

EMB-LN9T

Intel® Atom™ N450/D510 Processor

Mini-ITX

Realtek 8111C/ 8102E Ethernet

8 USB2.0, 6 COM, 1 Parallel

1 PCI, 1 Mini PCI, 1 Mini Card

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Packing List

(Standard, not bulk pack)

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

- 1 9657666600 Jumper Cap
- 1 1709070500 Serial ATA Cable
- 1 1702151200 Onboard Serial ATA Power Cable
- 1 M209459000 Metal I/O Bracket
- 1 Quick Installation Guide
- 1 Utility CD
- 1 EMB-LN9T

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

The EMB-LN9T supports Intel® Atom™ N450/D510 processor which when paired with the Intel® ICH8M chipset offers a high performance computing platform with low power consumption. This new product supports two 200-pin DDR2 SODIMM at speeds of 667/800, up to 4GB. One CompactFlash™ and two SATA interfaces provide ample storages. With dual Gigabit Ethernet, six COM ports, eight USB2.0, and one parallel port, the EMB-LN9T meets the requirements of today's demanding applications.

Display requirements are met with an abundance of interfaces such as CRT, 18-bit single channel LVDS or 24-bit single channel LVDS or DVI. Simultaneous / Dual View are available in LCD/CRT, CRT/DVI configurations. Display memory is shared from the system memory up to 384MB/ DVMT4.0.

With all of its integrated features, the EMB-LN9T strikes a balance of performance and price. This versatile product targets Industrial Automation, Entertainment, Networking, KIOSK/POS, Transportation, Banking, Healthcare and Digital Signage applications that require high performance and high reliability.

1.2 Features

- Onboard Intel® Atom™ N450/D510 Processor (Fanless with N450)
- Intel® ICH8M
- DDR2 667/800 SODIMM x 2, Max. 4GB
- Gigabit Ethernet x 2 or 10/100Base-TX x 2
- VGA, 18-bit Single Channel LVDS or Optional 24-bit Single Channel LVDS or Optional DVI
- SATA x 2, CompactFlash™ x 1
- USB2.0 x 8, COM x 6, LPT x 1
- PCI x 1, Mini-PCI x 1, Mini Card x 1
- DC 12V Input with PS-ON Power Type
- Optional: TPM, Extra COM x 4, Amplifier Speaker Out, SPDIF

1.3 Specifications

System

- Processor Onboard Intel[®] Atom[™] N450/D510 Processor (Fanless with N450)
 - System Memory 200-pin DDR2 SODIMM x 2, DDR2 667/800, Max. 4GB
 - Chipset Intel[®] ICH8M
 - I/O Chipset Winbond W83627UHG
 - Ethernet Realtek 8111C for 10/100/1000Base-TX, RJ-45 x 2; or Realtek 8102E for 10/100Base-TX, RJ-45 x 2
 - BIOS AMI Plug & Play SPI BIOS – 4MB ROM
 - Wake On LAN Yes
 - Watchdog Timer Generates a time-out system reset
 - H/W Status Monitoring Supports power supply voltages and temperature monitoring
 - Expansion Interface PCI x 1, Mini PCI x 1, Mini Card x 1
 - Battery Lithium battery
 - Power Requirement DC 12V input with PS-ON Power Type
 - Board Size 6.7”(L) x 6.7”(W) (170 mm x 170 mm)
 - Gross Weight 1.2 lb (0.5 Kg)
 - Operating Temperature 32°F~ 140°F (0°C ~ 60°C)
 - Storage Temperature -40°F~ 176°F (-40°C ~ 80°C)
-

- Operating Humidity 0%~90% relative humidity, non-condensing

Display: Supports CRT/LCD, CRT/DVI simultaneous / dual view displays

- Chipset Intel[®] N450/D510 integrated, integrates hardware MPEG2 decoder
- Memory Shared system memory up to 384MB w/ DVMT4.0
- Resolution Up to 2048x1536 (QXGA) @ 60 Hz for CRT (D510);
Up to 1400x1050 (SXGA) @ 60 Hz for CRT (N450);
Up to 1366x768 or 1280x800 (WXGA) for LCD
- LCD Interface 18-bit single channel LVDS or optional 24-bit single channel LVDS
- DVI Optional (needs to disable LVDS function)

I/O

- Storage SATA x 2, Type II CompactFlash x 1
- Serial Port RS-232 x 5, RS-232/422/485 x 1, optional extra RS-232 x 4
- Audio MIC-In, Line-in (optional: Amplifier speaker-out, line-out SPDIF)
- USB USB 2.0 x 8
- Parallel Port Supports SPP/ EPP/ ECP mode
- PS/2 Port Keyboard+Mouse x1

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

Warning!

