

# **SOM-4477 SOM-ETX Module**

**VIA Eden (V4) CPU Module with  
CPU, VGA/LVDS, Audio & LAN**

## **User Manual**

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This manual is for SOM-4477

## Packing List

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

- SOM-4477 System On Module CPU module
- CD-ROM or Disks for utility, drivers, and manual (in PDF format)
- Heatspreader

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

## Document Feedback

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To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: [support@advantech.com](mailto:support@advantech.com)

## Additional Information and Assistance

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1. Visit the Advantech web site at [www.advantech.com](http://www.advantech.com) where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance.

Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

## Declaration of Certification

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### CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

### FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Caution!** *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*



## Safety Instructions

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1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well, or you cannot get it to work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.

**DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE**

EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.



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## General Information

This Chapter gives background information on the SOM-4477 CPU System on Module

Sections include:

- Introduction
- Specification

# Chapter 1 General Information

## 1.1 Introduction

---

SOM-4477 is the latest VIA solution for Advantech's SOM-ETX product line, powered by the Eden CPU + CX 700 single chipset platform plus VIA's V4 bus interface. VIA's new generation V4 bus Eden CPU provides higher performance than previous generation Eden CPUs but with lower power consumption at the same frequency.

VIA's new generation CX700 chipset provides a single integrated chipset solution to IPC customers. The single chip design successfully saves board space without sacrificing functions. CX700 supports integrated LVDS, up to 48 bit dual channel TFT LCD and CRT; this allows CRT and LCD monitors to simultaneously display different content (Dual View) making SOM-4477 suitable for multi-display applications. For connectivity, SOM-4477 comes with USB 2.0 to enhance data transfer bandwidth. SOM-4477 also supports the latest DDR2 memory technology at 400 or 533MHz, and the power consumption is about 50% lower than traditional DDR memory.

SOM-4477 complies with the "Green Function" standard and supports Doze, Standby and Suspend modes. The small size (95 mm x 114 mm) module uses four high quality connectors based on the proven SOM-ETX form factor, which allows the SOM-ETX modules to be easily and securely mounted onto a customized solution board or our standard SOM-DB4400 development board.

SOM-ETX is a standard CPU module with all the main components on-board and connects to the customer's carrier board through 4 connectors. Customers can make the necessary design on their carrier board based on different demands. SOM-ETX not only reduces development time but also keeps the maximum design flexibility for satisfying different market demands.

## 1.2 Specifications

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### 1.2.1 Standard System On Module functions

- **CPU:** On-board VIA V4 bus Eden 1 GHz/600 MHz/400 MHz CPU (For detailed CPU support information please contact your sales representative)

- **BIOS:** Award 4 Mb Flash BIOS
- **Chipset:** VIA CX700 Chipset 400 MHz FSB
- **Cache memory:** VIA Eden CPU integrated L2 cache.
- **System memory:** 1 x 200 pin SODIMM sockets, Double Data Rate 2 (DDR2) 128 MB to 1 GB, DDR2 400/533 MHz.
- **Power management:** Supports power saving modes including Normal / Standby / Suspend modes. ACPI 2.0 compliant
- **Enhanced IDE interface:** 1 EIDE channel for two devices. BIOS auto-detect up to UDMA -100
- **Watchdog timer:** 255 levels timer interval, from 1 to 255 sec. or min setup by software, jumper less selection, generates system reset
- **USB interface:** Supports 4 USB 2.0 ports
- **Expansion Interface:** Supports PCI / ISA interface

### 1.2.2 VGA/Flat panel Interface

- **Chipset:** VIA CX700 integrated 2D/3D graphic controller
- **Frame buffer:** Shared system memory up to 128 MB
- **Display type:** Simultaneously supports CRT / LCD displays; Dual-view supports CRT / LCD displays; Supports 48/24-bit LVDS TFT LCD
- **Display mode:** CRT Mode: Supports up to 2048 x 1536; LCD Mode: Supports up to 1280 x 1024

### 1.2.3 Audio function

- **Audio interface:** Supports AC'97 audio codec with Line In, Line Out and MIC In.

