

**EMB-852T**

Intel® Pentium® M/Celeron® M CPU

DVI/LVDS Display

6 Channel Audio & TV-out

CFD/ Mini PCI/PCMCIA Slots

Touch Screen Controller (Optional)

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## Packing List

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

- 1 40-pin IDE Cable
- 1 44-pin IDE Cable
- 3 COM Port Cable (For model with touch controller)
- 2 COM Port Cable + 1 Dual-COM Port Cable  
(For model without touch controller)
- 1 Audio Cable
- 1 USB Cable
- 1 DVI Cable
- 1 TV-out Cable
- 1 CFD Cover (For model with CFD slot)
- 1 Jumper Cap
- 1 Quick Installation Guide
- 1 CD-ROM for manual (in PDF format) and drivers
- 1 EMB-852T

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

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The EMB-852T is AAEON's first Mini-ITX CPU module. It adopts the Intel® 852GM + ICH4 + ICP ULV 600MHz platform to provide a high performance and low power solution. By the way, the ULV Celeron 600MHz processor uses just 7W power consumption and in combination with the 852GM it can be applied with high efficiency and in many different applications. With one DIMM slot, up to 1GB of DDR memory module can be configured.

The embedded VGA controller has shared memory up to 64MB with DVMT. LCD support permits the use of Dual LVDS 18/24/36/48bit panels. CRT, TV-out, LVDS and TTL LCD panel interfaces are available to support our customers' applications.

The Realtek® ALC650 has a six channel, full duplex AC97 2.2 compatible stereo audio CODEC enabling a rich audio experience for PC multimedia systems. S/PDIF audio input and output are available to ensure the best audio transmission quality between other consumer devices such as DVD players, home theater etc.

Its Mini PCI and PCMCIA slots provide the best expansion capability. To meet the requirement of POS/KIOSK applications, it is equipped with an onboard touch screen controller to support 4/5/8 wire resistive touch screens and 5 COM ports for multiple device connection demands.

## 1.2 Features

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- Intel 852GM+ICH4, supports Intel® Pentium® M / Celeron® M Processor, Fanless design with Celeron M 600MHz
- One DIMM slot supports DDR memory up to 1GB
- Integrated Graphic supports Dual LVDS 18/24/36/48 bit panels, shared memory up to 64MB with DVMT
- One 10/100Mbps Ethernet and 6 Channel AC97 audio CODEC
- Supports 2-slot Type I/II PCMCIA (Cardbus)
- Supports 4/5/8-wire Resistive Touch Screen Panel
- 1 PCI slot and 1 Mini PCI socket
- Supports NTSC and PAL standard TV output
- +5V only operation
- PS/2 KB and MS,  
Serial port x 6 (ACPI Mode) or x 4 (APM Mode),  
Parallel Port x 1,  
ATA100 x 1, ATA33 x 1  
USB2.0 x 4,  
Digital I/O

## 1.3 Specifications

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### System

- CPU: Support Pentium<sup>®</sup>M/ Celeron<sup>®</sup>M processor, up to 2.1GHz or onboard ULV/LV Pentium<sup>®</sup>M/ Celeron<sup>®</sup>M processor
- Memory: Max. 1GB (DDR266)
- Chipset: Intel<sup>®</sup> 852GM + ICH4
- I/O Chipset: ITE 8712+Fintek F81216
- Ethernet: Realtek RTL 8100C, 10/100Base-TX; RTL 8110S, 1000Base-TX (Optional)
- BIOS: AWARD 512KB FLASH ROM
- Watchdog Timer: Generates a time-out system reset
- H/W Status Monitoring:  
Supports power supply voltages, fan speed and temperature monitoring
- SSD: Type II CompactFlash<sup>™</sup> slot x 1 (Specific model)
- Expansion Interface:  
PCI slot x1, Mini PCI x 1, PCMCIA (Specific model)
- Battery: Lithium battery
- Power Requirement: +5V, AT/ATX

- Board Size: 6.7”(L) x 6.7”(W) (170mm x 170mm)
- Gross Weight: 1.1lb (0.5kg)
- Operating Temperature: 32°F~140°F (0°C~60°C)