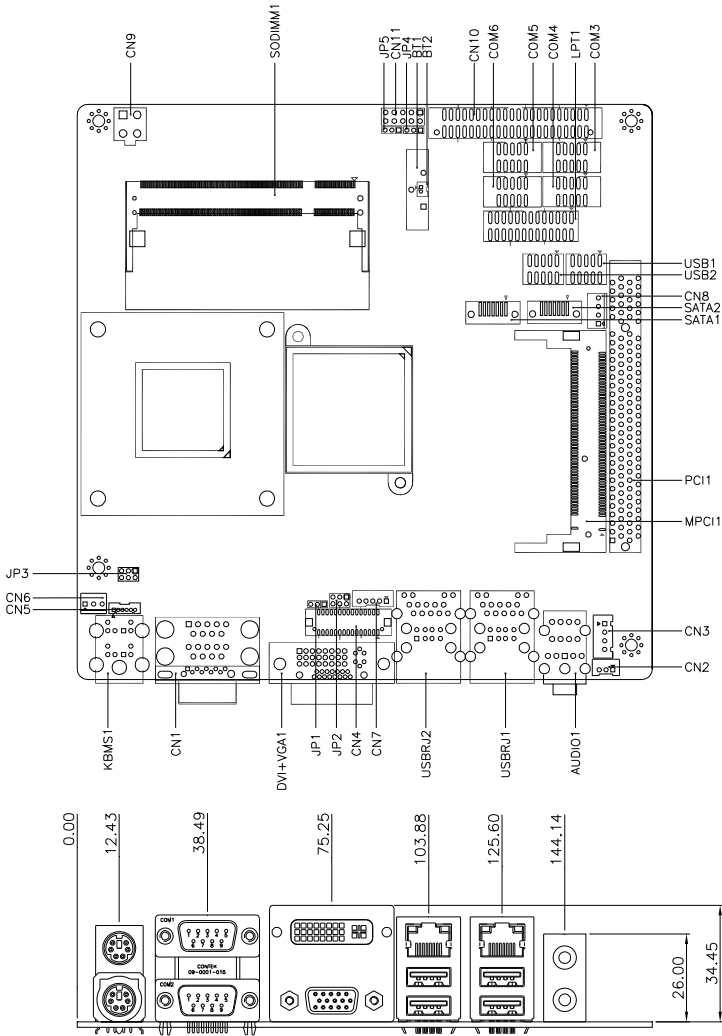
Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

Caution!

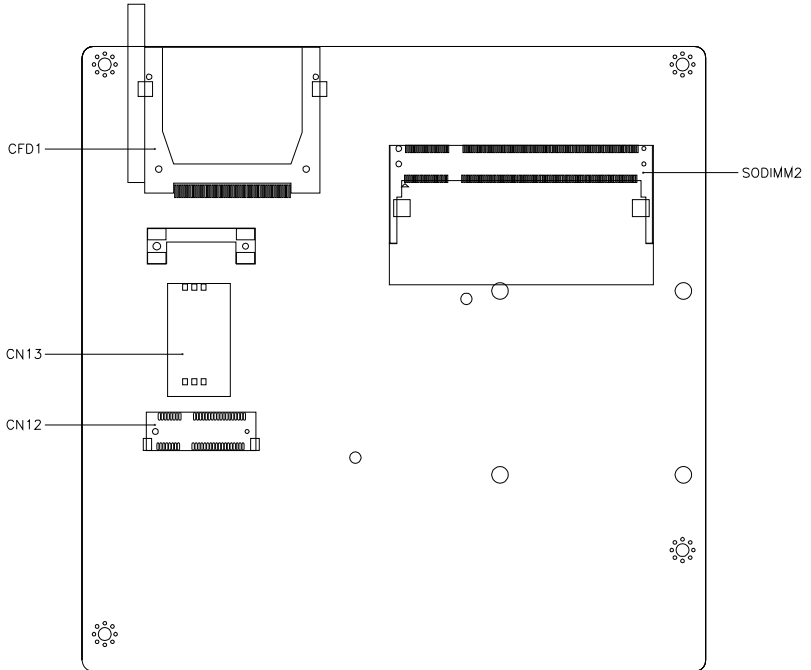
Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not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

