

**ASUS<sup>®</sup> SP98-N**  
Mini NLX Motherboard

**USER'S MANUAL**

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# FCC & DOC COMPLIANCE

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## ***Federal Communications Commission Statement***

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**WARNING!** Any changes or modifications to this product not expressly approved by the manufacturer could void any assurances of safety or performance and could result in violation of Part 15 of the FCC Rules.

## ***Canadian Department of Communications Statement***

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

**This Class B digital apparatus complies with Canadian ICES-003.**

**Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.**

# 1. INTRODUCTION

## 1.1 How This Manual Is Organized

This manual is divided into the following sections:

- |                              |  |
|------------------------------|--|
| 1) <b>INTRODUCTION</b>       | Manual information and checklist             |
| 2) <b>FEATURES</b>           | Product information and specifications       |
| 3) <b>HARDWARE SETUP</b>     | Instructions on setting up the motherboard   |
| 4) <b>BIOS SETUP</b>         | Instructions on setting up the BIOS software |
| 5) <b>SOFTWARE CONTENTS</b>  | Information on included software             |
| 6) <b>SOFTWARE REFERENCE</b> | Reference material for the included software |
| 7) <b>APPENDIX</b>           | Optional items and general reference         |

## 1.2 Item Checklist

Check that your package is complete. If you discover damaged or missing items, contact your retailer.

### 1.2.1 Motherboard

- (1) ASUS Motherboard
- (1) Support CD with drivers and utilities
- (1) This Motherboard User's Manual
- (1) NLX form-factor system housing, riser card, and power supply
- ASUS slim CD-ROM (optional)
- LCD panel connector with bracket (for LCD model only)
- ASUS IrDA-compliant infrared module (optional)
- ASUS PCI-L101 Wake-On-LAN 10/100 Fast Ethernet Card (optional)

**NOTE:** This motherboard only works with ASUS riser cards. See your dealer for more information.

### 1.2.2 Riser Card

- (1) ASUS Riser Card
- (1) Ribbon cable for master and slave UltraDMA/33 IDE drives
- (1) Ribbon cable for (1) 3.5" floppy disk drive
- (1) FDC slim CD-ROM cable (optional)
- (1) Bag of spare jumper caps

## 2. FEATURES

### 2.1 The ASUS SP98-N Motherboard

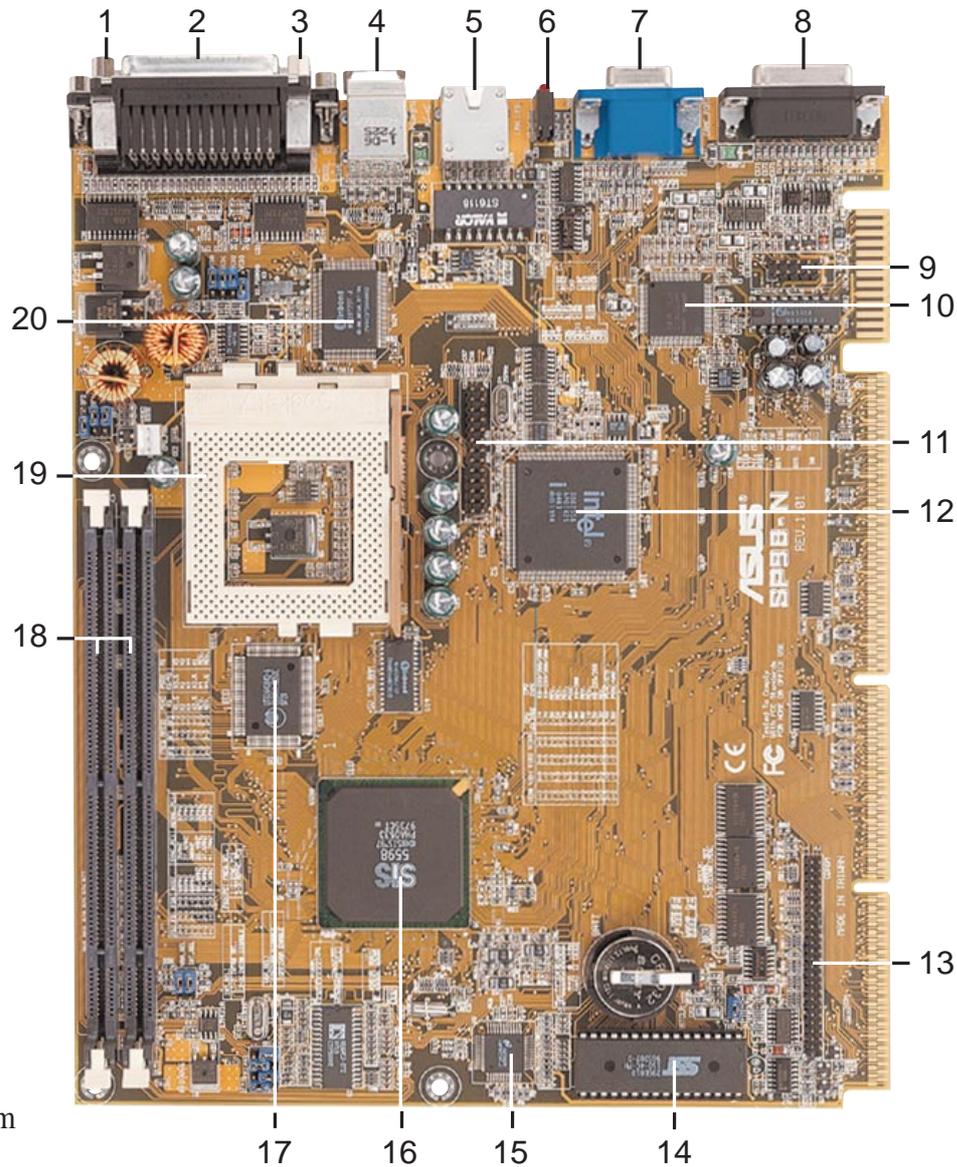
The ASUS SP98-N motherboard is carefully designed for the demanding PC user who wants many features in a small package:

