EMB-830

Embedded ATX
Socket 478-based Intel® Pentium®4/
Celeron® Processors
With LCD, Ethernet, Audio,
CompactFlash & Mini PCI

EMB-830 Manual Rev.A 3rd Ed.
October 2006

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Packing List

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

- 1 EMB-830 Embedded ATX Board
- 1 Quick Installation Guide
- 1 CD-ROM for manual (in PDF format), BIOS, and drivers
- 1 Jumper cap
- 1 Audio Cable
- 1 USB Cable
- 1 TV-out Cable
- 2 40-pin IDE Cables
- 1 44-pin IDE Cable
- 2 COM port Cables
- 1 FDD Cable

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

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Chapter

1

General Information

1.1 Introduction

EMB-830 is the world's first Pentium 4 industrial board in embedded ATX form factor. It features a PGA 478 socket that can accommodate Pentium 4 supporting FSB up to 400/533MHz.

Best performance for multimedia solution

AAEON's EMB-830 also supports DDR DRAM up to 2.0Gbyte, 4X AGP, and 6 channels audio output. It can provide the strong multimedia functions. Therefore EMB-830 can be broadly implemented in several markets, such as Point of sale, point of information (Kiosk), and gaming markets.

Slim form factor

If you are looking for a slim board for space-constrained applications, EMB-830 is the one. EMB-830 is a low-profile design, meanwhile it supports 6 USB2.0, mini PCI slots. EMB-830 promises you the greatest expansion possibilities with the most cost-effective expansion standards. With numerous off-the-shelf Mini PCI modules, you get easy access to solutions ranging from IEEE 1394, Modem, Storage, Sound Card, SCSI card, Audio/Video capture card, Wireless LAN module, to Bluetooth module. Especially for customers whose application is various or changing, EMB-830 reserves more than enough flexibility for future expansion.

EMB-830 provides 10/100Base-TX Fast Ethernet port as standard. Talking about the display signal transmission, EMB-830 integrated dual channel LVDS interface onboard, which allows long distance display signal transmission.

1.2 Features

- Embedded ATX form factor
- ATX family backwards-compatible rear I/O panel
- Supports Intel® Pentium® 4/ Celeron® processors
- AC97 3D surround 5.1 channel audio
- 24/48-bit dual channel LVDS TFT LCD
- Supports Type II CompactFlash
- Supports Type III Mini PCI and PCI Slots
- Supports 6 USB 2.0 / 4 COM/ TV-out Ports

1.3 Specifications

System

- CPU: Support Socket 478-based Intel® Pentium® 4 (400 or 533 MHz FSB data rate)/ Celeron® Processors, up to 2.8GHz
- Memory: 184-pin DDR RAM slot x 2, support up to 2.0G (PC-200/ 266/ 333 MHz operation)
- Chipset: Intel® 845 GV+82801DB (ICH4)
- BIOS: Award 4 MB FLASH BIOS
- Audio: Realtek ALC655 to support 5.1 channel audio output (with headphone amplifier)
- Solid Storage Disk: One Type II CompactFlash slot
- Watchdog timer: ITE IT8712, generates a time-out system reset
- Ethernet: One 10/100 Base-TX Fast Ethernet (Intel 82562ET)
- Expansion Interface: PCI slot x 1; Type III Mini PCI socket x 1
- H/W status monitoring: supports power supply voltages, fan speed, and temperature monitoring

- Power supply voltage: ATX, ATX 12V
- Operating temperature: 32˚F to 140˚F (0˚C to 60˚C)
- Board size: 9.6" (L) x 9.6" (W) (243.8 mm x 243.8 mm)
- Gross Weight: 0.88 Lb (0.4 Kg)