2.2 Location of Connectors and Jumpers

Component Side

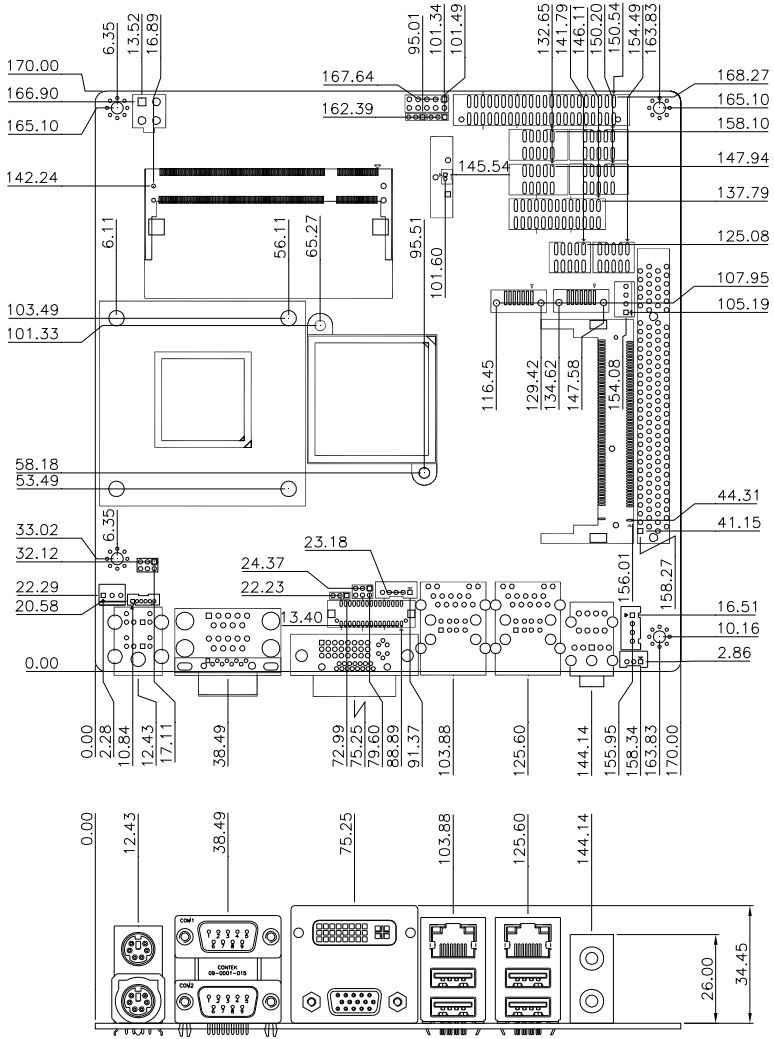


Solder Side

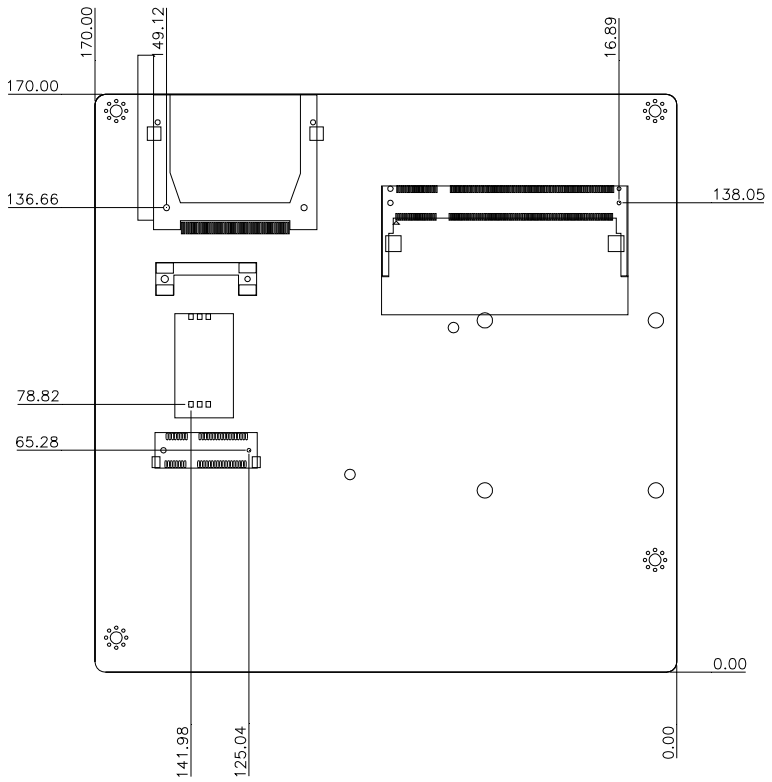


2.3 Mechanical Drawing

Component Side



Solder Side



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:

Label	Function
JP1	LCD Voltage Selection
JP2	LCD Backlight Control Selection
JP3	COM2 Ring/+5V/+12V Selection
JP4	AT/ATX function Selection
JP5	Clear CMOS

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:

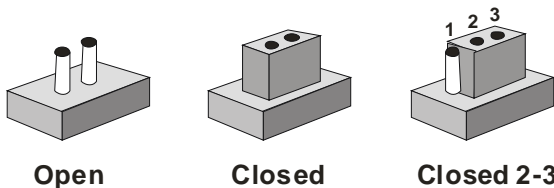
Label	Function
CN1 (Optional)	COM2 RS-232/422/485 Serial Port Connector
CN2	SPDIF Connector
CN3	Internal Audio 2 Channel Connector
CN4	LVDS Connector
CN5	Internal PS2 Keyboard/Mouse Connector
CN6	FAN Connector
CN7	LVDS backlight Connector
CN8	SATA Power Connector
CN9	ATX 4P Power Connector
CN10	COM7~10 RS-232 Serial Port Connector