#### 2.1.1 Specifications

- **Mini NLX:** Features ASUS' custom-designed mini-NLX form factor.
- **SiS PCIset:** SiS 5598 PCIset with built-in 64-bit PCI 2D graphics controller and support for video-shared memory from 1MB to 4MB.
- **Onboard Audio (optional):** Features Yamaha's ISA audio chip (OPL3-SA3®) with 3D surround and positioning capability.
- **Slim CD-ROM (optional):** Supports a notebook-sized slim CD-ROM drive.
- **Wake on LAN:** Supports wake on LAN activity with built-in network support.
- **Intel Network Interface:** Equipped with the Intel 82558 Ethernet LAN Controller (fully integrated 10BASE-T/100BASE-TX) with LED indicators for monitoring network conditions.
- **Multi-Processor/Multi-Speed Support:** AMD® K6®-2/266 & faster, AMD® K6®/166 & faster, AMD® K5™/100–133, IBM®/Cyrix® 6x86MX™/M II™ (PR166 & faster), IBM®/Cyrix® 6x86-PR166+ (Rev 2.7 or later), Intel® Pentium® 100–233MHz (P55C-MMX™, P54C/P54CS).
- **Versatile Memory Support:** Equipped with two DIMM sockets to support 8-128MB 168-pin 3.3Volt SDRAM memory modules up to 256MB.
- **Super Multi-I/O:** Provides an onboard I/O processor for two high-speed UART-compatible serial ports and one parallel port with EPP and ECP capabilities.
- **Level 2 Cache:** Comes with onboard 512K Pipelined Burst SRAM.
- **Desktop Management Interface (DMI):** Supports DMI through BIOS, which allows hardware to communicate within a standard protocol creating a higher level of compatibility. (Requires DMI-enabled components.) (See section V)
- **PCI Bus Master IDE Controller:** Onboard Ultra DMA/33 Bus Master IDE controller with two connectors (one for CD-ROM only). Supports two IDE devices up to 8.4GB using one channel. Supports Bus Master UltraDMA/33 IDE, PIO Modes 3 & 4, and Bus Master IDE DMA Mode 2. Includes integrated keyboard controller. Supports two of either 5.25-inch (360KB, 1.2KB) or 3.5-inch disk drives (720KB, 1.44MB, 2.88MB). Supports Japanese "Floppy 3 mode" (3.5-inch disk drive: 1.2MB) and LS-120 drives (3.5-inch disk drive: 120 MB, 1.44MB, 720K). BIOS supports IDE CD-ROM or SCSI device bootup.
- **Symbios SCSI BIOS:** Supports optional ASUS SCSI controller cards through onboard firmware.
- **Performance:** Provides 528MB/s data transfer rate using SDRAM, 33MB/s IDE transfer rate using Bus Master UltraDMA/33 IDE, concurrent PCI allows multiple PCI transfers.
- **Compliance:** ACPI ready for advanced power management features and PC97 compliance for greater support.
- **Easy Installation:** Incorporates BIOS that supports autodetection of hard disk drives, PS/2 mouse, and Plug and Play devices to make setup of hard disk drives, expansion cards, and other devices virtually automatic.
- **Riser Card:** Provides NLX power, IDE, floppy disk drive, LAN wake-up connectors, PCI/ISA slots, USB/infrared support.

# 2. FEATURES

## 2.2 Motherboard Parts



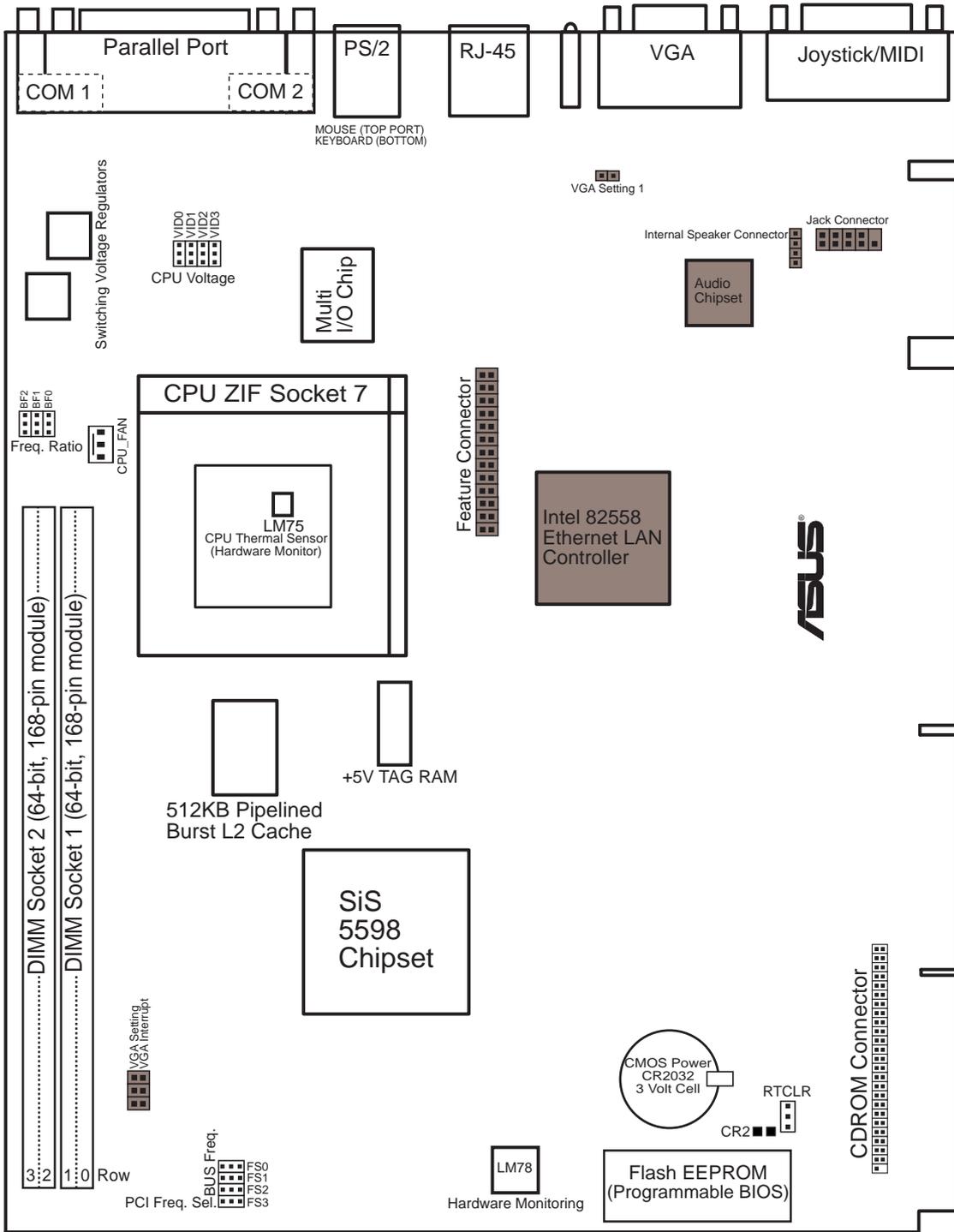
T: Top  
B: Bottom

- |   |   |
|---|---|
| 1 COM1 Connector (B)                    | 12 LAN Controller Chip (optional)               |
| 2 Parallel Connector (T)                | 13 Slim CD-ROM Drive Connector                  |
| 3 COM2 Connector (B)                    | 14 Programmable Flash EEPROM                    |
| 4 PS/2 Mouse (T)/Keyboard (B) Connector | 15 Hardware Monitoring Chip                     |
| 5 RJ-45 Connector                       | 16 SiS Chipset with Integrated Video Controller |
| 6 LAN LED                               | 17 512KB Pipelined Burst L2 Cache               |
| 7 VGA Connector                         | 18 DIMM Sockets                                 |
| 8 Joystick/MIDI Connector               | 19 CPU ZIF Socket 7                             |
| 9 Back Panel Audio Connector (optional) | 20 Multi-I/O Chip                               |
| 10 Audio CODEC (optional)               |   |
| 11 Video Feature Connector (optional)   |   |

2. FEATURES  
Motherboard Parts

# 3. HARDWARE SETUP

## 3.1 Motherboard Layout



Grayed items are optional at the time of purchase.

