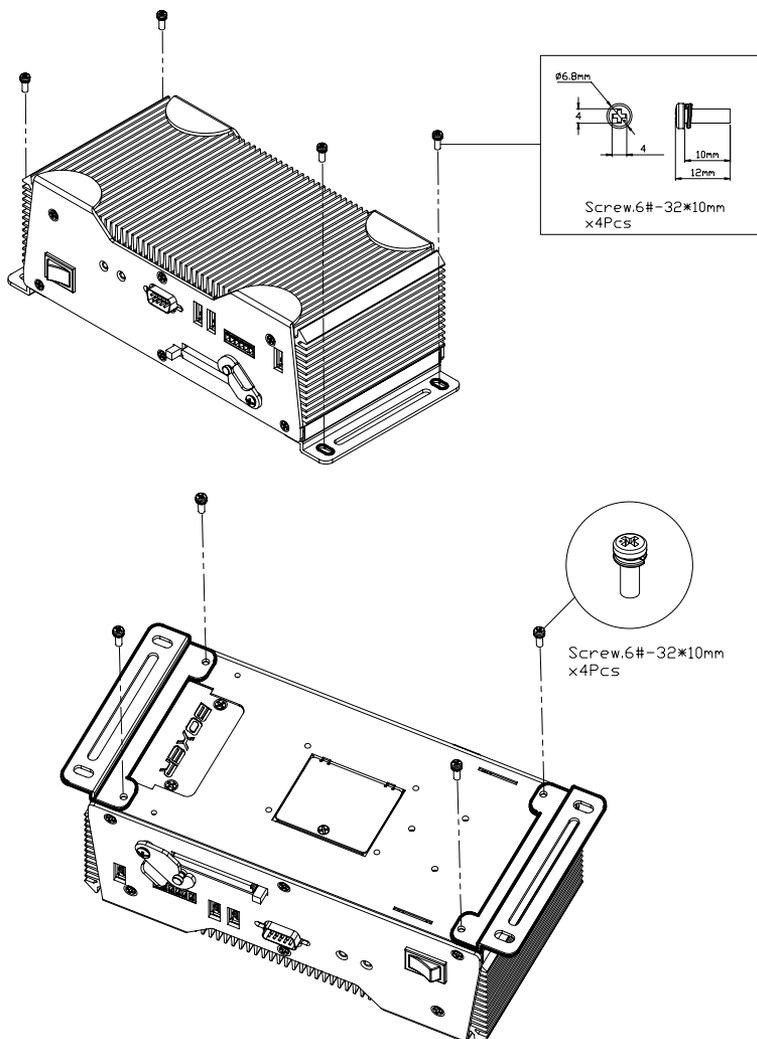
2.8 COM2 RS-232/422/485 Serial Port Connector

Different devices implement the RS-232/422/485 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments below for the connector.
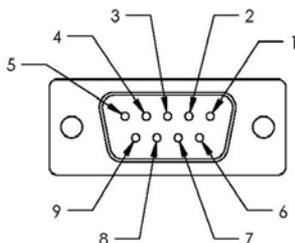
Pin	Signal	Pin	Signal
1	DCD (422TXD-/485DATA-)	2	RXD (422RXD+)
3	TXD (422TXD+/485DATA+)	4	DTR (422RXD-)
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N.C.

2.9 COM1/3/4 RS-232 Serial Port Connector

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.

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 AEC-6845 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 AEC-6845 comes with a CD-ROM that contains all drivers and utilities that meet your needs.

Follow the sequence below to install the drivers:

Install Audio for Chipset driver

Install USB2.0 Driver

Install VGA Driver

Install Audio Driver

Install LAN Driver

Install UART 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/.

The latest step is to install VIA USB 2.0 driver after you complete Windows Service Pack Installation. We recommend you to install VIA USB 2.0 driver due to the compatibility issue.

Please read instructions below for further detailed installations.

4.1 Installation

Insert the AEC-6845 CD-ROM into the CD-ROM Drive. And install the drivers in order.