CN11	Front Panel Connector
CN12	Mini Card Connector
CN13	SIM Socket
KBMS1	PS2 Keyboard/Mouse Connector
COM1	COM1 RS-232 & COM2 RS-232/422/485 Serial Port Connector
COM3	COM3 RS-232 Serial Port Connector
COM4	COM4 RS-232 Serial Port Connector
COM5	COM5 RS-232 Serial Port Connector
COM6	COM6 RS-232 Serial Port Connector
DVI+VGA1	VGA and DVI display Connector
USBRJ1	USB Connector & 1000Base-TX Ethernet Connector
USBRJ2	USB Connector & 1000Base-TX Ethernet Connector
AUDIO1	Audio 2 Channel Connector
USB1	USB Port Connector
USB2	USB Port Connector
LPT1	LPT Port Connector
SATA1	Primary Serial ATA Connector
SATA2	Secondary Serial ATA Connector
MPC11	Mini PCI Slot
PCI1	PCI Slot
SODIMM1	SODIMM Slot
SODIMM2	SODIMM Slot
CFD1	CompactFlash Slot

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 LCD Voltage Selection (JP1)

JP1	Function
1-2	+5V
2-3	+3.3V (Default)

2.8 LCD Backlight Control Selection (JP2)

Backlight Control

JP2	Function
1-3	Chips control
3-5	SMBus control (Default)

Backlight Voltage

JP2	Function
2-4	+5V
4-6	+12V (Default)

2.9 COM2 Ring/+5V/+12V Selection (JP3)

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

2.10 AT/ATX Power Mode Selection (JP4)

JP4	Function
1-2	ATX (Default)
2-3	AT

2.11 Clear CMOS (JP5)

JP5	Function
1-2	Protected (Default)
2-3	Clear

2.12 SPDIF Connector (CN2)

Pin	Signal
1	SPDIF-OUT
2	GND
3	SPDIF-IN

2.13 Internal Audio 2 Channel Connector (CN3)

Pin	Signal
1	SPEAK-OUT R+
2	SPEAK-OUT R-
3	SPEAK-OUT L+
4	SPEAK-OUT L-

2.14 LVDS Connector (CN4)

Pin	Signal	Pin	Signal
1	LVDS_BKLEN	2	LVDS_BKLCTL
3	PPVCC	4	GND
5	LVDS_TXLCLK#	6	LVDS_TXLCLK
7	PPVCC	8	GND
9	LVDS_TXL0#	10	LVDS_TXL0
11	LVDS_TXL1#	12	LVDS_TXL1
13	LVDS_TXL2#	14	LVDS_TXL2
15	LVDS_TXL3#	16	LVDS_TXL3
17	LVDS_DDCPDATA	18	LVDS_DDCPCLK
19	N.C	20	N.C
21	N.C	22	N.C
23	N.C	24	N.C
25	N.C	26	N.C
27	PPVCC	28	GND

29	N.C	30	N.C
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Note: For VLCD (pin 3, 7, 27), the max. rating of each pin is 0.5A@5V.

2.15 Internal PS2 Keyboard and Mouse Connector (CN5)

Pin	Signal
1	KBDATA
2	KBCLK
3	GND
4	+5V
5	MSDATA
6	MSCLK

2.16 Fan Connector (CN6)

Pin	Signal
1	GND
2	Power control
3	Speed detection

2.17 LVDS Backlight Connector (CN7)

Pin	Signal
1	LVDS Voltage select
2	LVDS Backlight control
3	GND
4	GND
5	LVDS Backlight Enable

Note: The max. rating of Pin 1 is 0.5A @ 12V.

2.18 SATA Power Connector (CN8)

Pin	Signal
1	+12V

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2	GND
3	GND
4	+5V

Note: The max. rating of Pin1 is 1A @ 12V; the max. rating of Pin4 is 1A @ 5V.