### 1.2.4 Ethernet

- **Chipset:** 10/100 Mbps: Realtek 8100CL Controller. Base on IEEE 10Base-T and 100Base-TX standard
- 

### 1.2.5 Mechanical and environmental

- **Dimensions:** SOM-Express form-factor, 114 mm x 95 mm (4.5" x 3.74")
- **Power supply voltage:** +5 V power only, +5 V standby for ATX power
- **Power requirement:** (w/1 GHz, 1 GB DDR2)
- Max: 5 V @ 2.18 A

- Typical: 5 V @1.82 A
- (w/ULV 1 GHz, 1 GB DDR2)
- Max: 5 V @ 1.81 A
- Typical: 5 V @ 1.43 A
- (w/600 MHz, 1 GB DDR2)
- Max: 5 V @ 2.02 A
- Typical: 5 V @ 1.82 A
- (w/400 MHz, 1 GB DDR2)
- Max: 5 V @ 1.84 A
- Typical: 5 V @ 1.71 A
- **Operating temperature:** 0 ~ 60° C (32 ~ 140° F)
- **Operating humidity:** 0% ~ 90% relative humidity, non-condensing
- **Weight:** 0.103 Kg (weight of total package)

## **Mechanical Information**

This Chapter gives mechanical and connector information on the SOM-4477 CPU System on Module

Sections include:

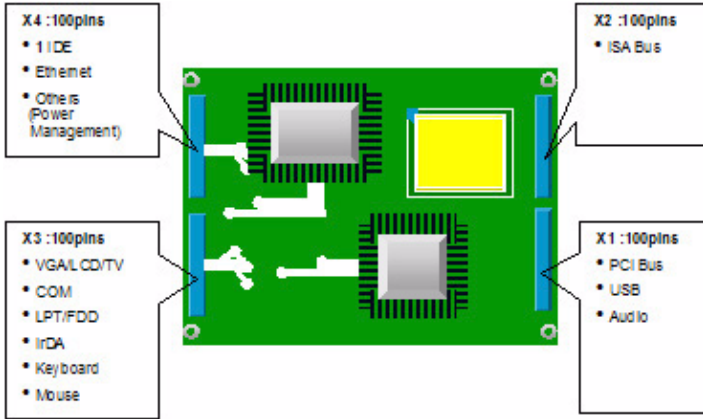
- Connector Information
- Mechanical Drawing

# Chapter 2 Mechanical Information

## 2.1 Board Connector

---

There are four connectors at the rear side of SOM-4477 for connecting to the carrier board.