Audio for Chipset Driver

1.   Click on *Audio for Chipset* folder
2.   Double click on the *Setup.exe*
3.   Follow the instructions that the window shows
4.   The system will help you install the driver automatically

USB2.0 Driver

1.   Click on *USB2.0* folder
2.   Double click on the *Setup.exe*
3.   Follow the instructions that the window shows
4.   The system will help you install the driver automatically

VGA Driver

1.   Click on *VGA* folder
2.   Click on the *CLE266_98ME_160108_wlShld_logod* folder or the *CLE266_xp2k_16943209_wlShld_logod* folder in terms of the OS your system is and then double click on the *Setup.exe*
3.   Follow the instructions that the window shows
4.   The system will help you install the driver automatically

Audio Driver

1. Click on ***Audio-ALC650*** folder

2. Double click on ***wdm_a354a.exe***

3. Follow the instructions that the windows shows

4. The system will help you install the driver automatically

LAN Driver

Install LAN Driver for Windows 98SE/2000/XP

For Windows 98SE

1. Click on the ***"rtlsetup-rtlnic (611)"*** folder and then double click on the ***Setup.exe***

2. Follow the instructions that the window shows

3. The system will help you install the driver automatically

For Windows 2000/XP

Please follow the steps:

1. ***Start*** → ***Setting*** → ***Control Panel***

2. ***System*** → ***Hardware*** → ***Device Manager***

4. ***Network Adapter*** → ***Ethernet Chipset Name***

5. ***Driver*** → ***Update Driver***

6. Follow the wizard and then mark "***Specify a location***"

7. Browse the path to

CD-ROM: \ Driver\ LAN \ ***win2k-rtlnic(611)*** (For Windows 2000) OR ***winxp–rtlnic (611)*** (For Windows XP)

UART Driver

1. Start ➝ Setting ➝ Control Panel

2. System ➝ Hardware ➝ Device Manager

3. Driver ➝ Update Driver

4. Follow the wizard and then select the "Install from a list or specify location"
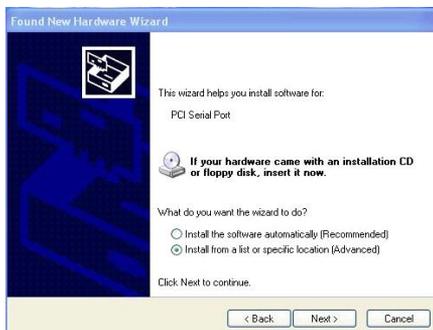
1. Search for the best driver in these locations and browse the file of *windows_XP-32* in D:\MSM-4S\ Windows_XP-32
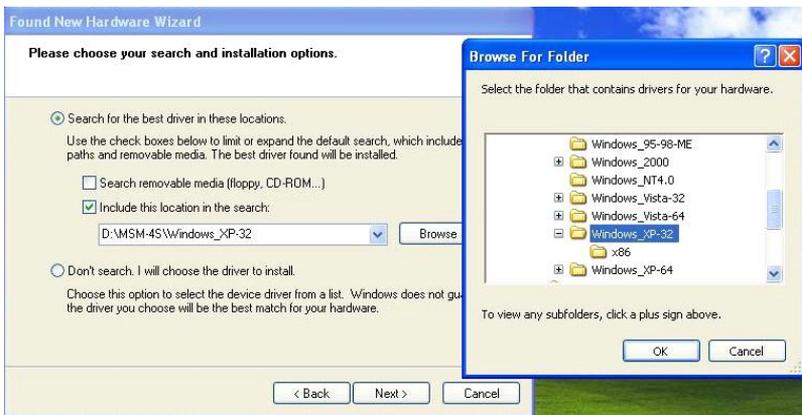
6.   Wizard the driver

7.   Finish founding the New Hardware Wizard and click
      "*Finish"* for installing the UART driver

Appendix

A

Programming the

Watchdog Timer

A.1 Programming

AEC-6845 utilizes Winbond W83697UF chipset as its watchdog timer controller. 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.