2.19 ATX Power +12V Connector (CN9)

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

2.20 COM7~10 RS-232 Serial Port Connector (CN10)

Pin	Signal	Pin	Signal
1	DCD#7	2	DSR#7
3	RXD7	4	RTS#7
5	TXD7	6	CTS#7
7	DTR#7	8	RI#7
9	GND	10	N.C
11	DCD#8	12	DSR#8
13	RXD8	14	RTS#8
15	TXD8	16	CTS#8
17	DTR#8	18	RI#8
19	GND	20	N.C
21	DCD#9	22	DSR#9
23	RXD9	24	RTS#9
25	TXD9	26	CTS#9
27	DTR#9	28	RI#9
29	GND	30	N.C
31	DCD#10	32	DSR#10
33	RXD10	34	RTS#10

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35	TXD10	36	CTS#10
37	DTR#10	38	RI#10
39	GND	40	N.C
41	+5V	42	+5V
43	GND	44	N.C

2.21 Front Panel Connector (CN11)

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(+)

2.22 SIM Socket Connector (CN13)

Pin	Signal	Pin	Signal
1	UIM Power	6	UIM DATA
2	UIM RESET	5	UIM Vpp
3	UIM CLK	4	GND

2.23 RS-232 Serial Port Connector (COM3)

Pin	Signal	Pin	Signal
1	DCD#3	2	RXD3
3	TXD3	4	DTR#3
5	GND	6	DSR#3
7	RTS#3	8	CTS#3
9	RI#3	10	N.C

2.24 RS-232 Serial Port Connector (COM4)

Pin	Signal	Pin	Signal
1	DCD#4	2	RXD4
3	TXD4	4	DTR#4
5	GND	6	DSR#4
7	RTS#4	8	CTS#4
9	RI#4	10	N.C

2.25 RS-232 Serial Port Connector (COM5)

Pin	Signal	Pin	Signal
1	DCD#5	2	RXD5
3	TXD5	4	DTR#5
5	GND	6	DSR#5
7	RTS#5	8	CTS#5
9	RI#5	10	N.C

2.26 RS-232 Serial Port Connector (COM6)

Pin	Signal	Pin	Signal
1	DCD#6	2	RXD6
3	TXD6	4	DTR#6
5	GND	6	DSR#6
7	RTS#6	8	CTS#6
9	RI#6	10	N.C

2.27 USB Port Connector (USB1)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USBD4-	4	GND
5	USBD4+	6	USBD5+

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7	GND	8	USB D5-
9	GND	10	+5V

2.28 USB Port Connector (USB2)

Pin	Signal	Pin	Signal
1	+5V	2	GND
3	USB D6-	4	GND
5	USB D6+	6	USB D6+
7	GND	8	USB D6-
9	GND	10	+5V

2.29 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	N.C

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>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。</p> <p>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。</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

**AMI
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.

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-LN9T 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 AMI BIOS Setup

AMI 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 or <F2> immediately. This will allow you to enter Setup.

Main

Set the date, use tab to switch between date elements.

Advanced

Enable/disable boot option for legacy network devices.

Chipset

host bridge parameters.

Boot

Enables/disables quiet boot option.

Security

Set setup administrator password.

Save&Exit

Exit system setup after saving the changes.

Chapter

4

**Driver
Installation**

The EMB-LN9T 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 Chipset Driver

Step 2 – Install VGA Driver

Step 3 – Install Audio Device

Step 4 – Install LAN Driver

Step 5 – Install TPM Driver

Please read instructions below for further detailed installations.

4.1 Installation:

Insert the EMB-LN9T CD-ROM into the CD-ROM drive. And install the drivers from Step 1 to Step 5 in order.

Step 1 – Install Chipset Driver

1. Click on the **Step 1 - Chipset** folder and double click on the ***infinst_autol.exe*** file
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 - Intel Graphics Media Accelerator Driver** folder and select the OS folder your system is
2. Double click on the **Setup.exe** file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 –Install Audio Device

1. Click on the **Step 3 - Audio** folder and double click on the ***SETUP.exe*** file
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 folder your system is
2. Double click on the **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 TPM Driver

1. Click on the **Step 5 - TPM** 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

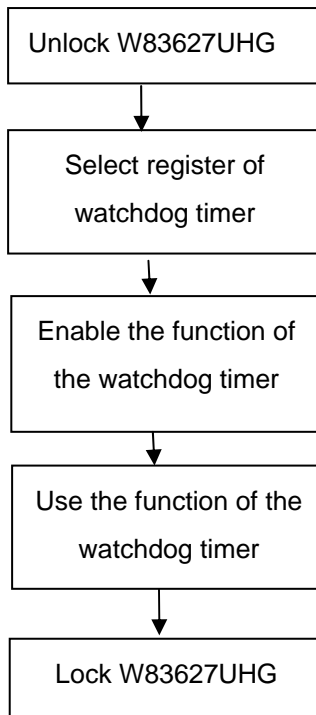
Programming the Watchdog Timer

A.1 Programming

EMB-LN9T utilizes W83627UHG 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



There are three steps to complete the configuration setup:

- (1) Enter the W83627UHG config Mode
- (2) Modify the data of configuration registers

- (3) Exit the W83627UHG config Mode. Undesired result may occur if the config Mode is not exited normally.

(1) Enter the W83627UHG config Mode

To enter the W83627UHG config Mode, two 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 two write operations to the Special Address port (2EH). The different enter keys are provided to select configuration ports (2EH/2Fh) of the next step.