3. HW SETUP  
Motherboard Layout

# 3. HARDWARE SETUP

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## Motherboard Settings

- |                           |   |
|---------------------------|---|
| 1) VGA_SEL, VGA_SEL1      | p.16 VGA Setting                          |
| 2) INT_SEL                | p.16 VGA Interrupt Setting                |
| 3) BF0, BF1, BF2          | p.18 CPU:BUS Frequency Ratio              |
| 4) FS0, FS1, FS2          | p.18 CPU External Frequency Setting       |
| 5) VID0, VID1, VID2, VID3 | p.20 CPU Voltage Regulator Output Setting |
| 6) RTCLR                  | p.59 CMOS RTC RAM Setting                 |

## Sockets

- |                     |   |
|---------------------|---|
| 1) DIMM1, DIMM2     | p.22 168-Pin DIMM Memory Support          |
| 2) CPU ZIF Socket 7 | p.24 Central Processing Unit (CPU) Socket |

## Back Panel Connectors

- |              |   |
|--------------|---|
| 1) PARALLEL  | p.27 Parallel Port Connector (25-pin female)                |
| 2) COM1/COM2 | p.27 Serial Port Connector (Two 9-pin male)                 |
| 3) PS2KBMS   | p.28 PS/2 Mouse Port Connector (6-pin female)               |
| 4) PS2KBMS   | p.28 PS/2 Keyboard Port Connector (6-pin female)            |
| 5) RJ-45     | p.28 Fast-Ethernet Port Connector (8-pin female) (optional) |
| 6) LAN_LED   | p.28 LAN Diagnostic LEDs (3-diode Indicator)                |
| 7) VGA       | p.29 Monitor (VGA) Output Connector (15-pin female)         |
| 8) GAME      | p.29 Joystick/MIDI Connector (15-pin female) (optional)     |

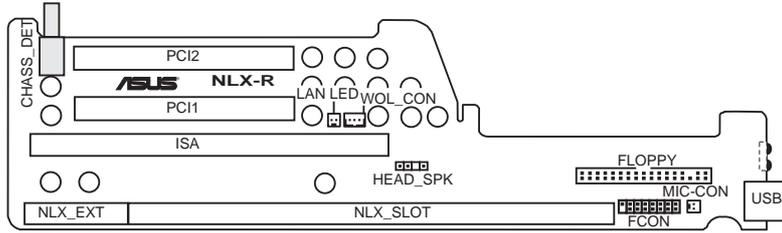
## Midboard Connectors

- |              |  |
|--------------|--|
| 1) CPU_FAN   | p.30 CPU Fan Connectors (3 pins)             |
| 2) CDROM     | p.30 CD-ROM Drive Connector (50-1 pins)      |
| 3) INT_SPKR  | p.31 Internal Speaker Connector (4 pins)     |
| 4) JACK_CONN | p.31 Back Panel Audio Connectors (10-1 pins) |
| 5) FEATURE   | p.32 Video Feature Connector (26 pins)       |

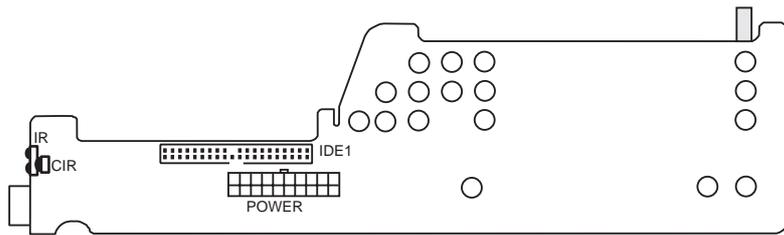
# 3. HARDWARE SETUP

## 3.2 Riser Card Layout

### 3.2.1 NLX-R

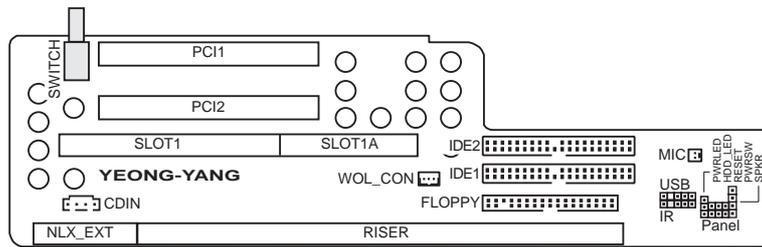


NLX-R Riser Card Front

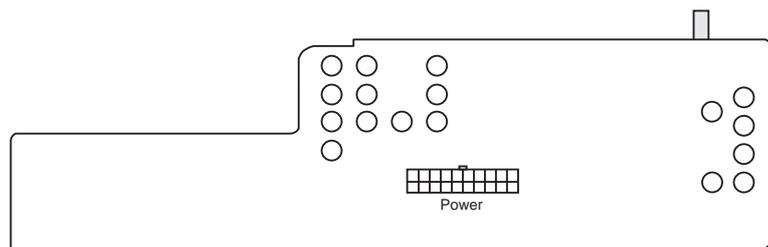


NLX-R Riser Card Back

### 3.2.2 Yeong-Yang



Yeong-Yang Riser Card Front



Yeong-Yang Riser Card Back

# 3. HARDWARE SETUP

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## Expansion Slots

- |  |      |  |
|--|------|--|
| 1) ISA (NLX-R)<br>SLOT1/1A (Yeong-Yang)          | p.25 | 16-bit ISA Bus Expansion Slot<br>16-bit ISA Bus Expansion Slot   |
| 2) PCI1, PCI2 (NLX-R)<br>PCI1, PCI2 (Yeong-Yang) | p.25 | 32-bit PCI Bus Expansion Slots<br>32-bit PCI Bus Expansion Slots |

