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## *Chapter 1*

# Overview

MX3WL is a new generation Socket 370 based system board that utilizes Intel **810** AGPset on **Micro ATX** PCI/ISA platform. This AGPset is designed for Celeron PPGA CPU, and supports new architectures such as high speed **AGP** graphic port, **PC100 SDRAM**, **AMR slot**, **Ultra DMA 33**, **Bus master IDE**, **PCI 2.2** and **USB** port. It has **two Dual in-line Memory Module (DIMM)** slots that allow to install PC100 SDRAMs and expand up to a maximum of **512MB**. Also, MX3WL uses **4M bit Flash ROM** BIOS to reserve for future new functions.

In addition to the above features, MX3WL also implements many special features as follows.

**Jumper-less Design** Celeron PPGA VID signal and SMBus clock generator provide CPU voltage auto-detection and allows the user to set the CPU frequency through the CMOS setup, therefore no jumpers or switches are used. The correct CPU information is saved into the EEPROM. With these technologies, the disadvantages of the Pentium based jumper-less designs are eliminated. There will be no worry of wrong CPU voltage detection and no need to re-open the housing in case of CMOS battery loss. The only jumper left is to clear the CMOS, which is a safety hook if you forget the password.

**Battery-less** This motherboard implements EEPROM and a special circuit (patent applied) that allows you to save your current CPU and CMOS Setup configurations without the need of a battery. The RTC (real time clock) can also keep running as long as the power cord is plugged. If you lose your CMOS data by accident, you can just reload the CMOS configurations from EEPROM and the system will recover as usual.

**ACPI Suspend to DRAM** You can resume your original work directly from DRAM without going through the Win98 booting process and run your application again. Suspend to DRAM saves your current work into the system memory.

**ACPI Suspend to Hard Drive** The conventional "Suspend to Hard Drive" function is a private design of AOpen motherboards, the requirement to run it is a BIOS revision and correct chipset that supports this function. However, nowadays "Suspend to Hard Drive" has been become widely known as the "S4

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- Hibernation" state defined in the ACPI specification; in this case not only the BIOS itself but also the operation system (i.e. Windows98) and even the display card are involved in the execution of this function. With regard to how to implement this function, please refer to section "1.3 ACPI Suspend to Hard Drive".

**0V Wake On Modem** In conjunction with ATX soft power On/Off, it is possible to have the system totally power off and wakeup to automatically answer a phone call to serve as an answering machine or to send/receive a fax. The most important break through is not only an externally cased modem but also an internal modem card can be used to support Wake On Modem. This motherboard and MP56 internal modem card implement a special circuit (patent applied) to make sure the modem card works properly without any power.

**Wake On LAN** This feature is very similar as the Wake On Modem feature, but it is through a local area network. To use the Wake On LAN function, you must have a network card that supports this feature and have installed proper network management software, such as ADM.

**Wake On RTC Timer** The Wake Up Timer is more like an alarm, which wakes up and powers on your system at a pre-defined time for a specific application. It can be set to wake up everyday or on specific date within a month. The date/time is accurate to within a second.

**Wake On Keyboard** This function allows you to power on your system by clicking the hot key that you specified. Besides, you also may disable the function of power button and let the system can only be powered on through the preset keys (like a password).

**Wake On Mouse** This function allows you power on the system by clicking a specified mouse button twice successively.

**AC Power Auto Recovery** A traditional ATX system should remain at power off stage when AC power resumes from power failure. This design is inconvenient for a network server or workstation, without an UPS, that needs to keep power-on. This motherboard implements an AC Power Auto Recovery function to solve this problem. In BIOS Setup settings if this item is set to "Enabled" the system will automatically power-on after AC power resumes.

**High Efficient Synchronous Switching Regulator** Most of the current switching designs are Asynchronous mode, which from the technical point of view, still consumes very high power as well as heat. MX3WL implements high efficient synchronous switching design that the temperature of MOS FET is far less than Schottky diode of asynchronous design.

**Over Current Protection** The Over Current Protection was very popular implemented on the Baby AT or ATX 3.3V/5V/12V switching power supply. However, the new generation Celeron PPGA CPU uses different voltage that have regulator to transfer 5V to CPU voltage (for example, 2.0V), and make 5V

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over current protection useless. MX3WL with switching regulator onboard support CPU over current protection, in conjunction with 3.3V/5V/12V power supply provide the full line over current protection.

**CPU and Housing Fan Monitoring** This motherboard has one more "fan monitoring" function to prevent system overheat. There are two fan connectors. One is for the CPU and the other can be an extra housing fan. The system will report an alarm fan malfunction through utility software such as Hardware Monitoring Utility.