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

(2) Modify the Data of the Registers

All configuration registers can be accessed after entering the config 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 W83627UHG config Mode

The exit key is provided to select configuration ports (2EH/2Fh) of the next step.

	Address Port	Data Port
0aah:	2Eh	2Fh

CR 30h. (Default 02h)

BIT	READ/WRITE	DESCRIPTION
7~3	Reserved.	
2	R/W	0: GPIO6 is inactive. 1: GPIO6 is active.

1	R/W	0: GPIO5 is inactive. 1: GPIO5 is active.
0	R/W	0: WDTO# and PLED are inactive. 1: WDTO# and PLED are inactive.

CR F5h. (WDTO# and KBC P20 Control Mode Register; Default 00h)

BIT	READ/WRITE	DESCRIPTION
7~5	Reserved.	
4	R/W	1000 time faster in WDTO# count mode. 0: Disable. 1: Enable. (If bit-3 is Second Mode, the count mode is 1/1000 Sec.) (If bit-3 is Minute Mode, the count mode is 1/1000 Min.)
3	R/W	Select WDTO# count mode. 0: Second Mode. 1: Minute Mode.
2	R/W	Enable the rising edge of KBC reset (P20) to issue time-out event. 0: Disable. 1: Enable.
1	R/W	Disable/ Enable the WDTO# output low pulse to the KBRST# pin (PIN60) 0: Disable. 1: Enable.
0	Reserved.	

CR F6h. (WDTO# Counter Register; Default 00h)

BIT	READ/WRITE	DESCRIPTION
7~0	R/W	Watch Dog Timer Time-out value. Writing a non-zero value to this register causes the counter to load the value to Watch Dog Counter and start counting down. If bits 7 and 6 of CR F7h are set, any Mouse Interrupt or Keyboard Interrupt event will also cause the reload of previously-loaded non-zero value to Watch Dog Counter and start counting down. Reading this register returns current value in Watch Dog Counter instead of Watch Dog Timer Time-out value. 00h: Time-out Disable

		01h: Time-out occurs after 1 second/minute 02h: Time-out occurs after 2 second/minutes 03h: Time-out occurs after 3 second/minutes FFh: Time-out occurs after 255 second/minutes
--	--	--

CR F7h. (WDTO# Control & Status Register; Default 00h)

BIT	READ/WRITE	DESCRIPTION
7	R/W	Mouse interrupt reset watch-dog timer enable 0: Watchdog timer is not affected by mouse interrupt. 1: Watchdog timer is reset by mouse interrupt.
6	R/W	Keyboard interrupt reset watch-dog timer enable 0: Watchdog timer is not affected by keyboard interrupt. 1: Watchdog timer is reset by keyboard interrupt.
5	Write "1" Only	Trigger WDTO# event. This bit is self-clearing.
4	R/W Write "0" Clear	WDTO# status bit 0: Watchdog timer is running. 1: Watchdog timer issue time-out event.
3~0	R/W	These bits select IRQ resource for WDTO#. (02h for SMI# event.)

A.2 W83627UHG Watchdog Timer Initial Program

Example: Setting 10 sec. as Watchdog timeout interval

```
#include <stdio.h>
```

```
#include <conio.h>
```

```
#define EFER_Port 0x2E
```

```
#define Entry_Key 0x87
```

```
void main (void)
```

```
{
```

```
// Set Entry Key
```

```
outportb(EFER_Port,Entry_Key);
```

```
outportb(EFER_Port,Entry_Key);
```

```
// Enable WatchDog function
```

```
outportb(EFER_Port,0x07);
```

```
outportb(EFER_Port+1,0x08);
```

```
outportb(EFER_Port,0x30);
```

```
outportb(EFER_Port+1,0x01);
```

```
// Set WatchDog time is 10 sec
outportb(EFER_Port,0xf6);
outportb(EFER_Port+1,0x0A);   time is 10 sec
outportb(EFER_Port,0xAA);    exit
}
```