WatchDog Timer Configuration Registers

Logical Device 8

CRF3---Select WDTO count mode

CRF4---Default 0X00

CRF5—Watch Dog Timer status

CRF3 (PLED mode register.   Default 0 x 00)

Bit   Reserved

[7:3]:

Bit 2:   select WDTO count mode.

0   second

1   minute

CRF4---Default 0X00

Watchdog Timer Time-out value. Writing a non-zero value to this register causes the counter to load the value to watchdog counter and start counting down. Reading this register returns current value in watchdog counter instead of watchdog timer time-out value.

Bit [7:0]: = 0 x 00 Time-out Disable

= 0 x 01 Time-out occurs after 1 second/minute

= 0 x 02 Time-out occurs after 2 second/minutes

= 0 x 03 Time-out occurs after 3 second/minutes

…………………………………………..

= 0 x FF Time-out occurs after 255 second/minutes

CF5 (Default 0 x 00)

Bit [7]: Reserved.

Bit [6]: invert Watchdog Timer Status

Bit 5: Force Watchdog Timer Time-out, Write only

1   Force Watchdog Timer Time-out event; this bit is self-clearing.

Bit 4: Watchdog Timer Status, R/W

1   Watchdog Timer Time-out occurred.

0   Watchdog Timer counting

.

You can use DEBUG commands to test watchdog function. Some examples are listed as below：

-o 4e 87   Enter W83697UF configuration mode

-o 4e 87

-o 4e 07   logic device register

-o 4f 08   logic device number

-o 4e f3   select register CRF3

-i 4f   read F1 value

-00   F3 value；Bit 2=0 ----second

                     1 ----minute

-o 4e f4   select register CRF4

-i 4f 0a　　　　　　input timeout value，example:10 seconds

Digital IO control process:

The AEC-6845 digital IO interface are controlled by the W83697UF.The GPIO port locates on Logical Device 7.The CRF1 register can read or write the data of digital I/O, and please read the following information for your reference.

F1 register	Digital IO interface	
Bit0	Port 1	in
Bit1	Port 2	in
Bit2	Port 3	in
Bit3	Port 4	n/a
Bit4	Port 5	out
Bit5	Port 6	out
Bit6	Port 7	out
Bit7	Port 8	n/a

You can try the AEC-6845 digital IO interface with some simple tests using DEBUG commands. Some examples are listed as below:

-o 4e 87　　　　　Enter W83697UF configuration mode

-o 4e 87

-o 4e 7　　　　　logic device register

-o 4f 7　　　　　logic device number

-o 4e f1　　　　　select register　CRF1

-i 4f   read F1 value

-0f   F1 value

-o 4f,1f   output "high" to port 5

-o 4f,3f   output "high" to port 5 and port 6

-i 4f

-0e   if input port 1 to "low",then you can read data

                become to 0e

-0d   if input port 2 to "low",then you can read data

                become to 0d

Another method: You and setup a base address to digital IO in BIOS, and have four selection：280h，290h，2A0h，2B0h.

Example:

select 280h

-o 280 1f   output "high" to port 5

-o 280 3f   output "high" to port 5 and port 6

-i 280

-0e   if input port 1 to "low", and then you can read data

                become to 0e

-0d   if input port 2 to "low", and then you can read data

                become to 0d

A.2 W83697UF Watchdog Timer Initial Program

------Enter W83697UF configuration mode

        mov   al,87h   ;Unlock 83697UF register

        out   4eh,al

        out   4eh,al

------Select Logic device 8(Watch dog device)

        mov   al,07   ;logic device register

        out   4eh,al

        mov   al,8   ;logic device 8

        out   4fh,al

------Select CRF3   (Set unit to minute or second)

        mov   al,0f3h

        out   4eh,al

        in   al,4fh

        or   al,11111011b   ;bit 2 :0-> second

                    ;   :1-> minute

                    ;Select second in this example

------Select CRF4   (Set timeout value)

        mov   al,0f4h

        out   4eh,al

        mov   al,0ah   ;10 seconds in this example

                    ;Set this value to 0 disable timeout

```
        out        4fh,al
```

------Exit configuration mode

```
        mov        al,0aah
        out        4eh,al
```