

**ETX-LN**

Onboard Intel® Atom™ D525/N455  
Processor

DDR3 667/800 Memory

With LCD, Ethernet, PCI, ISA,  
Audio, SATA, USB2.0, COM

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## Packing List

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

- 1 ETX-LN CPU Module
- 4 M2.0 Screw
- 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.

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Chapter

1

**General  
Information**

## 1.1 Introduction

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ETX-LN is able to equip with Intel® Atom™ D525/N455 processor and has one 204-pin DDR3 667/800 SODIMM to support system memory up to 2GB. ETX-LN adopts Intel® ICH8M chipset that implements serial technologies with high performance. In addition, ETX-LN accommodates user-friendly expansion interfaces, such as four 32-bit PCI, four 8-bit/16-bit ISA bus, one SMBus and one LPC interfaces.

For the display specifications, ETX-LN integrates Intel® D525/N455 and hardware MPEG2 decoder, and shares system memory up to 384MB/DVMT 4.0. The display of ETX-LN supports CRT and 24-bit single channel LVDS. Moreover, it features one optional PATA SSD up to 16GB and two SATA 3.0 Gb/s (on module).

If you are looking for an economic, time-saving and high performance solution, ETX-LN definitely is your first choice.



## 1.2 Features

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- Onboard Intel® Atom™ D525/N455 Processor
- Intel® ICH8M
- SODIMM DDR3 667/800 Memory, Max. 2 GB
- 10/100Base-TX Ethernet
- CRT, 24-bit Single Channel LVDS LCD
- AC97 2.3 Codec 2CH Audio
- PATA SSD (Up to 16GB, Optional) x 1, SATA 3.0Gb/s x 2 (On Module)
- USB2.0 x 4, COM x 2, LPC x 1
- +5V Only Operation

### 1.3 Specifications

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#### System

- CPU Onboard Intel® Atom™ D525/N455 Processor
- Memory 204-pin DDR3 SODIMM x 1, Max. 2GB (DDR3 667 for N455 and DDR3 800 for D525)
- Chipset Intel® ICH8M
- I/O Chipset Winbond W8362DHG-P
- Ethernet Realtek RTL8102E-VB-GR, 10/100Base-TX
- BIOS AMI BIOS, SPI type, 4 MB ROM
- Wake on LAN Optional
- Watchdog Timer Generates a Time-out System Reset
- H/W Status Monitoring Supports Power Supply Voltages, Fan Speed and Temperatures Monitoring
- Expansion Interface 32-bit PCI x 4  
8-bit/16-bit ISA Bus x 4  
SMBus x 1  
LPC x 1
- Battery Lithium battery
- Power Supply Voltage +5V DC
- Board Size 4.5"(L) x 3.74"(W) (114mm x 95mm)
- Gross Weight 0.66lb (0.3kg)

- Operating Temperature 32°F~140°F (0°C~60°C)  
-4°F ~ 158°F (-20°C ~ 70°C) Intel®  
Atom™ N455 for WiTAS 1
- Storage Temperature -40°F~176°F (-40°C~80°C)
- Operating Humidity 0%~90% relative humidity,  
non-condensing

**Display: Supports CRT/LCD simultaneous/ dual view displays**

- Chipset Intel® D525/N455 integrated  
Integrates hardware MPEG2 decoder
- Memory Shared system memory up to 384MB/  
DVMT 4.0
- Resolution Up to 1400x1050 (SXGA) for CRT; Up to  
1366x768 or 1280x800 (WXGA) for LCD
- LCD Interface 24-bit single channel LVDS

**I/O**

- Storage PATA SSD onboard, Max. 16GB  
(Optional) or PATA x 1 (two devices),  
SATA3.0Gb/s x 2 (on module)
- USB USB2.0 x 4
- Audio Mic-in, Line-in, Line-out

Chapter

2

**Quick  
Installation  
Guide**

## 2.1 Safety Precautions

---

**Warning!**

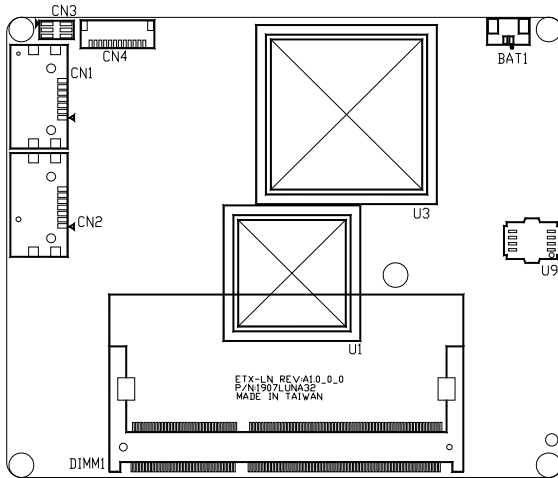
*Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.*