## Display

- Chipset Intel® 852GM
- Memory size: Shared memory up to 64MB with DVMT
- Resolutions: Up to 1280 X 1024
- LCD Interface: Up to 48-bit dual channel LVDS, DVI
- TV-Out: Composite / S-Video

## I/O

- MIO: UDMA100 x 1, UDMA33 x 1, FDD x 1, PS/2 Keyboard/Mouse x 1, RS-232 x 5, (RS-232 x 4 while adding touchscreen controller) RS-232/422/485 x 1, Parallel x 1
- IrDA: One IrDA Tx/Rx header
- Audio: 6CH AC97 CODEC
- USB: One Type-A (dual) connector supports 2 USB 2.0 ports (External)  
One 5 x 2 pin header supports 2 USB 2.0 ports (Internal)

- Digital I/O Supports up to 8 in and 8 out

**Note:** For model with touch controller, one RS-232 port is allocated by touch controller

## 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.*



## 2.1 Safety Precautions

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**Warning!**

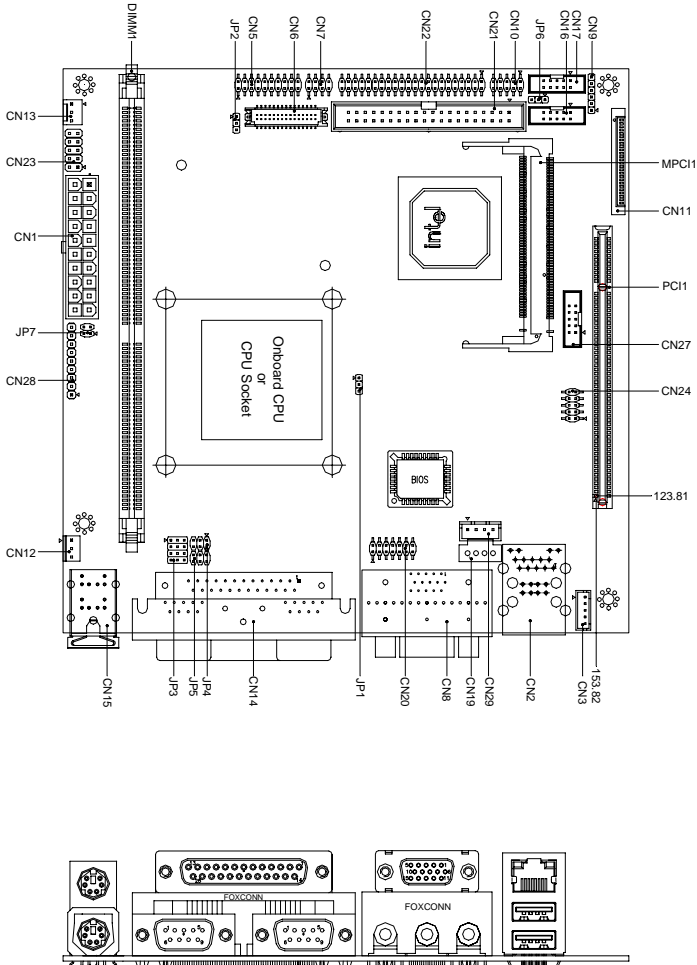
*Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.*