Display

- Chipset: Built in Intel 845GV + Chrontel 7017
- Memory size: Up to 8MB
- Resolution: CRT：Up to 1280 x 1024 @ 32bpp colors; LCD：Up to 1280 x 1024 @ 24bpp colors
- LCD Interface: Dual channels 48-bit LVDS
- Dual Display: Supports CRT/LCD simultaneous display, supports screen image rotation
- LCD Interface: Up to 24/48-bit dual channel LVDS TFT
- TV-out: Supports NTSC and PAL

I/O

- MIO: EIDE x 2 (Ultra DMA100 x 1, UDMA 33 x 1), Floppy Disk Drive x 1, Keyboard & Mouse x 1,

	RS-232/422/485 x 1, RS-232 x 3, Parallel x 1
• IR interface:	One IrDA Tx/Rx header
• Audio:	MIC-in, Line-in, Line-out, speaker-out, 5.1 output
• USB:	Two 5x2 pin headers + Type-A connectors, support up to 6 USB ports
• Digit I/O:	Up to 8 in or 8 out

Chapter

2

Quick Installation Guide

Notice:

The Quick Installation Guide is derived from Chapter 2 of user manual. For other chapters and further installation instructions, please refer to the user manual CD-ROM that came with the product.

Part No. 2007830012 Printed in Taiwan Oct.2006

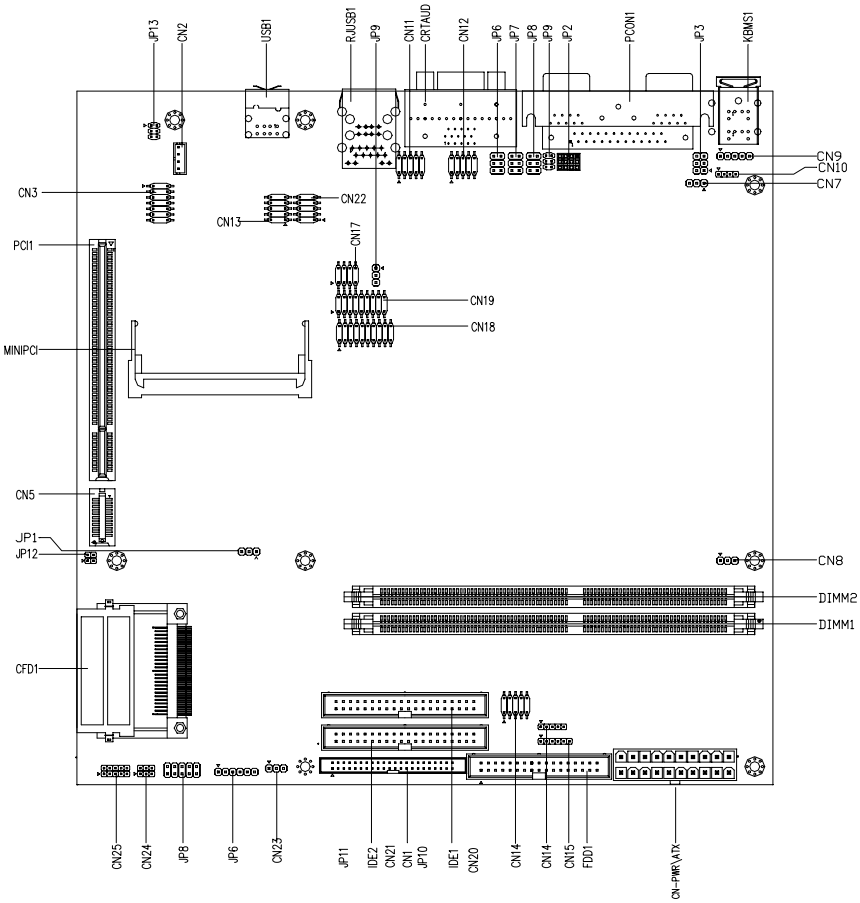
2.1 Safety Precautions

Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis

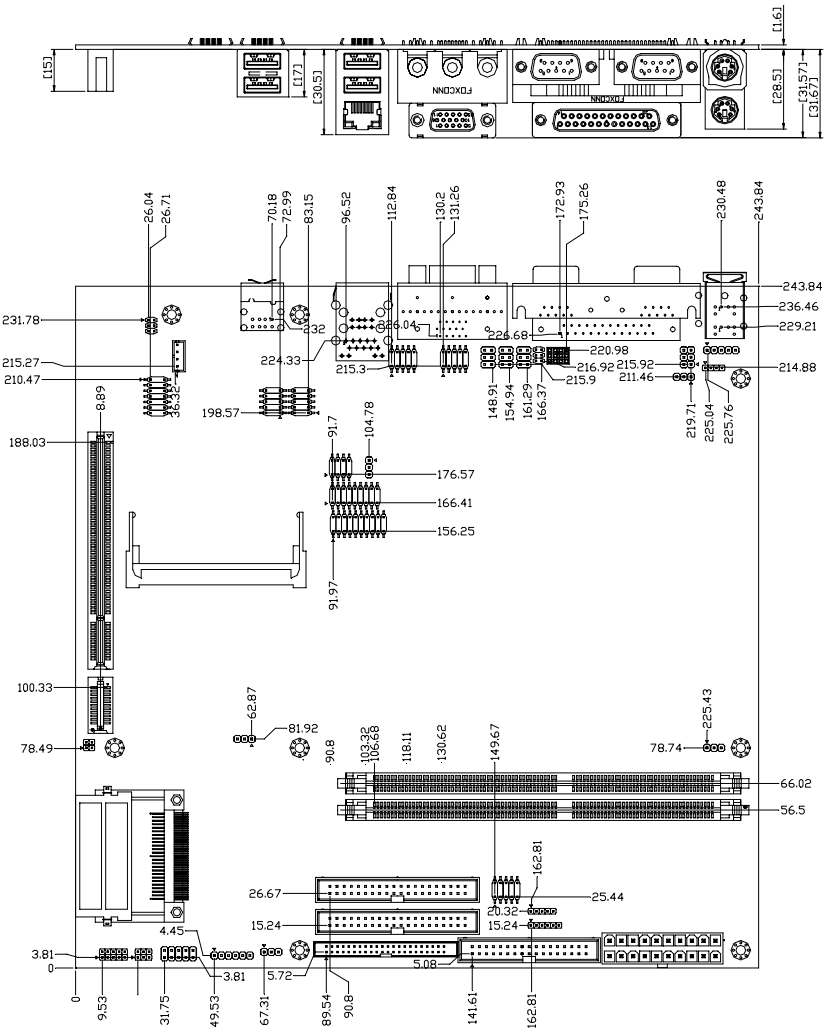