## Connectors

- |   |      |   |
|---|------|---|
| 1) LAN_LED (NLX-R)<br>WOL_CON (NLX-R)<br>WOL_CON (Yeong-Yang) | p.33 | LAN Activity Connector (2 pins)<br>LAN Activity Connector (3 pins)<br>LAN Activity Connector (3 pins) |
| 2) MIC-CON (NLX-R)<br>MIC (Yeong-Yang)                        | p.33 | Front Panel Microphone Connector (2 pins)<br>Front Panel Microphone Connector (2 pins)                |
| 3) POWER (NLX-R)<br>Power (Yeong-Yang)                        | p.34 | NLX Power Supply Connector (20 pins)<br>NLX Power Supply Connector (20 pins)                          |
| 4) IDE1 (NLX-R)<br>IDE1, IDE2 (Yeong-Yang)                    | p.34 | IDE Connector (40-1 pins)<br>IDE Connectors (40-1 pins)   |
| 5) FLOPPY (NLX-R)<br>FLOPPY (Yeong-Yang)                      | p.35 | 3.5" Floppy Disk Drive Connector (34-1 pins)<br>3.5" Floppy Disk Drive Connector (34-1 pins)          |
| 6) USB (NLX-R)<br>USB (Yeong-Yang)                            | p.35 | Universal Serial Bus (USB) Ports (Two 4-pin sockets)<br>USB Module Connector (5-1 pins)               |
| 7) IR, CIR (NLX-R)<br>IR (Yeong-Yang)                         | p.36 | IrDA-Compliant Infrared Module (Lenses)<br>Infrared Module Connector (5-1 pins)                       |
| 8) CDIN (Yeong-Yang)  | p.37 | Stereo Audio In Connector (4 pins)  |
| 9) FCON/HEAD_SPK (NLX-R)<br>Panel (Yeong-Yang)                | p.37 | Front Panel Connector (16-1 pins)<br>Front Panel Connectors (13 pins)                                 |

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# 3. HARDWARE SETUP

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## 3.3 Hardware Setup Procedure

**NOTE:** The following procedure assumes that you have already installed the motherboards in an appropriate housing or case.

Before using your computer, you must complete the following steps:

1. **Check Motherboard Settings**
2. **Install Memory Modules**
3. **Install the Central Processing Unit (CPU)**
4. **Install Expansion Cards**
5. **Connect Ribbon Cables, Panel Wires, and Power Supply**

## 3.4 Motherboard Settings

This section explains in detail how to change your motherboard's function settings through the use of switches and/or jumpers.

**WARNING!** Computer motherboards and expansion cards contain very delicate Integrated Circuit (IC) chips. To protect them against damage from static electricity, you should follow some precautions whenever you work on your computer.

1. Unplug your computer when working on the inside.
2. Use a grounded wrist strap before handling computer components. If you do not have one, touch both of your hands to a safely grounded object or to a metal object, such as the power supply case.
3. Hold components by the edges and try not to touch the IC chips, leads or connectors, or other components.
4. Place components on a grounded antistatic pad or on the bag that came with the component whenever the components are separated from the system.

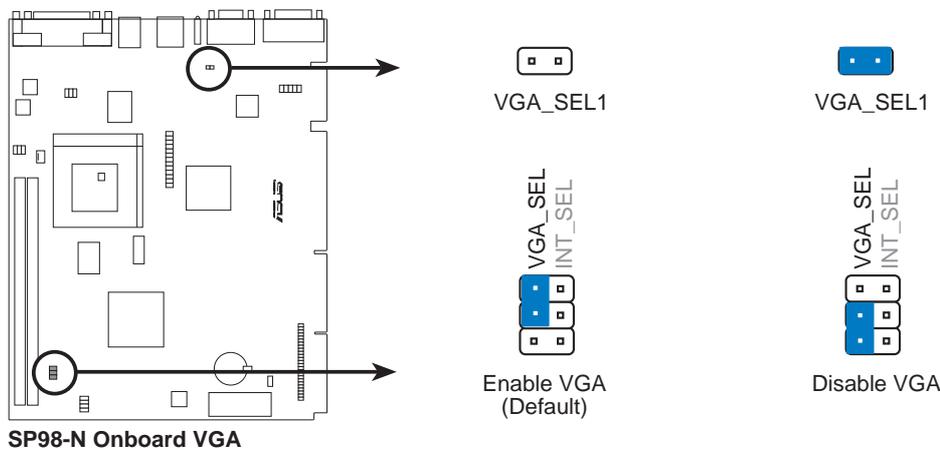
# 3. HARDWARE SETUP

## Using Your Own VGA Card on the PCI Expansion Slot

The motherboard's BIOS will autodetect whether a VGA card is installed on the PCI expansion slot and disable or enable the onboard VGA but most operating systems bypasses the BIOS and installs the onboard VGA through Plug and Play. The following VGA Selection jumpers are not required under standard configurations but if you experience any conflicts, follow the jumper settings below.

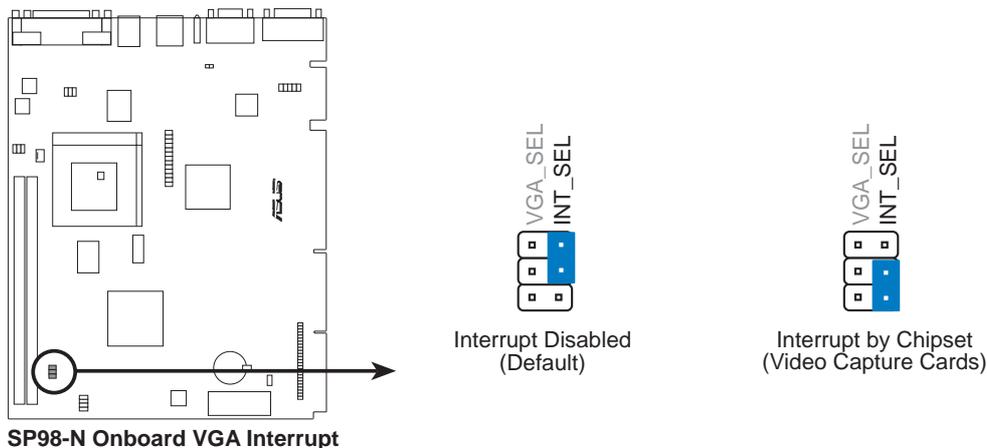
### 1. VGA Selection (VGA\_SEL, VGA\_SEL1)

These jumpers allow you to turn the onboard VGA on or off. BIOS has automatic Enable/Disable onboard VGA. You need to disable the onboard VGA only if you have conflicts within your operating system.



### 2. VGA Interrupt Selection (INT\_SEL)

These jumpers allow you to set the VGA interrupt method. The default disables the chipset's internal interrupt routing. Some video capture cards may require that the interrupt be assigned by the onboard chipset.



# 3. HARDWARE SETUP

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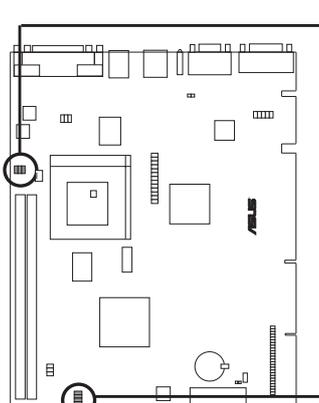
# 3. HARDWARE SETUP

## 3. CPU to BUS Frequency Ratio (BF0, BF1, BF2)

These jumpers set the frequency ratio between the *Internal* frequency of the CPU and the *External* frequency (called the *BUS Clock*) within the CPU. These must be set together with the above jumpers *CPU External (BUS) Frequency Selection*.

## 4. CPU External Clock (BUS) (FS0, FS1, FS2) and PCI Frequency Selection (FS3)

These jumpers tell the clock generator what frequency to send to the CPU. These allow the selection of the CPU's *External* frequency (or *BUS Clock*). The *BUS Clock* multiplied by the *BUS Ratio* equals the CPU's *Internal* frequency (the advertised CPU speed).