**Caution!**

*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

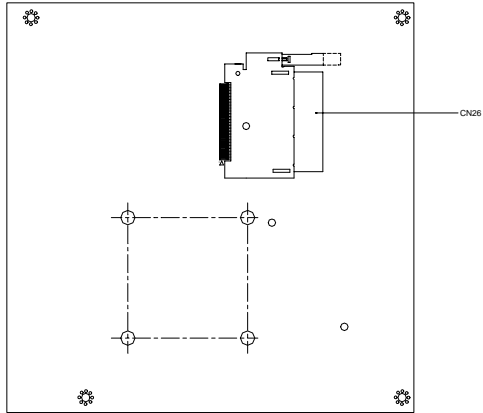
### Component Side



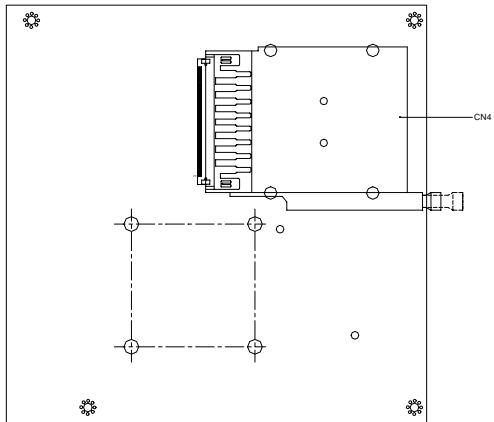


Solder Side

CFD

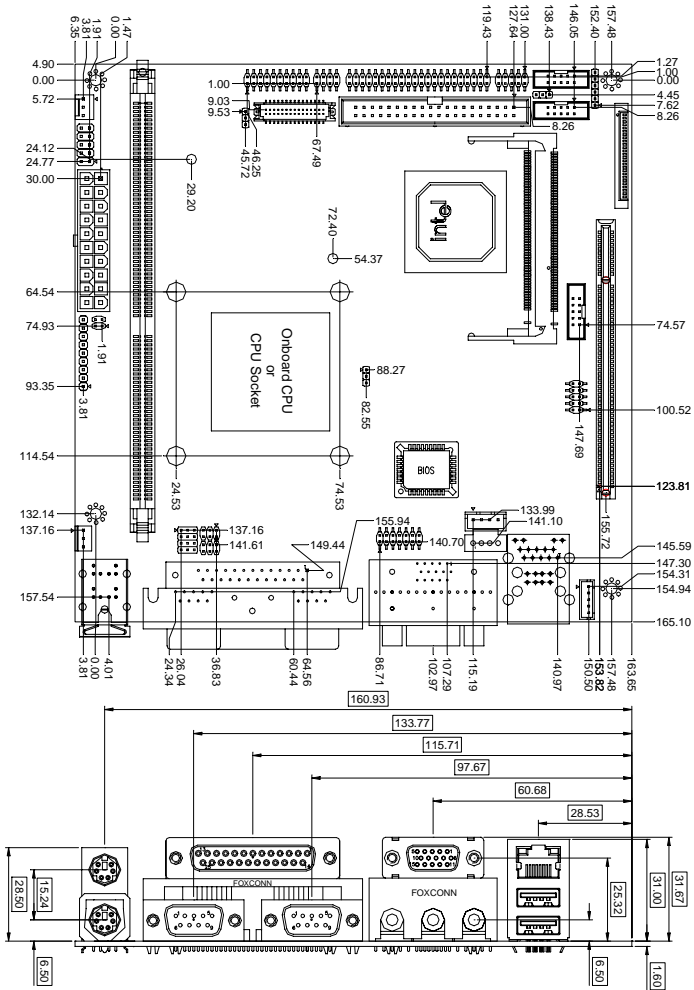


PCMCIA



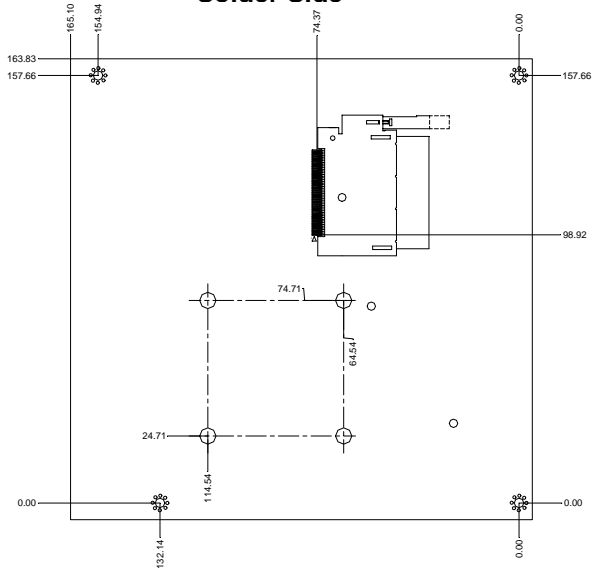
## 2.3 Mechanical Drawing

### Component Side

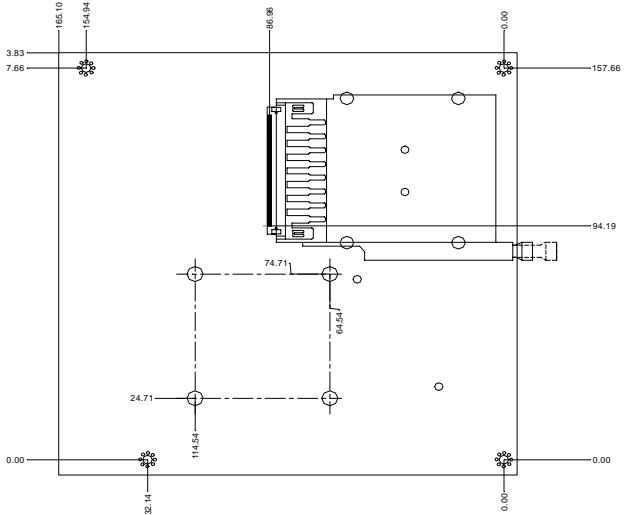


CFD

Solder Side



PCMCIA



## 2.4 List of Jumpers

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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	LVDS voltage selection
JP3	COM2 RS232/422/485 mode selection – 1
JP4	COM2 RS232/422/485 mode selection – 2
JP5	COM2 Ring/+5V/+12V selection
JP6	APM/ ACPI selection
JP7	Touch panel selection (For model with touch panel controller)

## 2.5 List of Connectors

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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:

### Connectors

Label	Function
CN1	ATX power connector
CN2	LAN+USB connector (USB1, USB2)
CN3	LAN Wake up connector
CN4	Card Bus connector
CN5	DVI connector

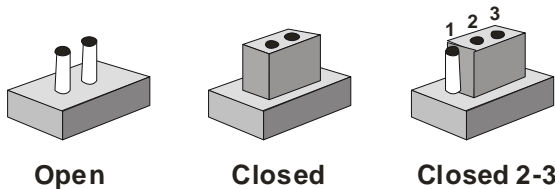
CN6	LVDS connector
CN7	TV OUT connector
CN8	CRT+AUDIO connector
CN9	SIR connector
CN10	Digital I/O connector
CN11	Floppy drive connector
CN12	FAN connector
CN13	FAN connector
CN14	COM1+COM2+Printer port connector
CN15	PS2 KB+MS connector
CN16	RS-232 serial port connector ( COM3 )
CN17	RS-232 serial port connector ( COM4 )
CN19	CD-ROM audio input connector
CN20	Audio 5.1 channel connector
CN21	PRIMARY IDE connector
CN22	Secondary IDE connector
CN23	Front panel connector
CN24	USB connector(USB3, USB4)
CN26	CompactFlash connector
CN27	RS-232 serial port connector (COM5/ COM6, or COM5 only while adding touchscreen controller)
CN28	Touch panel connector (For model with touch panel controller)
CN29	Line-out connector

MPC11	MINI PCI slot
PCI1	PCI slot
DIMM1	DDR DIMM 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.



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)

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

## 2.8 TFT LCD Clock Selection (JP2)

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JP2	Function
1-2	+5V
2-3	+3.3V (Default)

## 2.9 COM 2 RS-232/422/485 Selection (JP3 & JP4)

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JP3	JP4	Function
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

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

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

## 2.11 APM/ ACPI Selection (JP6)

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JP6	Function
1-2	ACPI
2-3	APM