**Figure 2.1: SOM-4477 Locating Connectors**

Pin Assignments for X1/2/3/4 connectors

Please refer to Advantech SOM-ETX Design Guide

## 2.2 Board Mechanical Drawing

### 2.2.1 Front Side

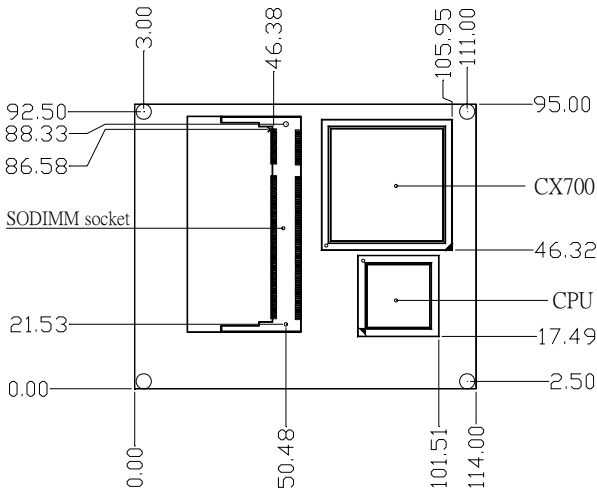


Figure 2.2: SOM-4477 Front Side Drawing

### 2.2.2 Rear Side

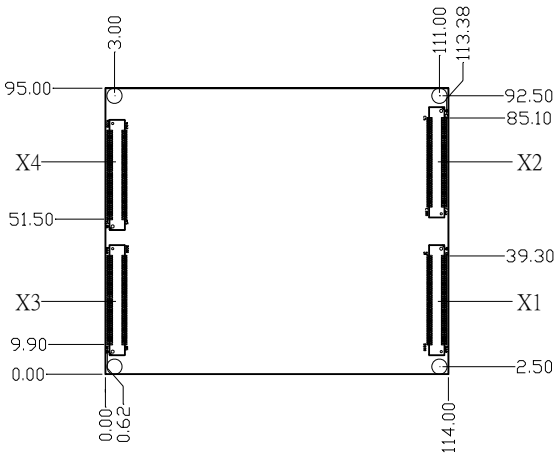
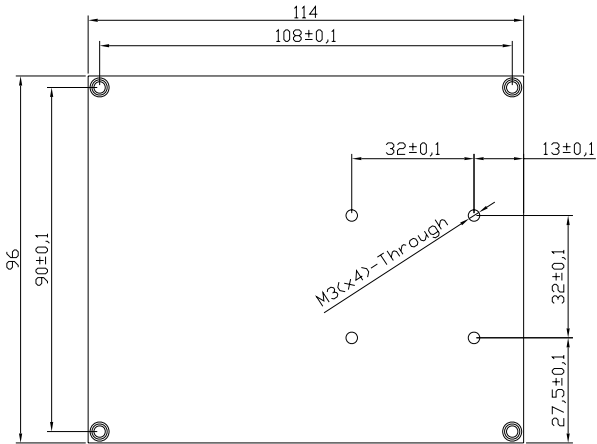


Figure 2.3: SOM-4477 Rear Side Drawing

## 2.3 Heatspreader Mechanical Drawing

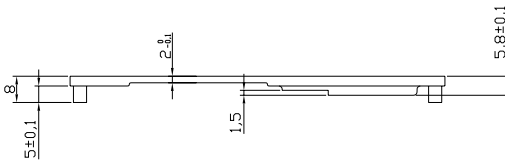
---

### 2.3.1 Heatspreader- Front View



*Figure 2.4: Heatspreader Front Drawing of SOM-4477*

### 2.3.2 Heatspreader- Side View



*Figure 2.5: Heatspreader Side Drawing of SOM-4477*





## BIOS Setup Information

This Chapter gives basic BIOS upgrade and Setup information on the SOM-4477 CPU System on Module

Sections include:

- Safety Precautions
- BIOS Update
- Basic BIOS Setup

# Chapter 3 BIOS Setup Information

## 3.1 Introduction

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The SOM-4477 system BIOS is located in Flash ROM. A Single Flash chip holds the system BIOS, VGA BIOS and network Boot ROM (optional). This method minimizes the number of chips and difficulty of configuration.

## 3.2 Safety Precautions

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**Caution!** *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 sensitive electronic components can be damaged by a sudden rush of power.*

*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 use.*

*Note: With some PS2 keyboards, if the user continuously clicks the “Del” key during the boot up process, the system may fail to enter the BIOS. To solve this problem, please reboot the system. We suggest users only click the “Del” key once to enter the CMOS setting page.*

### 3.3 BIOS Update

---

The SOM-4477 is supplied with a software utility on the CD-ROM. It contains all the necessary files for updating the BIOS. If you cannot find the below files, we can visit Advantech website at [www.advantech.com.tw](http://www.advantech.com.tw) to download it or contact our technical support person for help.

There are two files required for BIOS updating as below.

#### **AWDFLASH.EXE**

This program allows you to update the BIOS Flash ROM.

#### **4477V110.BIN (Example)**

This binary file contains the system BIOS.

Follow the process below to complete BIOS updating.

1. Apply power to the SOM-4477 application. Make sure that the AWDFLASH.EXE and \*.BIN files are located in the working drive.

*Note: Make sure that you do not run AWDFLASH.EXE while your system is operating in EMM386 mode.*

2. At the prompt, type AWDFLASH.EXE and press <Enter>. The BIOS configuration program will then display the following:
3. At the prompt, type in the BIN file. When you are sure that you have entered the file name correctly press <Enter>. The screen will ask "Do you want to save?" If you wish to continue press Y. If you change your mind or have made a mistake press N.
4. If you decide to continue, the screen will issue a prompt which will then ask "Are you sure to program (Y/N)?" If you wish to continue, press Y. Press N to exit the program. The new BIOS configuration will then write to the ROM BIOS chip.