Appendix

B

I/O Information

B.1 I/O Address Map

Address Range	Device Name
[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 - 00000071]	System CMOS/real time clock
[00000072 - 0000007F]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000081 - 00000083]	Direct memory access controller
[00000084 - 00000086]	Motherboard resources
[00000087 - 00000087]	Direct memory access controller
[00000088 - 00000088]	Motherboard resources
[00000089 - 0000008B]	Direct memory access controller
[0000008C - 0000008E]	Motherboard resources
[0000008F - 0000008F]	Direct memory access controller
[00000090 - 0000009F]	Motherboard resources
[000000A0 - 000000A1]	Programmable interrupt controller
[000000A2 - 000000BF]	Motherboard resources
[000000C0 - 000000DF]	Direct memory access controller
[000000E0 - 000000EF]	Motherboard resources
[00000170 - 0000017F]	Numeric data processor
[000001F0 - 000001F7]	Secondary IDE Channel
[000001F8 - 000001F7]	Primary IDE Channel
[00000274 - 00000277]	ISAPNP Read Data Port
[00000279 - 00000279]	ISAPNP Read Data Port
[00000296 - 00000296]	Motherboard resources
[000002B0 - 000002B7]	Communications Port (COM7)
[000002B8 - 000002BF]	Communications Port (COM8)
[000002C0 - 000002C7]	Communications Port (COM9)
[000002C8 - 000002CF]	Communications Port (COM10)
[000002E0 - 000002E7]	Communications Port (COM5)
[000002E8 - 000002EF]	Communications Port (COM4)
[000002F0 - 000002F7]	Communications Port (COM6)
[000002F8 - 000002FF]	Communications Port (COM2)
[00000376 - 00000376]	Secondary IDE Channel
[00000378 - 0000037F]	Printer Port (LPT1)
[000003B0 - 000003B8]	Intel(R) Graphics Media Accelerator 3150
[000003C0 - 000003DF]	Intel(R) Graphics Media Accelerator 3150
[000003E8 - 000003EF]	Communications Port (COM3)
[000003F6 - 000003F6]	Primary IDE Channel
[000003F8 - 000003FF]	Communications Port (COM1)
[00000480 - 000004BF]	Motherboard resources
[000004D0 - 000004D1]	Motherboard resources
[00000779 - 0000077F]	Motherboard resources
[00000800 - 0000087F]	Motherboard resources
[00000A79 - 00000A79]	ISAPNP Read Data Port
[00000D00 - 0000FFFF]	PCI bus
[0000D000 - 0000D0FF]	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC #2
[0000D000 - 0000DFFF]	Intel(R) ICH8 Family PCI Express Root Port 2 - 2841
[0000E000 - 0000E0FF]	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
[0000E000 - 0000EFFF]	Intel(R) ICH8 Family PCI Express Root Port 1 - 283F
[0000F000 - 0000F01F]	Intel(R) ICH8 Family SMBus Controller - 283E
[0000F020 - 0000F03F]	Intel(R) ICH8 Family USB Universal Host Controller - 2832
[0000F040 - 0000F05F]	Intel(R) ICH8 Family USB Universal Host Controller - 2831
[0000F060 - 0000F07F]	Intel(R) ICH8 Family USB Universal Host Controller - 2830
[0000F080 - 0000F09F]	Intel(R) ICH8 Family USB Universal Host Controller - 2835
[0000F0A0 - 0000F0BF]	Intel(R) ICH8 Family USB Universal Host Controller - 2834
[0000F0C0 - 0000F0CF]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F0D0 - 0000F0DF]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F0E0 - 0000F0E3]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F0F0 - 0000F0F7]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F100 - 0000F103]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F110 - 0000F117]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F120 - 0000F12F]	Intel(R) ICH8M Ultra ATA Storage Controllers - 2850
[0000F170 - 0000F177]	Intel(R) Graphics Media Accelerator 3150

B.2 Memory Address Map

Address Range	Device
[000A0000 - 000BFFFF]	Intel(R) Graphics Media Accelerator 3150
[000A0000 - 000BFFFF]	PCI bus
[1F700000 - FFFFFFFF]	PCI bus
[D0000000 - DFFFFFFF]	Intel(R) Graphics Media Accelerator 3150
[E0000000 - E000FFFF]	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC #2
[E0000000 - E00FFFFF]	Intel(R) ICH8 Family PCI Express Root Port 2 - 2841
[E0200000 - E020FFFF]	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
[E0200000 - E02FFFFF]	Intel(R) ICH8 Family PCI Express Root Port 1 - 283F
[F0000000 - F3FFFFFF]	System board
[FE700000 - FE7FFFFF]	Intel(R) Graphics Media Accelerator 3150
[FE800000 - FE8FFFFF]	Intel(R) ICH8 Family PCI Express Root Port 2 - 2841
[FE820000 - FE820FFF]	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC #2
[FE900000 - FE9FFFFF]	Intel(R) ICH8 Family PCI Express Root Port 1 - 283F
[FE920000 - FE920FFF]	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
[FEA00000 - FEA7FFFF]	Intel(R) Graphics Media Accelerator 3150
[FEA80000 - FEAFFFFFFF]	Intel(R) Graphics Media Accelerator 3150
[FEB00000 - FEB03FFF]	Microsoft UAA Bus Driver for High Definition Audio
[FEB04000 - FEB040FF]	Intel(R) ICH8 Family SMBus Controller - 283E
[FEB05000 - FEB053FF]	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836
[FEB06000 - FEB063FF]	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A
[FEC00000 - FEC00FFF]	Motherboard resources
[FED00000 - FED003FF]	High precision event timer
[FED14000 - FED19FFF]	System board
[FED1C000 - FED1FFFF]	Motherboard resources
[FED20000 - FED8FFFF]	Motherboard resources
[FEE00000 - FEE00FFF]	Motherboard resources
[FFE00000 - FFFFFFFF]	Motherboard resources