**Caution!**

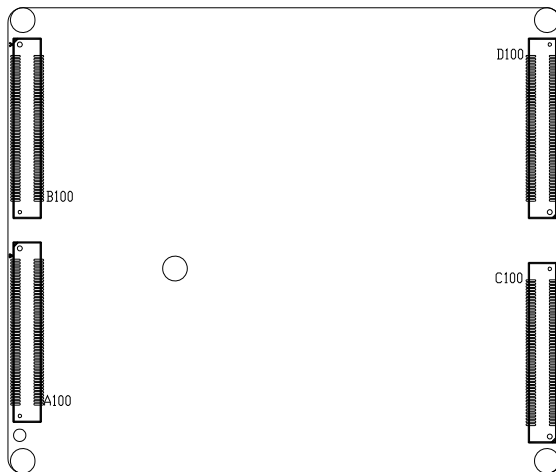
*Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not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

## 2.2 Jumpers and Connectors

### Component Side

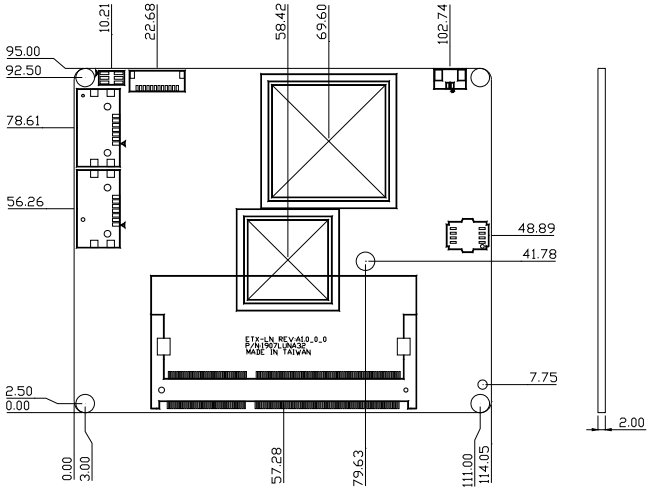


### Solder Side

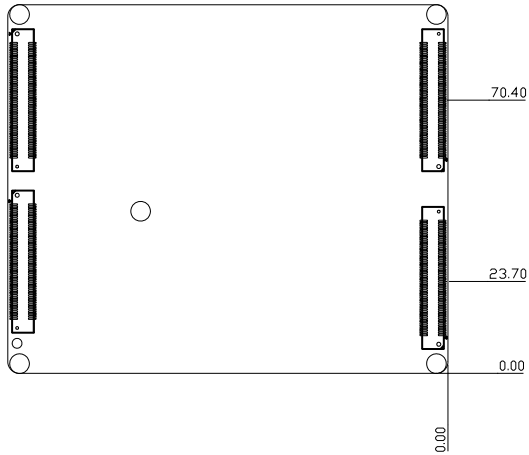


### 2.3 Mechanical Drawing

#### Component Side



#### Solder Side



## 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:

Label	Function
SW1	AT_ATX selection/LVDS backlight level 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 the board's connectors:

Label	Function
CN1	SATA Connector
CN2	SATA Connector
CN3	CPLD Download header
CN4	LPC Connector
BAT1	Battery Connector
DIMM1	DDR3 SODIMM connector



## 2.6 AT\_ATX Selection/LVDS Backlight Level Selection (SW1)

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SW1	Function
1 On	AT
1 Off	ATX (Default)
2 On	BKTLEN#
2 Off	BKTLEN (Default)

## 2.7 SATA Connector (CN1, CN2)

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Standard SATA Connector

## 2.8 CPLD Download Header (CN3)

---

Standard CPLD Download Header

## 2.9 LPC Connector (CN4)

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Pin	Signal
1	LPC AD0
2	LPC AD1
3	LPC AD2
4	LPC AD3
5	+3.3V
6	LPC FRAME#
7	RESET#
8	GND
9	LPC Clock
10	LPC DRQ0
11	LPC DRQ1

---

12	SERIRQ
----	--------

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### 2.10 CMOS Battery Connector (BAT1)

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Pin	Signal
1	Battery power (+3.0V)
2	GND

---

### 2.11 DDR3 SODIMM Connector (DIMM1)

---

Standard DDR3 SODIMM Connector

## 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

**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 ETX-LN 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 <Del> 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 ETX-LN comes with a CD-ROM that contains all drivers and utilities that meet your needs.