**SP98-N**

Match the **Mult.** (Multiple) column of the table on the opposite page with these CPU types:  
**CPU A:** AMD-K6-2, AMD-K6  
**CPU B:** Intel Pentium P54C, AMD-K5  
**CPU C:** Intel Pentium P55C, IBM/Cyrix 6x86MX, IBM/Cyrix M II  
**CPU D:** IBM/Cyrix 6x86, IBM/Cyrix 6x86L  
**CPU E:** IBM/Cyrix 6x86L

	BF2	BF1	BF0												
CPU A	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1
CPU B	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1
CPU C	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1
CPU D	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1
CPU E	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1

**CPU : BUS Frequency Multiple**

	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
FS0	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1
FS1	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1
FS2	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1
FS3	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1

	50MHz	55MHz	60MHz	66.8MHz	75.9MHz	83.3MHz
Host	→	→	→	→	→	→
Sync PCI	→	→	→	→	→	→
Async PCI	→	→	→	→	→	→

**CPU External Clock (BUS) Frequency Selection**

FS3  1  2  3      FS3  1  2  3

Synchronous PCI      Asynchronous PCI

**PCI Frequency Selection**

**WARNING!** Do not overclock your processor. Overclocking can cause undue stress on the CPU and motherboard. It may result in a slower speed or other unpredictable outcomes. The table on the following page shows the approved CPUs and their settings.

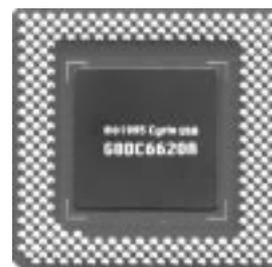
# 3. HARDWARE SETUP

Set the jumpers according to the internal speed of your processor as follows:

CPU Model	Freq.	Mult.	(BUS Freq.)				(Freq. Ratio)			
			BUS F.	FS0	FS1	FS2	FS3	BF2	BF1	BF0
AMD-K6-2/266	266MHz	A-4.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[2-3]	[1-2]	[2-3]
AMD-K6/300	300MHz	A-4.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[2-3]	[2-3]	[2-3]
AMD-K6/266	266MHz	A-4.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[2-3]	[1-2]	[2-3]
AMD-K6/233	233MHz	A-3.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
AMD-K6/200	200MHz	A-3.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]	[1-2]
AMD-K6/166	166MHz	A-2.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]	[2-3]
AMD-K5/133	100MHz	B-1.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
AMD-K5/120	90MHz	B-1.5x	60MHz	[1-2]	[2-3]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
AMD-K5/100	100MHz	B-1.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
AMD-K5/90	90MHz	B-1.5x	60MHz	[1-2]	[2-3]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
AMD-K5/75	75MHz	B-1.5x	50MHz	[2-3]	[2-3]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
Intel Pentium P54C	166MHz	B-2.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]	[2-3]
Intel Pentium P54C	150MHz	B-2.5x	60MHz	[1-2]	[2-3]	[2-3]	[1-2]	[1-2]	[2-3]	[2-3]
Intel Pentium P54C	133MHz	B-2.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[2-3]
Intel Pentium P54C	120MHz	B-2.0x	60MHz	[1-2]	[2-3]	[2-3]	[1-2]	[1-2]	[1-2]	[2-3]
Intel Pentium P54C	100MHz	B-1.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
Intel Pentium P54C	90MHz	B-1.5x	60MHz	[1-2]	[2-3]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
Intel Pentium P54C	75MHz	B-1.5x	50MHz	[2-3]	[2-3]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
Intel Pentium P55C	233MHz	C-3.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
Intel Pentium P55C	200MHz	C-3.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]	[1-2]
Intel Pentium P55C	166MHz	C-2.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]	[2-3]
IBM/Cyrix M II-PR333	333MHz	C-3.0x	83MHz	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]	[2-3]	[1-2]
IBM/Cyrix M II-PR300	300MHz	C-3.0x	75MHz	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[2-3]	[1-2]
IBM/Cyrix M II-PR300	300MHz	C-3.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[1-2]
IBM/Cyrix 6x86MX-PR233	200MHz	C-3.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]	[1-2]
IBM/Cyrix 6x86MX-PR200	166MHz	C-2.5x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]	[2-3]
IBM/Cyrix 6x86MX-PR166	150MHz	C-2.5x	60MHz	[1-2]	[2-3]	[2-3]	[1-2]	[1-2]	[2-3]	[2-3]
IBM/Cyrix 6x86-PR166+*	133MHz	D-2.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[2-3]
IBM/Cyrix 6x86L-PR166+*	133MHz	D-2.0x	66MHz	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[1-2]	[2-3]
IBM/Cyrix 6x86L-PR200+	150MHz	E-2.0x	75MHz	[1-2]	[2-3]	[1-2]	[2-3]	[1-2]	[1-2]	[2-3]

### \*Compatible Cyrix CPU Identification

The only IBM/Cyrix 6x86(L)-PR166+ (M1) CPU that is supported on this motherboard is revision 2.7 or later. Look at the underside of the CPU for the serial number. The number should read G8DC6620A or later.



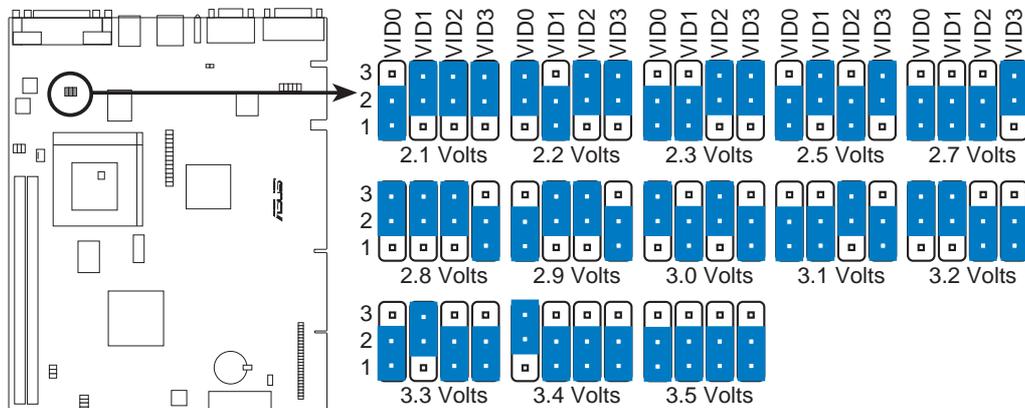
# 3. HARDWARE SETUP

## 5. Voltage Regulator Output Selection (VID0, VID1, VID2, VID3)

These jumpers set the voltage supplied to the CPU.

**WARNING!** Because CPU designs change rapidly, the table below is only intended as a simple guideline and thus may not be true for your CPU. Always refer to the CPU documentation for your CPU's voltage and then set the appropriate VID jumpers according to the illustration below.