## 2.12 Touch Panel Selection (JP7)

JP7	4/8 WIRE	5 WIRE (Default)
1-2	OPEN	CLOSED
3-4	CLOSED	OPEN

## 2.13 ATX Power Connector (CN1)

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

## 2.14 LAN Wake up Connector (CN3)

Pin	Signal
1	+5VSB
2	GND
3	PME/RING
4	SMBDATA
5	SMBCLK



## 2.15 DVI Connector (CN5)

Pin	Signal	Pin	Signal
1	TDC1	2	TDC1#
3	GND	4	GND
5	TLC	6	TLC#
7	GND	8	+5V
9	HPDET	10	+5V
11	TDC2	12	TDC2#
13	GND	14	GND
15	TDC0	16	TDC0#
17	NC	18	NC
19	SMBDT	20	SMBCK

## 2.16 LVDS Connector (CN6)

Pin	Signal	Pin	Signal
1	BACKLIGHT ENABLE	2	BACKLIGHT CONTROL
3	PPVCC	4	GND
5	#LCLK	6	LCLK
7	PPVCC	8	GND
9	#LDATA0	10	LDATA0
11	#LDATA1	12	LDATA1
13	#LDATA2	14	LDATA2
15	#LDATA3	16	LDATA3
17	SMBDATA	18	SMBCLK
19	#UDATA0	20	UDATA0
21	#UDATA1	22	UDATA1
23	#UDATA2	24	UDATA2

25	#UDATA3	26	UDATA3
27	PPVCC	28	GND
29	#UCLK	30	UCLK

### 2.17 TV Out Connector (CN7)

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

### 2.18 SIR Connector (CN9)

Pin	Signal
1	+5V
2	NC
3	IRRX
4	GND
5	IRTX
6	NC

### 2.19 Digital I/O Connector (CN10) Address=801H

Pin	Signal	Pin	Signal
1	IN0	2	IN1
3	IN2	4	IN3
5	OUT0	6	OUT1

7	OUT2	8	OUT3
9	+5V	10	GND

## 2.20 Floppy Connector (CN11)

Pin	Signal	Pin	Signal
1	+5V	2	#INDEX
3	+5V	4	#DRIVE SELECT A
5	+5V	6	#DISK CHANGE
7	NC	8	NC
9	NC	10	#MOTOR A
11	NC	12	#DIR
13	DENSEL#	14	#STEP
15	GND	16	#WRITE DATA
17	GND	18	#WRITE GATE
19	GND	20	#TRACK0
21	GND	22	#WRITE PROTECT
23	GND	24	#READ DATA
25	GND	26	#HDSEL

## 2.21 FAN Connector (CN12 & CN13)

Pin	Signal
1	GND
2	+5V/+12V (Optional)
3	Speed Sense

## 2.22 RS-232 Serial Port Connector (CN16 & CN17)

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

## 2.23 CD-IN Connector (CN19)

Pin	Signal
1	CD_L
2	CD_GND
3	CD_GND
4	CD_R

## 2.24 Audio 5.1 Channel Connector (CN20)

Pin	Signal	Pin	Signal
1	Front out R	2	Audio GND
3	Front out L	4	Audio GND
5	Surround out R	6	Audio GND
7	Surround out L	8	Audio GND
9	Low Frequency Effect out	10	Audio GND
11	Center out	12	Audio GND
13	S/PDIF out	14	S/PDIF in

## 2.25 Primary IDE Hard Drive Connector (CN21)

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	NC
21	REQ	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO READY	28	GND
29	DACK	30	GND
31	IRQ	32	NC
33	ADDR1	34	UDMA DETECT
35	ADDR0	36	ADDR2
37	CS#1	38	CS#3
39	LED	40	GND

## 2.26 Secondary IDE Hard Drive Connector (CN22)

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	NC
21	REQ	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO READY	28	GND
29	DACK	30	GND
31	IRQ	32	NC
33	ADDR1	34	UDMA DETECT
35	ADDR0	36	ADDR2
37	CS#1	38	CS#3
39	LED	40	GND
41	NC	42	+5V
43	NC	44	GND

## 2.27 Front Panel (CN23)

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

## 2.28 USB Connector (CN24)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USB D2-	4	GND
5	USB D2+	6	USB D3+
7	GND	8	USB D3-
9	GND	10	+5V