***Follow the sequence below to install the drivers:***

Step 1 – Install Chipset Driver

Step 2 – Install VGA Driver

Step 3 – Install Audio Driver

Step 4 – Install LAN Driver

Please read instructions below for further detailed installations.



## 4.1 Installation:

---

Insert the ETX-LN CD-ROM into the CD-ROM Drive. And install the drivers from Step 1 to Step 4 in order.

### Step 1 – Install Chipset Driver

1. Click on the **STEP1-CHIPSET** folder and select the folder of OS your system is
2. Double click on the **infinst\_autol.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 2 – Install VGA Driver

1. Click on the **STEP2-VGA** folder and select the folder of OS 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 Driver

1. Click on the **STEP3-AUDIO** folder and select the folder of OS your system is
2. Double click on the **.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 4 – Install LAN Driver

1. Click on the **STEP4-LAN** folder and select the folder of OS 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

Appendix

**A**

# Programming the Watchdog Timer

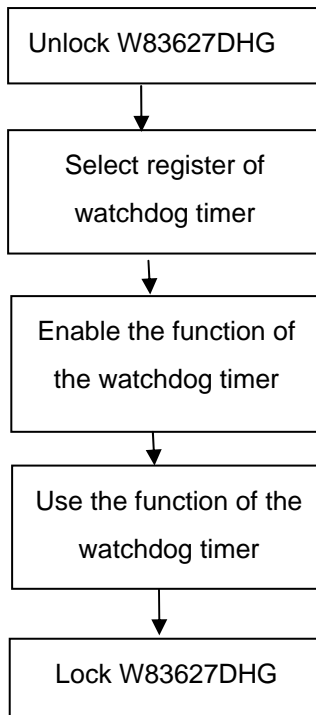
## A.1 Programming

---

ETX-LN utilizes W83627DHG-P 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 W83627DHG config Mode
- (2) Modify the data of configuration registers

- (3) Exit the W83627DHG config Mode. Undesired result may occur if the config Mode is not exited normally.

### (1) Enter the W83627DHG config Mode

To enter the W83627DHG 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 W83627DHG config Mode

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

	Address Port	Data Port
0aah:	2Eh	2Fh

### WatchDog Timer Register I (Index=F5h, Default=00h)

#### CRF5 (PLED and KBC P20 Control Mode Register)

**Bit 7-5** : select PLED mode

= 000 Power LED pin is driven high.

= 001 Power LED pin outputs 0.5Hz pulse with 50% duty cycle.

= 010 Power LED pin is driven low.

= 011 Power LED pin outputs 2Hz pulse with 50% duty cycle.

= 100 Power LED pin outputs 1Hz pulse with 50% duty cycle.

= 101 Power LED pin outputs 4Hz pulse with 50% duty cycle.

= 110 Power LED pin outputs 0.25Hz pulse with 50% duty cycle.

=111 Power LED pin outputs 0.25Hz pulse with 50% duty cycle..

**Bit 4** : WDTO# count mode is 1000 times faster.

= 0 Disable.

= 1 Enable.

**Bit 3** : select WDTO# count mode.

= 0 second

= 1 minute

**Bit 2** : Enable the rising edge of keyboard Reset (P20) to force Time-out event.

= 0 Disable

= 1 Enable

**Bit 1** : Disable / Enable the WDTO# output low pulse to the KBRST# pin (PIN60)

= 0 Disable

= 1 Enable

**Bit 0** : Reserved.

**WatchDog Timer Register II (Index=F6h, Default=00h)**

- 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

**WatchDog Timer Register III (Index=F7h, Default=00h)**

- Bit 7** : Mouse interrupt reset Enable or Disable  
 = 1 Watchdog Timer is reset upon a Mouse interrupt  
 = 0 Watchdog Timer is not affected by Mouse interrupt
- Bit 6** : Keyboard interrupt reset Enable or Disable  
 = 1 Watchdog Timer is reset upon a Keyboard interrupt  
 = 0 Watchdog Timer is not affected by Keyboard interrupt
- 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
- Bit 3-0** : These bits select IRQ resource for Watchdog. Setting of 2 selects SMI.