Manufacturer	CPU Type	Single Plane	Dual Plane	VID0	VID1	VID2	VID3
AMD (.25micron)	K6-2/266,300,333, 350,366,380,400 K6/233,266,300	----	2.2V(Dual)	[2-3]	[1-2]	[2-3]	[2-3]
AMD	K5	3.5V(VRE)	----	[1-2]	[1-2]	[1-2]	[1-2]
IBM/Cyrix	6x86	3.5V(VRE)	----	[1-2]	[1-2]	[1-2]	[1-2]
Intel	P54C/P54CS	3.5V(VRE)	----	[1-2]	[1-2]	[1-2]	[1-2]
AMD	K5	3.4V(STD)	----	[2-3]	[1-2]	[1-2]	[1-2]
Intel	P54C/P54CS	3.4V(STD)	---	[2-3]	[1-2]	[1-2]	[1-2]
AMD (.35micron)	K6/233	----	3.2V(Dual)	[2-3]	[2-3]	[1-2]	[1-2]
AMD (.35micron)	K6/166,200	----	2.9V(Dual)	[1-2]	[2-3]	[2-3]	[1-2]
IBM/Cyrix	6x86MX	----	2.9V(Dual)	[1-2]	[2-3]	[2-3]	[1-2]
AMD (.35micron)	K6/166,200	----	2.9V(Dual)	[1-2]	[2-3]	[2-3]	[1-2]
Intel	P55C-MMX	----	2.8V(Dual)	[2-3]	[2-3]	[2-3]	[1-2]



SP98-N Voltage Regulator Output Selection

# 3. HARDWARE SETUP

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# 3. HARDWARE SETUP

## 3.5 System Memory (DIMM)

This motherboard uses only Dual Inline Memory Modules (DIMMs). Sockets are available for **3.3Volt** (power level) unbuffered Synchronous Dynamic Random Access Memory (SDRAM) or EDO DRAM of either 8, 16, 32, 64, or 128MB to form a memory size between 8MB to 256MB. One side (with memory chips) of the DIMM takes up one row on the motherboard.

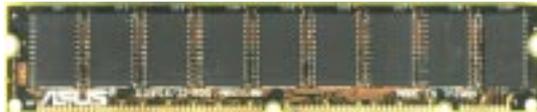
The SiS chipset does not support ECC. However, ECC memory modules may still be used, but the ECC function will not be available.

**IMPORTANT:** Memory speed setup is required through “Auto Configuration” in BIOS Chipset Features Setup.

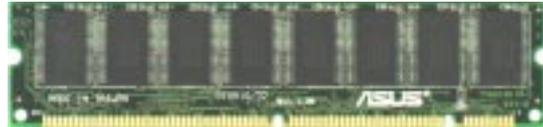
*Install memory in any combination as follows:*

DIMM Location	168-pin DIMM Memory Modules		Total Memory
Socket 1 (Rows 0&1)	SDRAM/EDO 8, 16, 32, 64, 128MB	x1	
Socket 2 (Rows 2&3)	SDRAM/EDO 8, 16, 32, 64, 128MB	x1	
	<b>Total System Memory (Max 256MB)</b>	=	

### ASUS DIMM Module Examples



Parity EDO DIMM (9 chips)



Non-Parity SDRAM DIMM (8 chips)

### 3.5.1 General DIMM Notes

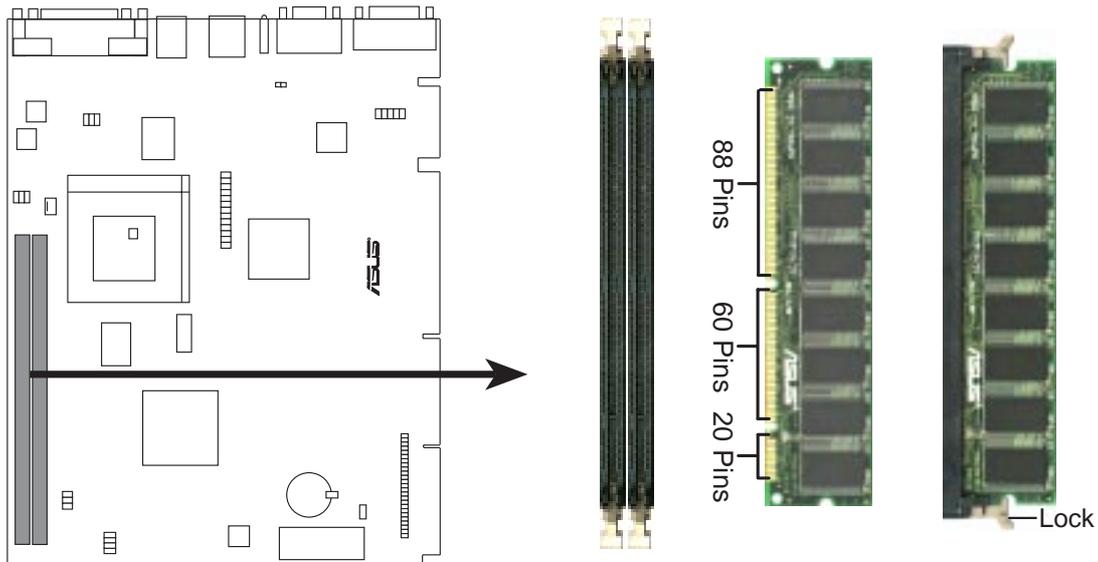
**NOTE:** These notes may not apply for all memory modules.

- Four possible memory chips are supported: EDO or SDRAM with and without parity.
- SDRAM chips are generally thinner with higher pin density than EDO chips.
- BIOS shows EDO or SDRAM memory on bootup screen.
- 8 chip/side modules do not support parity, only 9 chip/side modules support parity.
- Single sided modules are usually 16 or 64 MB, double sided are usually 8, 32, or 128MB.

# 3. HARDWARE SETUP

## 3.5.2 DIMM Memory Installation

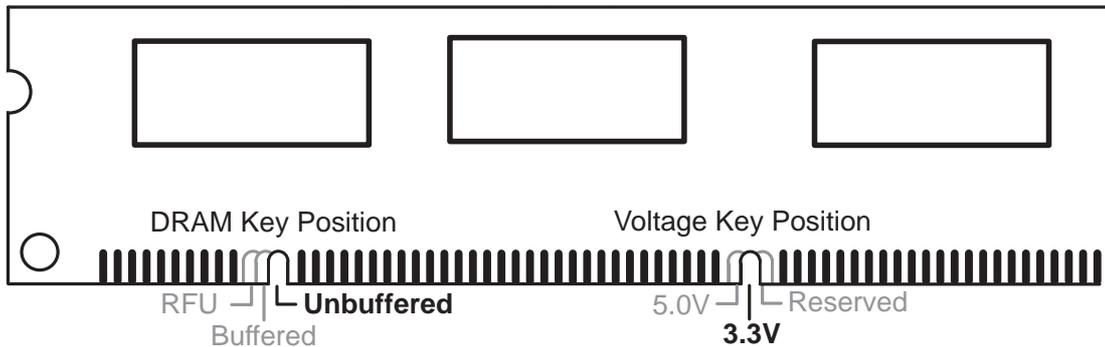
Insert the module(s) as shown. Because the number of pins are different on either side of the breaks, the module will only fit in the orientation as shown. DIMM modules are longer and have different pin contact on each side and therefore have a higher pin density. SIMM modules have the same pin contact on both sides.