B.3 IRQ Mapping Chart

Interrupt request (IRQ)	
(ISA) 0	High precision event timer
(ISA) 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
(ISA) 3	Communications Port (COM2)
(ISA) 4	Communications Port (COM1)
(ISA) 7	Communications Port (COM3)
(ISA) 7	Communications Port (COM4)
(ISA) 8	High precision event timer
(ISA) 9	Microsoft ACPI-Compliant System
(ISA) 10	Communications Port (COM5)
(ISA) 10	Communications Port (COM6)
(ISA) 11	Communications Port (COM10)
(ISA) 11	Communications Port (COM7)
(ISA) 11	Communications Port (COM8)
(ISA) 11	Communications Port (COM9)
(ISA) 12	Microsoft PS/2 Mouse
(ISA) 13	Numeric data processor
(ISA) 14	Primary IDE Channel
(ISA) 15	Secondary IDE Channel
(PCI) 10	Intel(R) ICH8 Family SMBus Controller - 283E
(PCI) 16	Intel(R) Graphics Media Accelerator 3150
(PCI) 16	Intel(R) ICH8 Family USB Universal Host Controller - 2834
(PCI) 16	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
(PCI) 17	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC #2
(PCI) 18	Intel(R) ICH8 Family USB Universal Host Controller - 2832
(PCI) 18	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 283A
(PCI) 18	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
(PCI) 19	Intel(R) ICH8 Family USB Universal Host Controller - 2831
(PCI) 21	Intel(R) ICH8 Family USB Universal Host Controller - 2835
(PCI) 21	Microsoft UAA Bus Driver for High Definition Audio
(PCI) 22	Intel(R) ICH8 Family PCI Express Root Port 1 - 283F
(PCI) 23	Intel(R) ICH8 Family PCI Express Root Port 2 - 2841
(PCI) 23	Intel(R) ICH8 Family USB Universal Host Controller - 2830
(PCI) 23	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836

B.4 DMA Channel Assignments

Direct memory access (DMA)	
4	Direct memory access controller

Appendix

C

Mating Connector

C.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model No.		
CN2	SPDIF Connector	CATCH	2.00mm pitch 3 pins (CATCH 1192-700-03S or compatible)	SPDIF Cable	1709030150
CN3	Audio 2Watt Speaker output	CATCH	WAFER BOX-4Pin- 180D-Pitch 2.5mm(CATC H.1191-700-0 4S compatible)	N/A	N/A
CN4	LVDS Connector	E-Call	Board-Wire Connector-30 P-Pitch=1.25 mm(E-call.01 10-01-553-30 0 or compatible)	N/A	N/A
CN5	PS2 Keyboard/ Mouse Connector	Molex	1.25mm Pitch 6 Pins (Molex 51021-0600)	Keyboard & Mouse Cable	1700060155
CN6	FAN Connector	CATCH	2.54mm Pitch 3 pins. (CATCH.1190 -700-03S or compatible)	N/A	N/A
CN7	LCD Inverter Connector	CATCH	2.0mm pitch 5 pin (CATCH HS-5P-2.0 or compatible)	N/A	N/A
CN10	RS-232 Serial Port	CATCH	2.00mm Pitch 44 pins	N/A	N/A

Mini-ITX

EMB-LN9T

	Connector (COM7-COM10)		(CATCH H754-2x22 or compatible)		
CN11	Front Panel Connector	HoBase	2.54mm pitch 10 pins (HO-BASE 2541-2H-2X5 or compatible)	N/A	N/A
COM1	COM1and COM2 Connector	Contek	D-SUB 9 Connector Dual Port (Contek.B-DG N10910101 or compatible)	N/A	N/A
COM3	RS-232 Serial Port Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Serial Port Cable	1701100206
COM4	RS-232 Serial Port Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Serial Port Cable	1701100206
COM5	RS-232 Serial Port Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Serial Port Cable	1701100206
COM6	RS-232 Serial Port Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	Serial Port Cable	1701100206
USB1	USB5&6 Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or compatible)	USB Cable	1709100208
USB2	USB7&8 Connector	CATCH	2.00mm Pitch 10 pins (CATCH H754-2x5 or	USB Cable	1709100208

Mini-ITX**EMB-LN9T**

			compatible)		
DVI+VGA1	DVI+VGA Connector	Astron	45Pin-90D-DIP (Astron 1860044-006-R or compatible)	N/A	N/A
LPT1	LPT port connector	CATCH	2.00mm Pitch 26 pins (CATCH A003-268 or compatible)	LPT cable	1701260200