## 2.29 CompactFlash™ Disk Connector (CN26)

Pin	Signal	Pin	Signal
1	GND	26	GND
2	SDD3	27	SDD11
3	SDD4	28	SDD12
4	SDD5	29	SDD13
5	SDD6	30	SDD14
6	SDD7	31	SDD15
7	SDCS#1	32	SDCS#3

8	GND	33	GND
9	GND	34	SDIOR#
10	GND	35	SDIOW#
11	GND	36	+5V
12	GND	37	IRQ15
13	+5V	38	+5V
14	GND	39	CSEL#
15	GND	40	NC
16	GND	41	SEC_IDERST#
17	GND	42	SIORDY
18	SDA2	43	NC
19	SDA1	44	+5V
20	SDA0	45	DASP#
21	SDD0	46	PDIAG#
22	SDD1	47	SDD8
23	SDD2	48	SDD9
24	NC	49	SDD10
25	GND	50	GND

### 2.30 RS-232 Serial Port Connector (CN27)

#### COM6 (Remove while adding touchscreen controller)

Pin	Signal	Pin	Signal
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR



7	RTS	8	CTS
9	RI	10	NC

**COM5**

Pin	Signal	Pin	Signal
11	DCD	12	RXD
13	TXD	14	DTR
15	GND	16	DSR
17	RTS	18	CTS
19	RI	20	NC

**2.31 Touch Panel Connector (CN28)**

Pin	8 WIRE	4 WIRE	5 WIRE
1	Right Sense	N.C.	N.C.
2	Left Sense	N.C.	N.C.
3	Bottom Sense	N.C.	N.C.
4	Top Sense	N.C.	Senses
5	Top Excite	Top	UL (Y)
6	Left Excite	Left	LL (L)
7	Bottom Excite	Bottom	UR (H)
8	Right Excite	Right	LR (X)
9	GND	GND	GND

### 2.32 Line-Out Connector (CN29)

---

Pin	Signal
1	LINE OUT-L
2	Audio GND
3	Audio GND
4	LINEOUT-R

## Below Table for China RoHS Requirements

产品中有毒有害物质或元素名称及含量

## AAEON Main Board/ Daughter Board/ Backplane

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	×	○	○	○	○	○
<p><b>O:</b> 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。</p> <p><b>X:</b> 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。</p> <p>备注: 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。</p>						

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-852T 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-852T 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 Intel INF Update for Windows 9x-2003

Step 2 – Install Intel Extreme Graphics 2 Driver

Step 3 – Install Realtek LAN Driver

Step 4 – Install Realtek AC97 codec Driver

Step 5 – Install Touch Panel Driver (Optional)

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

Please read instructions below for further detailed installations.

## 4.1 Installation:

---

Insert the EMB-852T CD-ROM into the CD-ROM drive. And install the drivers from Step 1 to Step 4 in order (Step 5 is optional).

Step 1 – Install Intel INF Update for Windows 9x-2003

1. Click on the **Step 1 - Intel INF Update for Windows 9x-2003** 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

Step 2 – Install Intel Extreme Graphics 2 Driver

1. Click on the **Step 2- Intel Extreme Graphics 2 Driver** folder and select an appropriate OS your system is
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

Remark: You can choose the different display ways by pressing below hot key,

C+A+F1=CRT, C+A+F2=LCD, C+A+F3=TV, C+A+F4=DVI,  
C+A+F12=Graphic Control Panel

Step 3 – Install LAN Driver

1. Click on the **Step 3-LAN Driver** folder and select the

*rtl8110s* folder

2. Double click on **setup.exe**
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 4 – Install Realtek AC97 Codec Driver

1. Click on the **Step 4 - Realtek AC Codec Driver** folder and then double click on the **wdm\_a361.exe**
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 5 – Install Touch Panel Driver (Optional)

1. Click on the **Touch Panel** folder and select an appropriate OS your system is
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

**Note:**

Under the Window OS environment, if the CRT connector is connected to display monitor by the data switch device, the user need to set the color and resolution from Intel Graphic utility (VGA driver) instead of setting from the control panel in case of the wrong display appearance.