### SP98-N 168-Pin DIMM Memory Sockets

The DIMMs must be **3.3V Unbuffered** for this motherboard. To determine the DIMM type, check the notches on the DIMMs (see figure below).

#### 168-Pin DIMM Notch Key Definitions (3.3V)



The notches on the DIMM module will shift between left, center, or right to identify the type and also to prevent the wrong type from being inserted into the DIMM slot on the motherboard. You must ask your retailer the correct DIMM type before purchasing. This motherboard supports four clock signals.

# 3. HARDWARE SETUP

## 3.6 Central Processing Unit (CPU)

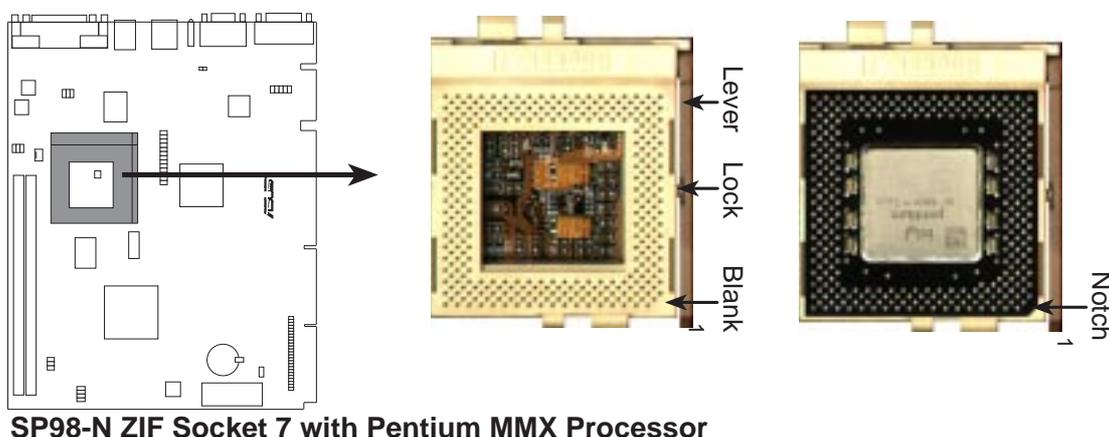
The motherboard provides a 321-pin ZIF Socket 7 that is backwards compatible with ZIF Socket 5 processors. The CPU that came with the motherboard should have a fan attached to it to prevent overheating. If this is not the case then purchase a fan before you turn on your system.

**WARNING!** Without a fan circulating air on the CPU, the CPU can overheat and cause damage to both the CPU and the motherboard.

To install a CPU, first turn off your system and remove its cover. Locate the ZIF socket and open it by first pulling the lever sideways away from the socket then upward to a 90-degree right angle. Insert the CPU with the correct orientation as shown. Use the notched corner of the CPU with the white dot as your guide. The white dot should point towards the end the of the lever. Notice that there is a blank area where one hole is missing from that corner of the square array of pin holes and a “1” printed on the motherboard next to that corner. Because the CPU has a corner pin for three of the four corners, the CPU will only fit in the one orientation as shown. The picture is for reference only; you should have a CPU fan that will cover the face of the CPU. With the added weight of the CPU fan, no force is required to insert the CPU. Once completely inserted, hold down on the fan and close the socket’s lever.

**IMPORTANT:** You must set jumpers for “CPU to BUS Frequency Ratio” and jumpers for “BUS Frequency Selection” depending on the CPU that you install.

**CAUTION!** Be careful not to scrape the motherboard when mounting a clamp-style processor fan or else damage may occur to the motherboard.



SP98-N ZIF Socket 7 with Pentium MMX Processor

# 3. HARDWARE SETUP

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## 3.7. Expansion Cards

**WARNING!** Make sure that you unplug your power supply when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your motherboard and expansion cards.

First read your expansion card documentation on any hardware and software settings that may be required to setup your specific card.

### 3.7.1 Expansion Card Installation Procedure:

1. Read the documentation for your expansion card.
2. Set any necessary jumpers on your expansion card.
3. Remove your computer system's cover.
4. Remove the bracket on the slot you intend to use. Keep the bracket for possible future use.
5. Carefully align the card's connectors and press firmly.
6. Secure the card on the slot with the screw you removed in step 4.
7. Replace the computer system's cover.
8. Setup the BIOS if necessary  
(such as "IRQ xx Used By ISA: Yes" in PNP AND PCI SETUP)
9. Install the necessary software drivers for your expansion card.

### 3.7.2 Assigning IRQs for Expansion Cards

Some expansion cards need to use an IRQ to operate. Generally an IRQ must be exclusively assigned to one use. In a standard design there are 16 IRQs available but most of them are already in use by parts of the system which leaves 6 free for expansion cards.

Both ISA and PCI expansion cards may need to use IRQs. System IRQs are available to cards installed in the ISA expansion bus first, and any remaining IRQs are then used by PCI cards. Currently, there are two types of ISA cards.

# 3. HARDWARE SETUP

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The original ISA expansion card design, now referred to as “legacy” ISA cards, requires that you configure the card’s jumpers manually and then install it in any available slot on the ISA bus. You may use Microsoft’s Diagnostic (MSD.EXE) utility included in the Windows directory to see a map of your used and free IRQs. For Windows 95 users, the “Control Panel” icon in “My Computer,” contains a “System” icon which gives you a “Device Manager” tab. Double clicking on a specific device give you “Resources” tab which shows the Interrupt number and address. Make sure that no two devices use the same IRQs or your computer will experience problems when those two devices are in use at the same time.

To simplify this process this motherboard has complied with the Plug and Play (PNP) specification, which was developed to allow automatic system configuration whenever a PNP-compliant card is added to the system. For PNP cards, IRQs are assigned automatically from those available.

If the system has both legacy and PNP ISA cards installed, IRQs are assigned to PNP cards from those not used by legacy cards. The PCI and PNP configuration of the BIOS setup utility can be used to indicate which IRQs are being used by legacy cards. For older legacy cards that does not work with the BIOS, you can contact your vendor for an ISA Configuration Utility.

An IRQ number is automatically assigned to PCI expansion cards after those used by legacy and PNP ISA cards. In the PCI bus design, the BIOS automatically assigns an IRQ to a PCI slot that has a card in it that requires an IRQ. To install a PCI card, you need to set something called the INT (interrupt) assignment. Since all the PCI slots on this motherboard use an INTA #, be sure that the jumpers on your PCI cards are set to INT A.