2.2 Location of Connectors and Jumpers

Component side



2.3 Mechanical Drawing

Component side (Note: The height of cooling system depends on customer's cooling device.)



2.4 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:

Jumpers

Label	Function
JP1	Clear CMOS
JP2	COM2 RS-232/422/485 Selection
JP3	COM1 Ring/+5V/+12V Selection
JP4	COM2 RS-232/422/485 Selection
JP5	COM2 Ring/+5V/+12V Selection
JP6	COM3 Ring/+5V/+12V Selection
JP7	COM4 Ring/+5V/+12V Selection
JP8	Audio Out Selection
JP9	LCD Voltage Selection

2.5 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 of the board's connectors:

Connectors

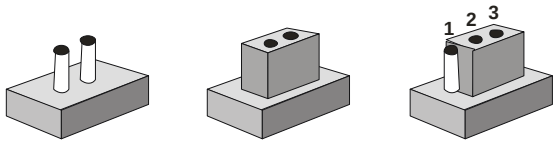
Label	Function
CN1	Secondary EIDE Connector
CN2	CD-IN Connector
CN3	Audio 5.1 Channel /SPDIF Connector
CN4	USB5 & USB6 Connector
CN5	PCI Extension Connector
CN6	IrDA Connector
CN7	Fan Connector
CN8	Fan Connector
CN9	Internal Keyboard Connector
CN10	Internal Mouse Connector
CN11	COM3 RS-232 Serial Port Connector
CN12	COM4 RS-232 Serial Port Connector
CN13	Digital I/O-2 Connector
CN14	Option PME Connector
CN15	External Power-on Function Connector
CN16	ATX Power_12V Connector
CN17	TV_Out Connector
CN18	Channel1 LVDS Connector