Appendix

**A**

# Programming the Watchdog Timer

## A.1 Programming

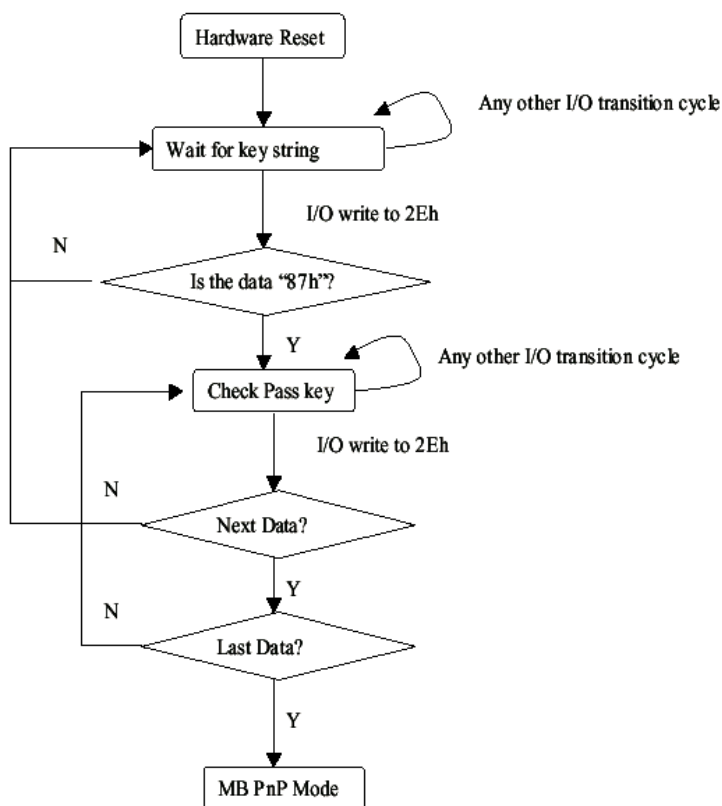
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EMB-852T utilizes ITE 8712 chipset as its watchdog timer controller.

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.

### **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 MBPnP 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**

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 reached 0.
	2: 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 <sup>Note</sup> for WDT

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

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

## A.2 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
```

```
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	Description	User Address
000-01F	DMA Controller #1	000-000F
020-03F	Interrupt Controller #1, Master	020-021
040-05F	System Timer	040-043
060-06F	8042 (Keyboard Controller)	060-064
070-07F	Real time Clock, NMI (non-maskable Interrupt) Mask	070-073
080-09F	DMA Page Register	080-08F
0A0-0BF	Interrupt Controller #2	0A0-0A1
0C0-0DF	DMA Controller #2	0C0-0DF
0F0-0FF	Math Coprocessor	0F0-0FF
170-177	Secondary IDE Channel	170-177
1F0-1F7	Primary IDE Channel	1F0-1F7
2E8-2EF	Serial Port 4	2E8-2EF
2F8-2FF	Serial Port 2	2F8-2FF
378-37F	Parallel Printer Port 1	378-37F
3B0-3DF	EGA / VGA card	3B0-3DF
3E8-3EF	Serial Port 3	3E8-3EF
3F0-3F7	Floppy Drive interface	3F0-3F7
3F8-3FF	Serial Port 1	3F8-3FF
4E8-4EF	Serial Port 6 / Touch Panel	4E8-4EF
4F8-4FF	Serial Port 5	4F8-4FF

## B.2 1<sup>st</sup> MB Memory Address Map

Memory Address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
C0000-CFFFF	VGA BIOS
E0000-FFFFFF	System BIOS

### B.3 IRQ Mapping Chart

IRQ0	System Timer	IRQ8	System CMOS / Real time clock
IRQ1	Keyboard	IRQ9	Microsoft ACPI – Compliant system
IRQ2	Cascade to IRQ Controller#2	IRQ10/11*	COM3 to COM6/Touch Panel
IRQ3	COM2	IRQ12	PS/2 mouse
IRQ4	COM1	IRQ13	FPU
IRQ5	Unused	IRQ14	Primary IDE
IRQ6	Floppy	IRQ15	Secondary IDE
IRQ7	Printer		

Note: In ACPI mode, COM3 to COM6 can be all enabled and allocated to one IRQ (IRQ10 or IRQ11). In APM mode, only two COMs among COM3 to COM6 can be enabled and allocated to IRQ10 and IRQ11.