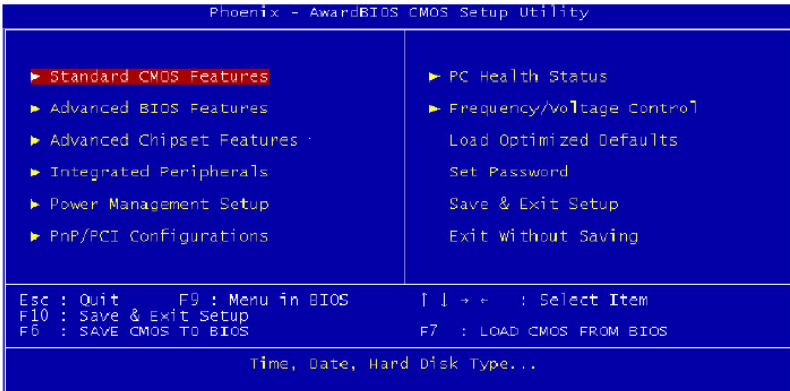
## 3.4 Basic BIOS Setup

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.

*Note: Please do not change the setting unless the default values do not meet your requirements. Inappropriately re configured BIOS settings may cause the system to become unstable. If the system becomes unstable. Please load the default values to ensure system stability.*

### 3.4.1 Enter the BIOS setup screen

Power on the system and click <Del> key under the BIOS post screen, below BIOS setup screen will show up.



Press arrow key to select the setting you would like to change. Press "Enter" key to enter the sub-screen.

### 3.4.2 Main Setup Item

#### *Standard CMOS Features*

This item allows the user to change the basic BIOS settings such as System Date, Time, FDD.....

#### *Advanced BIOS Features*

This item allows the user to change the CPU and booting devices

### ***Advanced Chipset Features***

This item allows the user to change the chipset and memory setting.

### ***Integrated Peripherals***

This item allows the user to change the Integrated Peripherals setting such as HDD, on board LAN, USB.

### ***Power Management Setup***

This item allows the user to change the system power management items, such as ACPI functions.

### ***PnP/PCI Configurations***

This item allows the user to change the Plug and Play and PCI resource setting, such as IRQ for VGA and USB.

### ***PC Health Status***

This item allows the user to monitor the system health status such as CPU & system temperatures, and voltage.

### ***Frequency / Voltage Control***

This item allows the user to change frequency of the CPU

### ***Load Optimized Default***

This item allows the user to load the optimized BIOS setting to achieve the best performance.

### ***Set Password***

This item allows the user to set Supervisor/User Passwords.

### ***Save & Exit Setup***

This item help to save BIOS changes you made and exit the setup screen.

### ***Exit Without Saving***

This item exit the BIOS setup screen without saving any changes.



## Driver Installation

This Chapter gives you the driver installation information on the SOM-4477 CPU System on Module

Sections include:

- Driver Information
- Driver Installation

# Chapter 4 Driver Installation

## 4.1 Driver Introduction

---

The CD shipped with SOM-4477 should contain below drivers, please follow the sequence to complete the driver installation.

**Step 1. Install VIA Hyperion 4 in 1 Driver for Windows XP/2000**

**Step 2. Install VIA Graphic Driver for Windows XP/2000**

**Step 3. Install Audio Driver for Windows XP/2000**

**Step 4. Install Ethernet Driver for Windows XP/2000**

*Note: For Windows XP Embedded support, please contact sales representative or a technical person.*

*Note: Downloading the update for Windows XP or Windows 2000 may be required for enabling USB 2.0 function. For detailed information please refer to below web link.*

<http://www.microsoft.com/whdc/system/bus/USB/USB2support.mspx>

## 4.2 Driver Installation

---

Insert the SOM-4477 CD into the CD-ROM device, an auto run program should show up. Click SOM-4477, and follow the installation process below from Step 1 to Step 4.

*Note: If the auto-run program doesn't execute appropriately. You can find related driver on the CD-ROM: \SOM\SOM-ETX\SOM-4477*

### 4.2.1 Step 1- Install VIA Hyperion 4 in 1 Driver for Windows XP/2000

1. Click on the "Chipset" folder and double click the "\*.exe" file.
2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.

### 4.2.2 Step 2- Install VIA Graphic Driver for Windows XP/2000

1. Click on the "VGA" folder and double click the "Setup.exe" file.
2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.

### 4.2.3 Step 3- Install Audio Driver for Windows XP/2000

1. Click on the "Audio" folder and double click the "Setup.exe" file.

2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.

#### **4.2.4 Step 4- Install Ethernet Driver for Windows XP/2000**

1. Click on the “LAN” folder and double click the “Setup.exe” file.
2. Follow the instructions that the driver installation wizard shows.
3. The system will help you to complete the driver installation.