CN19	Channel2 LVDS Connector
CN22	Digital I/O-1 Connector
CN23	Fan Connector
CN24	NC
CN25	NC
CN26	Front Panel Connector
CN27	ATX Power Connector
FDD1	Floppy Connector
IDE1	Primary EIDE Connector
IDE2	Secondary EIDE Connector
CRTAUD	VGA Display Connector / Audio Connector
PCON1	COM1 RS-232 & COM2 RS-232/422/485 Serial Port & LPT Port Connector
USB1	USB3 & USB4 Connector
RJUSB1	USB1 & USB2 Connector/ 10/100 Base-TX Ethernet Connector
MPCI1	Mini PCI Slot
PCI1	PCI Slot
CFD1	CompactFlash Slot
DIMM1	DIMM Slot
DIMM2	DIMM Slot
KBMS1	PS2 Keyboard/Mouse Connector

2.6 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.

2.7 Clear CMOS (JP1)

Warning:
To avoid damaging the computer, always turn off the power supply before setting " Clear CMOS." Before turning on the power supply, set the jumper back to "Normal."

JP1	Function
1-2	Protected (Default)
2-3	Clear

2.8 COM2 RS-232/422/485 Selection (JP2 & JP4)

The COM2 port can be selected as RS-232, RS-422 or RS-485 by setting both JP2 and JP4. The following chart shows the jumper setting..

JP2	JP4	COM
1-2, 4-5, 7-8, 10-11	1-2	RS-232 (Default)
2-3, 5-6, 8-9, 11-12	3-4	RS-422
2-3, 5-6, 8-9, 11-12	5-6	RS-485

2.9 COM1 Ring/+5V/+12V Selection (JP3)

JP3	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.10 COM2 Ring/+5V/+12V Selection (JP5)

JP5	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.11 COM3 Ring/+5V/+12V Selection (JP6)

JP6	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.12 COM4 Ring/+5V/+12V Selection (JP7)

JP7	Function
1-2	+12V
3-4	+5V
5-6	Ring (Default)

2.13 Audio Out Selection (JP8)

JP8	Function
1-3, 2-4	Line out via Amplifier (Default)
3-5, 4-6	Line out unvia Amplifier

2.14 LCD Voltage Selection (JP9)

JP9	Function
1-2	+5V
2-3	+3.3V (Default)

2.15 EIDE Connector (IDE1, IDE2, and CN1)

You can attach up to four Enhanced Integrated Device Electronics hard disk drives to IDE1, IDE2, and CN1. The IDE controller of EMB-830 uses a PCI local bus interface. This advanced interface supports faster data transfer. You can use either IDE2 or CN1 at the same time.

Connecting the hard drive

Wire number 1 on the cable is normally red or blue, and the other wires are usually gray.

1. Connect one end of the cable to CN1. Make sure that the red wire corresponds to pin 1 on the connector.

2. Plug the other end of the cable to the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drives. (See your hard drive's documentation for the location of the connector).

Connect a second drive with another connector on the cable as described above.