### B.4 DMA Channel Assignments

DMA Channel	Function
0	Available
1	Available
2	Floppy device
3	Available
4	Direct Memory Access Controller
5	Available
6	Available
7	Available

Appendix

C

# Processor and Cooler Installation Guide

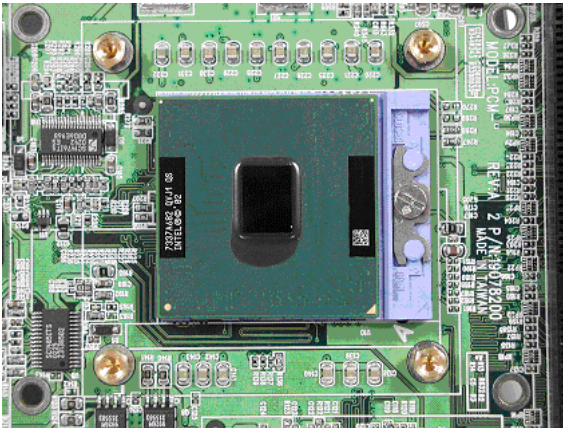
## C.1 How to install the Processor and cooler

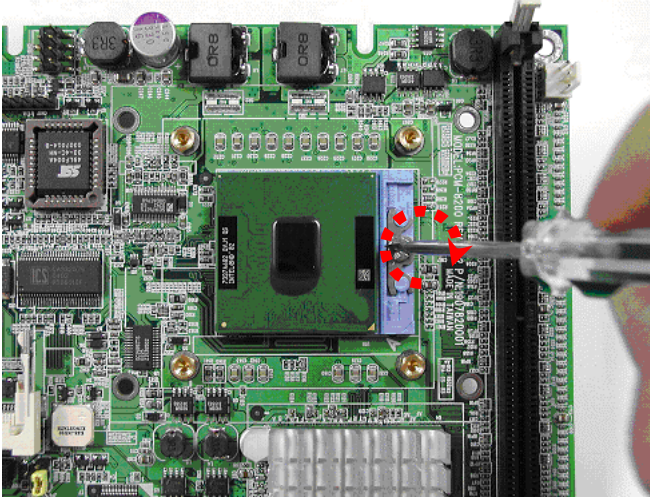
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EMB-852T provides a CPU cooler for socket type processor in the package. We will instruct you how to install socket type processor and cooler as follows.

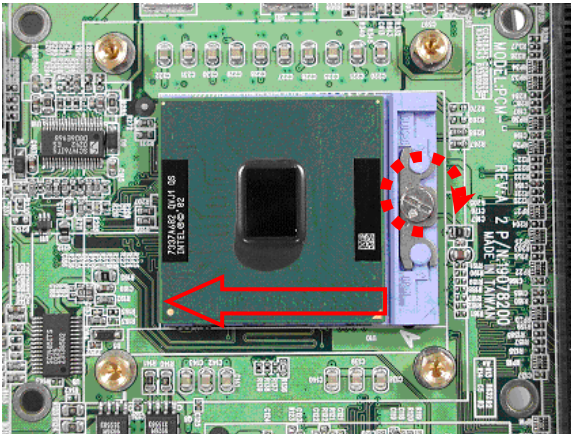
We have already installed the cooler for the onboard processor before shipping to the customers.

### Step 1: Put the processor on the socket



**Step 2: Turn the screw clockwise with a screwdriver**

When you turn the screw clockwise, the socket will move to left and lock the processor.



**Step 3: Put the cooler right above the CPU and align the four screws to the four copper stands. Turn the four screws clockwise to lock the cooler.**



Note: when you are locking the cooler, please fasten the four screws with the equal strength to prevent the processor from damage.

**Step 4: Connect the power cable of the cooler to the fan connector on CPU board.**