## **System Assignments**

This Appendix gives you the information about the watchdog timer programming on SOM-4477 CPU System on Module.

Sections include:

- Watchdog Timer Programming

# Appendix A Watchdog Timer

## A.1 Programming the Watchdog Timer

---

Below is a sample of programming code for controlling the watchdog timer function.

-----  
Enter the extended function mode, interruptible double-write

```
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL; Write 87h to I/O address 2Eh to enable configuration mode
```

-----  
Configured logical device 8, configuration register CRF6

```
MOV DX,2EH
MOV AL,2BH; CR2B
OUT DX,AL
MOV DX,2FH
IN AL,DX
AND AL,0EFH; 111101111
OUT DX,AL; Set CR2B bit4=0 Pin 89=WDTO
MOV DX,2EH
MOV AL,07H; CR07
OUT DX,AL; Point to Logical Device Number Reg.
MOV DX,2FH
MOV AL,08H; logical device 8
OUT DX,AL; Select logical device 8
MOV DX,2EH
MOV AL,30H; CR30
OUT DX,AL;
MOV DX,2FH
MOV AL,01H; 01: activate 00: inactivate
```

```

OUT DX,AL; Set logical device 8 is active
MOV DX,2EH
MOV AL,F5H; CRF5
OUT DX,AL
MOV DX,2FH
MOV AL,00H; 00: second, 08: minute
OUT DX,AL; Set counter unit is second
MOV DX,2EH
MOV AL,F6H; CRF6
OUT DX,AL
MOV DX,2FH
MOV AL,05H; 00: time-out disable, 01: 1sec/min, 02: 2 sec/min,
...FF:255sec/min
OUT DX,AL; Set 5 seconds
;-----
; Exit extended function mode |
;-----
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

```



## System Assignments

This Appendix gives you the information about the system resource allocation on the SOM-4477 CPU System on Module.

Sections include:

- System I/O ports
- DMA Channel Assignments
- Interrupt Assignments
- 1<sup>st</sup> MB Memory Map

# Appendix B System Assignments

## B.1 System I/O Ports

**Table B.1: System I/O Ports**

Addr. range	
(Hex)	Device
000-00F	DMA controller
020-03F	Interrupt controller 1, (master)
040-05F	Timer/counter
060-06F	(keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI) Mark
080-09F	DMA page register
0A0-0BF	Interrupt controller 2 (slave)
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F8	Primary IDE channel
278-27F	Reserved
2F8-2FF	Serial port 2
360-36F	Parallel printer port 2 (LPT2)
378-37F	Parallel printer port 1 (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/Graphics Monitor Adapter
3F0-3F7	Diskette Controller

**Table B.1: System I/O Ports**

3F8-3FF	Serial port 1
---------	---------------

## **B.2 DMA Channel Assignments**

**Table B.2: DMA Channel Assignments**

<b>Channel</b>	<b>Functions</b>
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

## B.3 Interrupt Assignments

*Table B.3: Interrupt Assignments*

<b>Interrupt#</b>	<b>Interrupt source</b>
NMI	Parity error detected
IRQ 0	Interval timer
IRQ 1	Keyboard
IRQ 2	Interrupt from controller 2 (cascade)
IRQ 3	Serial communication port 2
IRQ 4	Serial communication port 1
IRQ 5	Available
IRQ 6	Diskette controller (FDC)
IRQ 7	Parallel port 1 (print port)
IRQ 8	Real-time clock
IRQ 9	Reserve
IRQ 10	Available
IRQ 11	Reserve for watchdog timer
IRQ 12	PS/2 mouse
IRQ 13	INT from co-processor
IRQ 14	Preliminary IDE
IRQ 15	Available

USB and Ethernet IRQ is automatically set by the system

## B.4 1st MB Memory Map

---

**Table B.4: 1st MB Memory Map**

<b>Addr. range (Hex)</b>	<b>Device</b>
F000h - FFFFh	System ROM
E000h - EFFFh	Unused
CC00h - DFFFh	Available
C000h - CBFFh	VGA BIOS
B800h - BFFFh	CGA/EGA/VGA text
B000h - B7FFh	Reserved for graphic mode usage
A000h - AFFFh	EGA/VGA graphics
0000h - 9FFFh	Base memory

\*default setting