Pin	Signal	Pin	Signal
1	IDE RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	N.C
21	REQ	22	GND
23	IO WRITE	24	GND

25	IO READ	26	GND
27	IO READY	28	GND
29	DACK	30	GND
31	IRQ14	32	N.C
33	ADDR1	34	UDMA DETECT
35	ADDR0	36	ADDR2
37	CS#1	38	CS#3
39	LED	40	GND
41	+5V	42	+5V
43	GND	44	N.C

2.16 CD-IN Connector (CN2)

Pin	Signal	Pin	Signal
1	CD_IN_L	2	CD_GND
3	CD_GND	4	CD_IN_R

2.17 Audio 5.1 Channel/ SPDIF Connector (CN3)

Pin	Signal	Pin	Signal
1	Front-OUT-R	2	GND
3	Front -OUT-L	4	GND
5	Surr-OUT-R	6	GND
7	Surr-OUT-L	8	GND
9	LFE-OUT	10	GND
11	CNE-OUT	12	GND
13	SPDIF-OUT	14	SPDIF-IN

2.18 USB 5 & USB 6 connector (CN4)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD5-	4	GND
5	USBD5+	6	USBD6+
7	GND	8	USBD6-
9	GND	10	+5V

2.19 PCI Extension Connector (CN5)

Pin	Signal	Pin	Signal
B1	GND	A1	PCI-GNT#B
B2	PCI-CLK	A2	GND
B3	GND	A3	PCI-GNT#3
B4	PCI-REQ#B	A4	GND
B5	GND	A5	NC
B6	PCI-CLK	A6	IDSEL1 (AD30)
B7	GND	A7	NC
B8	PCI-REQ#3	A8	IDSEL2 (AD31)
B9	GND	A9	NC
B10	PCI-REQ#A	A10	+12V
B11	PCI-GNT#A	A11	SERIRQ

2.20 IrDA Connector (CN6)

Pin	Signal	Pin	Signal
1	+5V	2	DIR-TX
3	GND	4	IR-RX
5	IR-RX	6	CIR-RX

2.21 Fan Connector (CN7, CN8, and CN23)

Pin	Signal
1	GND
2	+12V
3	Speed Sense

2.22 Internal Keyboard Connector (CN9)

Pin	Signal
1	KB_CLK
2	KB_DATA
3	N.C
4	GND
5	+5V

2.23 Internal Mouse Connector (CN10)

Pin	Signal	Pin	Signal
1	MS_CLK	2	MS_DATA.
3	GND	4	+5V

2.24 COM3 RS-232 Serial Port Connector (CN11)

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI/+5V/+12V	10	N.C

2.25 COM4 RS-232 Serial Prot Connector (CN12)

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI/+5V/+12V	10	N.C

2.26 Digital I/O-2 Connector (CN13)

This connector offers 4-pair of digital I/O functions and address is 841H. The pin definitions are illustrated below: Please refer to Page 3-10 for digital I/O BIOS setting.

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

The pin definitions and registers mapping are illustrated below:

Address: **841H**

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
GPO 27	GPO 26	GPO 25	GPO 24	GPO 23	GPO 22	GPO 21	GPO 20
MSB							LSB

2.27 Digital I/O-1 Connector (CN22)

This connector offers 4-pair of digital I/O functions and address is 801H. The pin definitions are illustrated below: Please refer to Page 3-10 for digital I/O BIOS setting.

Pin	Signal		
1	Digital-IN/ OUT	2	Digital-IN/ OUT
3	Digital-IN/ OUT	4	Digital-IN/ OUT
5	Digital-IN/ OUT	6	Digital-IN/ OUT
7	Digital-IN/ OUT	8	Digital-IN/ OUT
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
GPO 27	GPO 26	GPO 25	GPO 24	GPO 23	GPO 22	GPO 21	GPO 20
MSB							LSB