**CPU Thermal Protection** MX3WL has a special thermal detection circuit to have warning through application software when the temperature is higher than a predefined value.

**System Voltage Monitoring** Further more, MX3WL implements a voltage monitoring system, As you turn on your system, this smart design will continue to monitor your system working voltage. If any of the system voltage is over the component's standard. There will be alarm though utility software such as Hardware Monitor utility (Small Icon for Hardware Monitoring) for a warning to user.

**Full-range CPU core voltage** This motherboard supports the CPU core voltage from 1.3V to 2.05V, that can be applied to various CPU type in future.

**Resetable Fuse** This motherboard implements resetable fuses to prevent any accidental short circuit caused by keyboard or USB devices hot plug.

**FCC DoC certificate** MX3WL has passed FCC DoC test. The radiation is very low, you can use any kind of housing.

**Powerful Utility Software** AOpen Bonus Pack CD disc contains many useful utilities, such as Norton Antivirus, AOchip, Hardware Monitoring utility, and Suspend to Hard Drive utility.



**Note:** This motherboard is battery-less, that means the RTC (real time clock) can keep running without battery as long as the power cord is plugged. But in case of power failure or the power cord unplugged, you need to reset date and time from "Standard CMOS Setup" section of BIOS Setup. For more information, please see "Chapter 3 BIOS Setup".

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## 1.1 Specifications

<b>Form Factor</b>	Micro ATX
<b>Board Size</b>	244 mm x 220 mm
<b>CPU</b>	Celeron PPGA
<b>System Memory</b>	168-pin DIMM x2, maximum 512 PC100 SDRAM.
<b>Chipset</b>	Intel 810 AGPset
<b>Onboard AGP</b>	Intel I752
<b>Audio CODEC</b>	AD1881
<b>Expansion Slots</b>	PCI x3 and AMR x1
<b>Serial Port</b>	Two serial ports UART 16C550 compatible, and the 3rd UART for IR function.
<b>Parallel Port</b>	One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP).
<b>Floppy Interface</b>	Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format
<b>IDE Interface</b>	Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4 , bus master hard disk drives and Ultra DMA 33 mode hard drives are also supported.
<b>USB Interface</b>	Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard.
<b>PS/2 Mouse</b>	Mini-Din PS/2 mouse connector onboard.
<b>Keyboard</b>	Mini-Din PS/2 keyboard connector onboard.
<b>RTC and Battery</b>	RTC within Intel ICH chipset. Lithium (CR-2032) battery is an option, no battery is needed if power cord is plugged.
<b>BIOS</b>	AWARD Plug-and-Play, 4M bit Flash ROM BIOS.

### 1.2 ACPI Suspend to Hard Drive

For a detailed installation procedure please refer to the following procedure to enable ACPI Suspend to Hard Drive on the AOpen MX3WL motherboard. First please check if your system meets the following requirements, then follow the procedure step by step.

#### System Requirement

1. AOZVHDD.EXE 1.30b or later ([http://www.aopen.com.tw/tech/mbdrv/default.htm#Suspend to Hard Disk Drivers](http://www.aopen.com.tw/tech/mbdrv/default.htm#Suspend%20to%20Hard%20Disk%20Drivers)).
2. Delete config.sys and autoexec.bat.

#### I. Fresh installation

1. Execute "Setup.exe /p j" to install Windows 98.
2. After Windows 98's installation is completed, go to Control Panel --> Power Management.
  - a. Set "Power Schemes -> System Standby" to "Never".
  - b. Click on "Hibernate" and select "Enable Hibernate Support" then "Apply".
  - c. Click on the "Advanced" tab, you'll see "Hibernate" on "Power Buttons". Note that this option will only be seen after step b mentioned above has been completed, otherwise only "Standby" and "Shutdown" will be shown. Select "Hibernate" and "Apply".
3. Run AOZVHDD utility.
  - a. If you assign the whole disk to your Win 98 system (FAT 16 or FAT 32), please run "aozvhd /c /file" in DOS mode. Please remember sufficient free space has to be reserved in the disk, e.g. if you have 64 MB DRAM and 16 MB VGA card installed, the system needs at least 80 MB free space. The utility will locate the space automatically.
  - b. If you assign an individual partition for Win 98, please run "aozvhd /c /partition". Of course, the system needs to provide unformatted an empty partition.
4. Reboot system.
5. You've already implemented ACPI with Suspend-to-Harddisk. Click "Start -> Shut Down -> Standby" then the screen will go off immediately. And 1 minute or so will be taken for the system to save what's in the memory to the harddrive; the larger the memory size the longer this process will take.