## A.2 W83627DHG Watchdog Timer Initial Program

---

Example: Setting 10 sec. as Watchdog timeout interval

```
;/;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
Mov dx,2eh           ;Enter W83627DHG config mode
```

```
Mov al,87h          (out 87h to 2eh twice)
```

```
Out dx,al
```

```
Out dx,al
```

```
;/;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
Mov al,07h
```

```
Out dx,al
```

```
Inc dx
```

```
Mov al,08h          ;Select Logical Device 8 (GPIO Port  
2)
```

```
Out dx,al
```

```
;/;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
```

```
Dec dx
```

```
Mov al,30h          ;CR30 (GP20~GP27)
```

```
Out dx,al
```

```
Inc dx
```

```
Mov al,01h          ;Activate GPIO2
```

```
Out dx,al
```

```

;/////////////////////////////////////////////////////////////////
Dec dx
Mov al,0f5h           ;CRF5 (PLED mode register)
Out dx,al
Inc dx
In al,dx
And al,not 08h       ;Set second as counting unit
Out dx,al
;/////////////////////////////////////////////////////////////////
Dec dx
Mov al,0f6h           ; CRF6
Out dx,al
Inc dx
Mov al,10             ;Set timeout interval as 10 sec.
Out dx,al
;/////////////////////////////////////////////////////////////////
Dec dx                 ;Exit W83627DHG config mode
Mov al,0aah           (out 0aah to 2eh once)
Out dx,al
;/////////////////////////////////////////////////////////////////

```

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 - 0000006D]	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
[000000F0 - 000000FF]	Numeric data processor
[00000170 - 00000177]	Secondary IDE Channel
[000001F0 - 000001F7]	Primary IDE Channel
[00000274 - 00000277]	ISAPNP Read Data Port
[00000279 - 00000279]	ISAPNP Read Data Port
[00000295 - 000002A4]	Motherboard resources
[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
[000003F6 - 000003F6]	Primary IDE Channel
[000003F8 - 000003FF]	Communications Port (COM1)
[00000480 - 000004BF]	Motherboard resources
[000004D0 - 000004D1]	Motherboard resources
[00000800 - 0000087F]	Motherboard resources
[00000A79 - 00000A79]	ISAPNP Read Data Port
[00000D00 - 0000FFFF]	PCI bus
[0000E000 - 0000E0FF]	Realtek PCIe FE Family Controller
[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 - 2831
[0000F040 - 0000F05F]	Intel(R) ICH8 Family USB Universal Host Controller - 2830
[0000F060 - 0000F06F]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F070 - 0000F07F]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F080 - 0000F083]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F090 - 0000F097]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F0A0 - 0000F0A3]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F0B0 - 0000F0B7]	Intel(R) ICH8M 3 port Serial ATA Storage Controller - 2828
[0000F0C0 - 0000F0CF]	Intel(R) ICH8M Ultra ATA Storage Controllers - 2850
[0000F110 - 0000F117]	Intel(R) Graphics Media Accelerator 3150

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




Address Range	Device
[000A0000 - 000BFFFF]	Intel(R) Graphics Media Accelerator 3150
[000A0000 - 000BFFFF]	PCI bus
[3F700000 - FFFFFFFF]	PCI bus
[D0000000 - DFFFFFFF]	Intel(R) Graphics Media Accelerator 3150
[E0000000 - E000FFFF]	Realtek PCIe FE Family Controller
[E0000000 - E000FFFF]	Intel(R) ICH8 Family PCI Express Root Port 1 - 283F
[F0000000 - F3FFFFFF]	System board
[FE800000 - FE8FFFFFF]	Intel(R) Graphics Media Accelerator 3150
[FE900000 - FE9FFFFFF]	Intel(R) ICH8 Family PCI Express Root Port 1 - 283F
[FE920000 - FE920FFF]	Realtek PCIe FE Family Controller
[FEA00000 - FEA7FFFF]	Intel(R) Graphics Media Accelerator 3150
[FEA80000 - FEAFFFFFF]	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
[FEC00000 - FEC00FFF]	Motherboard resources
[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

IRQ	Device
(ISA) 0	System timer
(ISA) 1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
(ISA) 3	Communications Port (COM2)
(ISA) 4	Communications Port (COM1)
(ISA) 8	System CMOS/real time clock
(ISA) 9	Microsoft ACPI-Compliant System
(ISA) 12	Microsoft PS/2 Mouse
(ISA) 13	Numeric data processor
(ISA) 14	Primary IDE Channel
(ISA) 15	Secondary IDE Channel
(PCI) 7	Intel(R) ICH8 Family SMBus Controller - 283E
(PCI) 16	Intel(R) Graphics Media Accelerator 3150
(PCI) 16	Realtek PCIe FE Family Controller
(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	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 USB Universal Host Controller - 2830
(PCI) 23	Intel(R) ICH8 Family USB2 Enhanced Host Controller - 2836

## B.4 DMA Channel Assignments

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