2.28 Option PME Connector (CN14)

Pin	Signal	Pin	Signal
1	+5VSB	2	GND
3	#PME	4	SMB_DATA
5	SMB_CLK		

2.29 External Power-on Function Connector (CN15)

Pin	Signal	Pin	Signal
1	N.C	2	GND
3	POWER-GOOD	4	GND
5	PS-ON	6	+5VSB

2.30 ATX Power-12V Connector (CN16)

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

2.31 TV-Out Connector (CN17)

Pin	Signal	Pin	Signal
1	Y	2	CVBS
3	GND	4	GND
5	C	6	N.C
7	GND	8	N.C

2.32 Channel 1 LVDS Connector (CN18)

Pin	Signal(18/24/36-bit)	Pin	Signal(18/24/36-bit)
1	LVDS_TX1+	2	LVDS_TX1-
3	GND	4	GND
5	LVDS_TXCLK+	6	LVDS_TXCLK-
7	GND	8	PPVCC
9	PPVCC	10	PPVCC
11	LVDS_TX2+	12	LVDS_TX2-
13	GND	14	GND
15	LVDS_TX0+	16	LVDS_TX0-
17	LVDS_TX3+	18	LVDS_TX3-
19	ENBKL	20	N.C

2.33 Channel 2 LVDS Connector (CN19)

Pin	Signal	Pin	Signal
1	LVDS_TX1+	2	LVDS_TX1-
3	GND	4	GND
5	LVDS_TXCLK+	6	LVDS_TXCLK-
7	GND	8	PPVCC
9	PPVCC	10	PPVCC
11	LVDS_TX2+	12	LVDS_TX2-

13	GND	14	GND
15	LVDS_TX0+	16	LVDS_TX0-
17	LVDS_TX3+	18	LVDS_TX3-

2.34 Front Panel Connector (CN26)

Pin	Signal	Pin	Signal
1	Power On Button (-)	2	Power On Button (+)
3	IDE LED (-)	4	IDE LED (+)
5	External Buzzer (-)	6	External Buzzer (+)
7	Power LED (-)	8	Power LED (+)
9	Reset Switch (-)	10	Reset Switch (+)

2.35 ATX Power Connector (CN27)

Pin	Signal	Pin	Signal
1	+3.3V	2	+3.3V
3	GND	4	+5V
5	GND	6	+5V
7	GND	8	Power OK
9	+5VSB	10	+12V
11	+3.3V	12	-12V
13	GND	14	PS_ON
15	GND	16	GND
17	GND	18	-5V
19	+5V	20	+5V

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.

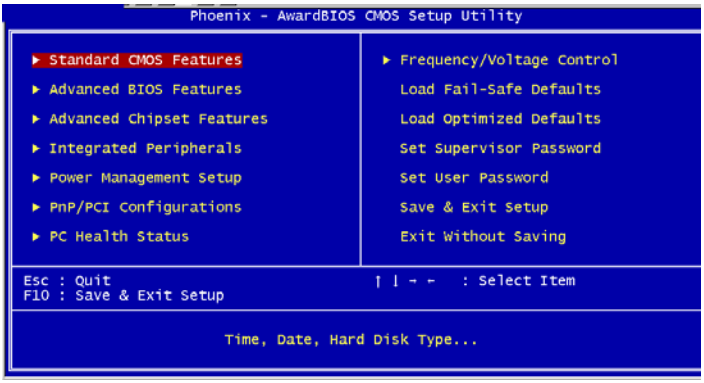
The EMB-830 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

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 EMB-830 comes with a CD-ROM which contains most of drivers and utilities of your needs.

There are several installation ways depending on the driver package under different Operating System application.

If you utilize Windows NT series OS, you are strongly recommended to download the latest version Windows NT Service Pack from Microsoft website and install it before installing any driver.

Please follow the sequence below to install the drivers:

Step 1 – Install Intel INF Driver

Step 2 – Install Intel VGA Driver

Step 3 – Install Intel Application Accelerator Driver

Step 4 – Install Intel LAN Driver

Step 5 – Install Realtek Audio Driver

Step 6 – Install ITE 8874 IO 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/.

4.1 Installation:

Insert the EMB-830 CD-ROM into the CD-ROM drive and install the drivers from Step 1 to Step 6 in order.