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### II. Changing from APM to ACPI (Windows 98 only)

1. Run "Regedit.exe"
  - a. Go through the following path  
HKEY\_LOCAL\_MACHINE  
SOFTWARE  
MICROSOFT  
WINDOWS  
CURRENT VERSION  
DETECT
  - b. Select "ADD Binary" and name it as "ACPIOPTION".
  - c. Right click and select Modify, add "01" after "0000" to make it "0000 01".
  - d. Save changes.
2. Select "Add New Hardware" under Control Panel. Allow Windows 98 to detect new hardware. (It will find "ACPI BIOS" and remove "Plug and Play BIOS")
3. Reboot system.
4. Clean boot into DOS and run "AOZVHDD.EXE /C /File"

### III. Changing from ACPI to APM

1. Run "Regedit.exe"
  - a. Go through the following path  
HKEY\_LOCAL\_MACHINE  
SOFTWARE  
MICROSOFT  
WINDOWS  
CURRENT VERSION  
DETECT  
ACPI OPTION
  - b. Right click and select Modify, change "01" to "00" to make it "0000 02".  
<Note> "02" means Windows 98 is ACPI acknowledged but disable ACPI function.
  - c. Save changes.

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2. Select "Add New Hardware" under Control Panel. Allow Windows 98 to detect new hardware. (It will find "Plug and Play BIOS" and remove "ACPI BIOS")
3. Reboot system.
4. Run "Add New Hardware" again and it will find "Advanced Power Management Resource".
5. Click "OK".

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### 1.3 ACPI Suspend to DRAM

This motherboard supports ACPI Suspend to DRAM function. With this function, you can resume your original work directly from DRAM without going through the Win98 booting process and run your application again. Suspend to DRAM saves your current work into the system memory. To implement ACPI Suspend to DRAM, please follow the procedures as below.

#### System Requirement

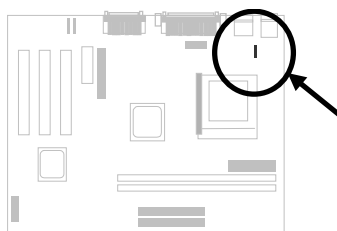
1. An ACPI OS is required. Currently, Windows 98 is the only choice. (Please refer to 1.2 for details.)
2. The Intel INF Update Utility and the AGP driver must be installed properly.

#### Procedures

1. Changed the following BIOS settings.  
BIOS Setup à Power Management à ACPI Function: Enabled.  
BIOS Setup à Power Management à ACPI Standby: S3.
2. Go to Control Panel --> Power Management. Set "Power Buttons" to "Standby".
3. Press power button or standby button to wake up the system.



### 1.4 Wake On Keyboard/Mouse



This function allows you to power on your system by clicking a hot key or a mouse button that you specified. Besides, you can also disable the function of the power button and only the preset keys (like a password) can boot your system.

Please follow the procedure below to enable Wake on Keyboard/Mouse function.

1. Set JP28 at pin 2-3 is to enable this function
2. Go to BIOS Setup à Integrated Peripherals à Power On Function. You can select various wakeup modes. For details, please refer to "Chapter 3 AWAED BIOS"
3. Save CMOS setup and Exit.
- 4. Successfully boot your system to Windows or DOS.**
5. Now you can proceed the normal shutdown and next time you can use this function to boot your system.

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**Caution:** To implement this function, the 5V Stand By current of ATX power supply must be greater than 800mA.

**Caution:** Wake On Mouse function applies to PS/2 mouse only

**Caution:** The mouse can't be moved between double clicking.

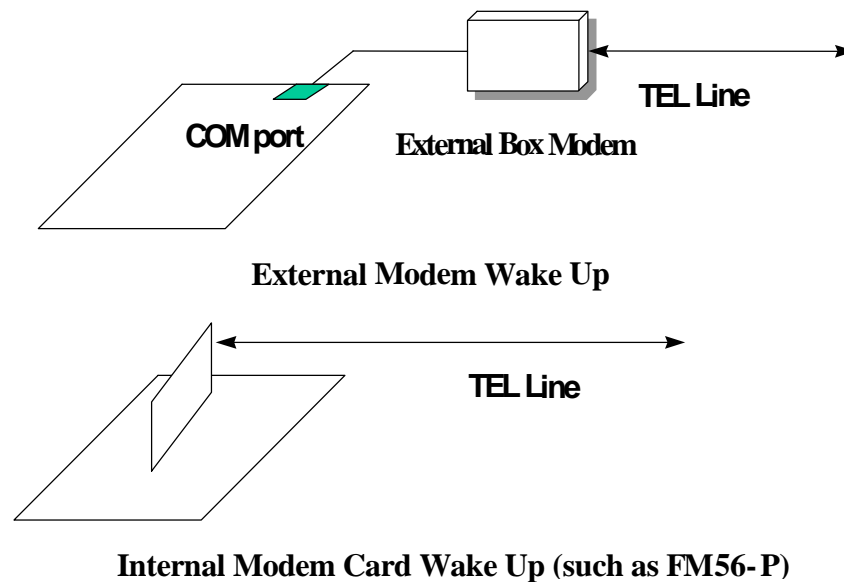
**Caution:** If you set a Password but forget it, please clear CMOS.