Step 1 – Install Intel INF Driver

1. Click on the ***Step 1 – Intel Inf Driver*** folder
2. Double click on the ***infinst_autol*** file
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 2 – Install Intel VGA Driver

1. Click on the ***Step 2 – Intel VGA Driver*** folder
2. Choose the OS your system is
3. Click on the ***WIN2K_XP*** file and double click on ***win2k_xp14103*** to install
4. Follow the instructions that the window shows
5. The system will help you install the driver automatically

Step 3 – Install Intel IAA Driver

1. Click on the ***Step 3 – Intel IAA Driver*** folder
2. Double click on the ***Setup*** file
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 4 – Install Intel LAN Driver

1. Click on the ***Step 4 – Intel LAN Driver*** folder
2. Choose the OS your system is
3. Click on the ***Win2000_XP*** file and double click on ***pro2kxp*** to install
4. Follow the instructions that the window shows
5. The system will help you install the driver automatically

Step 5 – Install Realtek Audio Driver

1. Click on the ***Step 5 – Realtek Audio Driver*** folder
2. Choose the OS your system is
3. Click on the ***Win9x_2K*** file and double click on ***WDM_A384*** to install
4. Follow the instructions that the window shows
5. The system will help you install the driver automatically

Step 6 – Install ITE 8874 IO Driver

1. Click on the ***Step 6 – ITE 8874 IO Driver*** folder
2. Choose the OS your system is
3. Click on the ***Win9x*** file and double click on ***SETUP*** to install
4. Follow the instructions that the window shows
5. The system will help you install the driver automatically

Note: if your OS is Windows 2000/XP, please refer to the file of " **IT 887x Device Driver Installation Guide for WinXP and Win2000**" in the path of "**Drivers\Step 6- ITE 8874 IO Driver\WIN2K_XP**."

Appendix

A

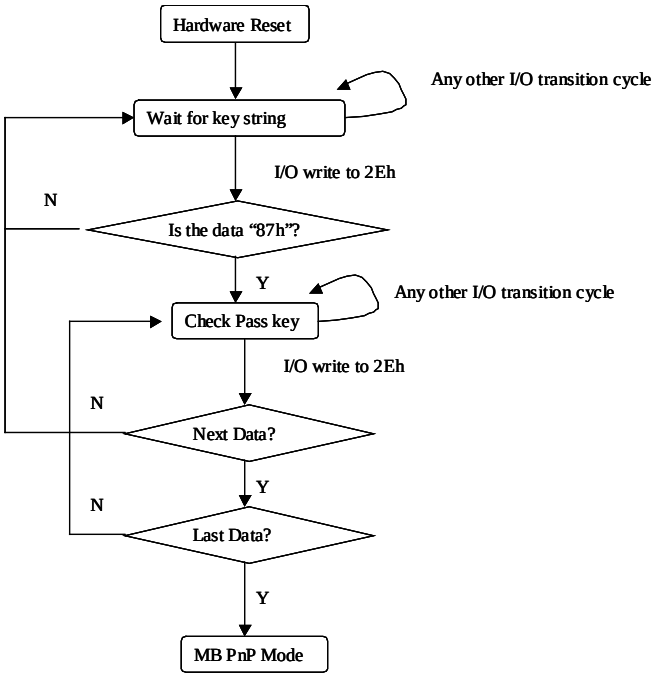
Programming the Watchdog Timer

A.1 Watchdog timer of EMB-830

EMB-830 utilizes ITE 8712 chipset as its watchdog timer controller. 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.

A.2 Configuring sequence description

After the hardware reset or power-on reset, the ITE 8712 enters the normal mode with all logical devices disabled except KBC. The initial state (enable bit) of this logical device (KBC) is determined by the state of pin 121 (DTR1#) at the falling edge of the system reset during power-on reset.



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	Configure 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 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	WDT is reset upon a read or a write to the Game Port base address
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
5-4	Reserved
3-0	Select the interrupt level[Note] for WDT

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

Bit	Description
7-0	WDT Time-out value 7-0

A.3 ITE8712 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
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

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03h: IRQ3

02h: not valid

01h: IRQ1

00h: no interrupt selected