**Caution:** If you want to use Wake On Mouse function in DOS, it is necessary to install the DOS driver of the mouse.

### 1.5 Zero Voltage Wake On Modem

The Wake on Modem discussed here is to wakeup from true power off (identified by fan of power supply is off), This motherboard still supports traditional green PC suspend mode but it is not discussed here.

With the help ATX soft power On/Off, it is possible to have system totally power off (The traditional suspend mode of power management function does not really turn off the system power supply), and wakeup to automatically answer a phone call such as answering machine or to send/receive fax. You may identify the true power off by checking fan of your power supply. Both external box modem and internal modem card can be used to support 0V Wake On Modem, but if you use external modem, you have to keep the box modem always power-on. AOpen MX3WL and internal modem card implement special circuit (patent applied) and make sure the modem card works properly without any power. We recommend you choose AOpen modem card (For example, FM56-P, FM56-H, etc.) for 0V Wake On Modem applications.



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### For Internal Modem Card (AOpen FM56-P):

1. Go into BIOS setup, Power Management à 0V Wake On Modem, select Enabled.
2. Setup your application, put into Windows 95.
3. Turn system power off by soft power switch.
4. Connect 4-pin Modem Ring-On cable from FM56-P RING connector to MX3WL connector WKUP.
5. Connect telephone line to FM56-P. You are now ready to use Wake On Modem.

### For External Box Modem:

1. Go into BIOS setup, Power Management à 0V Wake On Modem, select Enabled.
2. Setup your application, put into Windows 95 Start Up.
3. Turn system power off by soft power switch.
4. Connect RS232 cable of external box Modem to COM1 or COM2.
5. Connect telephone line to external box Modem. Turn on Modem power (you must keep Modem power always on). You are now ready to use Wake On Modem.



**Tip:** External 0V Wake On Modem signal is detected through COM1 or COM2. Internal modem card wake up signal is detected through cable from connector RING (on modem card) to WKUP (on mainboard).

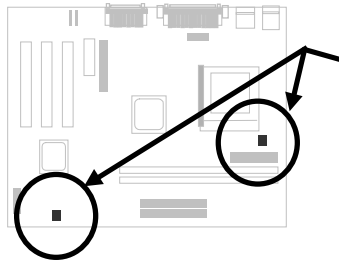


**Note:** If you use external modem, the power of external modem must be kept on to receive signal from telephone line. Internal modem card has no such limitation.

### 1.6 System Voltage Monitoring

This motherboard implements a voltage monitoring system. As you turn on your system, this smart design will continue to monitor your system's working voltage. If any of the system's voltage is over the component's standard there will be an alarm through application software such as the Hardware Monitoring Utility to warn the user. The system voltage monitoring function monitors CPU core voltage. It is automatically implemented by the BIOS and Hardware Monitoring Utility (the program's file name is like aohwxxx.exe, where xxx means the version number), no hardware installation is needed.

### 1.7 Fan Monitoring



There are two fan connectors, one is for the CPU, and the other can be a housing fan. The fan monitoring function is implemented by connecting a fan to the 3-pin fan connector **CPUFAN1** or **FAN1** and installing the Hardware Monitoring Utility.

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### 1.8 CPU Thermal Protection

This motherboard implements special thermal protection circuits. When temperature is higher than a predefined value, there will be warning through application software such as the Hardware Monitoring utility to notify the user. It is automatically implemented by the BIOS and the Hardware Monitoring Utility, no hardware installation is needed.

### 1.9 Battery-less Design

To preserve the earth, AOpen MX3WL implements the battery-less motherboard design. There is no need to have battery for RTC (real time clock) and CMOS Setup as long as ATX power cable is plugged. In case of the AC power is shutdown or power cord is removed by accident, the CMOS Setup and system configuration can be restored from EEPROM, only the system clock needed to be re-set to current date/time.

For the convenience of end user, MX3WL still shipped with one Lithium (CR-2032) battery. If you prefer to use battery, you can still insert it into battery socket. The RTC will still keep running even power cord is removed.