## 3.7.3 Assigning DMA Channels for ISA Cards

Some ISA cards, both legacy and PnP, may also need to use a DMA (Direct Memory Access) channel. DMA assignments for this motherboard are handled the same way as the IRQ assignment process described earlier. You can select a DMA channel in the PCI and PnP configuration section of the BIOS Setup utility.

**IMPORTANT:** To avoid conflicts, reserve the necessary IRQs and DMAs for legacy ISA cards (under PNP AND PCI SETUP of the BIOS SOFTWARE, choose *Yes* in *IRQ xx Used By ISA* and *DMA x Used By ISA* for those IRQs and DMAs you want to reserve).

## 3.7.4 ISA Cards and Hardware Monitor

The onboard hardware monitor uses the address 290H-297H so legacy ISA cards must not use this address or else conflicts will occur.

# 3. HARDWARE SETUP

## 3.8 External Connectors

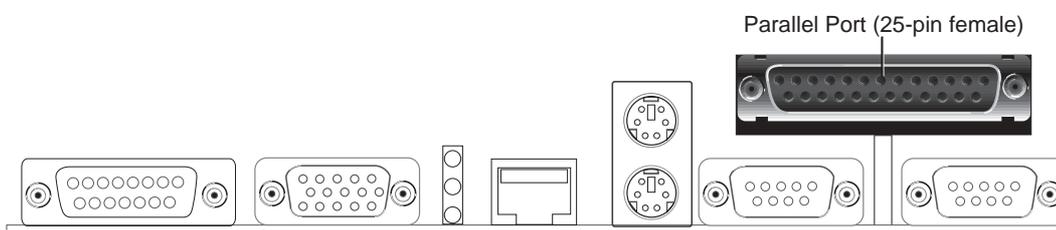
**WARNING!** Some pins are used for connectors or power sources. These are clearly distinguished from jumpers in *3.1 Motherboard Layout*. Placing jumper caps over these connector pins will cause damage to your motherboard.

**IMPORTANT:** Ribbon cables should always be connected with the red stripe to Pin 1 on the connectors. Pin 1 is usually on the side closest to the power connector on hard drives and CD-ROM drives, but may be on the opposite side on floppy disk drives. Check the connectors before installation because there may be exceptions. IDE ribbon cables must be less than 46 cm (18 in.), with the second drive connector no more than 15 cm (6 in.) from the first connector.

### 3.8.1 Back Panel Connectors

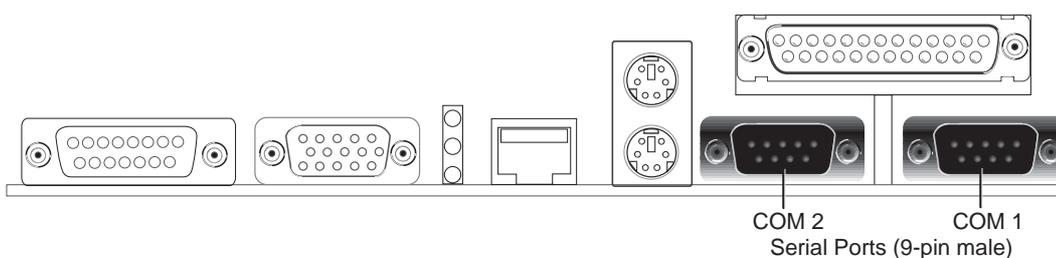
#### 1) Parallel Connector (25-pin PRINTER)

You can enable the parallel port and choose the IRQ through **Onboard Parallel Port** (see *4.4.2 I/O Device Configuration*). **NOTE:** Serial printers must be connected to the serial port.



#### 2) Serial Port Connectors (Two 9-pin COM1 and COM2)

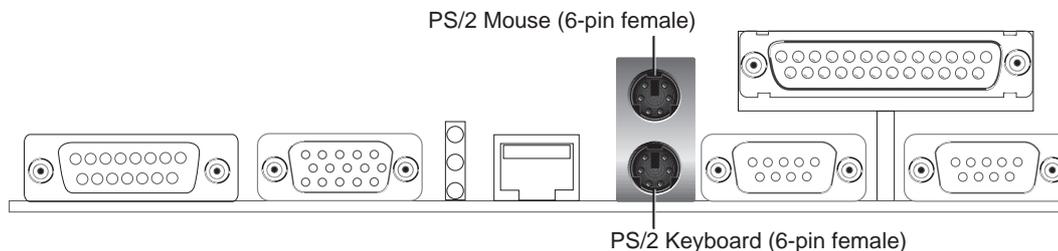
The two serial ports can be used for pointing devices or other serial devices. See **Onboard Serial Port 1** and **Onboard Serial Port 2** in *4.2.2 I/O Device Configuration* for settings.



# 3. HARDWARE SETUP

## 3) PS/2 Mouse Connector

The system will direct IRQ12 to the PS/2 mouse if one is detected. If not detected, expansion cards can use IRQ12. See **PS/2 Mouse Function Control** in *4.4 Advanced Menu*.

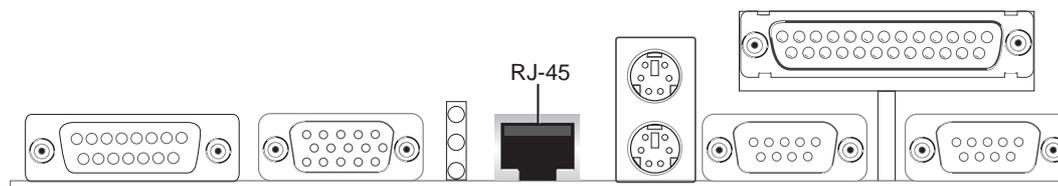


## 4) PS/2 Keyboard Connector (6-pin PS2KBMS)

This connector is for a standard keyboard using a PS/2 plug (mini DIN). **This connector will not allow standard AT size (large DIN) keyboard plugs. You may use a DIN to mini DIN adapter on standard AT keyboards.**

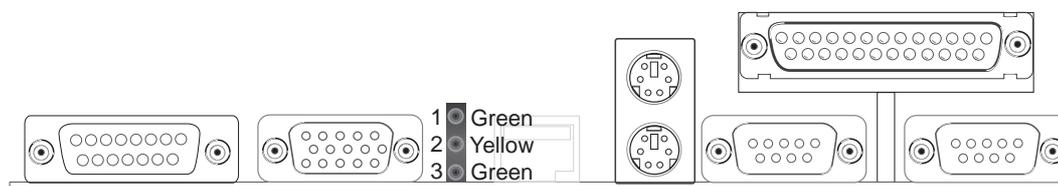
## 5) Fast-Ethernet Port Connector (RJ-45)

The RJ-45 connector is optional at the time of purchase. This connector allows the motherboard to connect to a **Local Area Network (LAN)** through a network hub.



## 6) LAN Diagnostic LEDs (LAN\_LED)

These diagnostic LEDs help indicate if there is a problem with the network connector, cable, or hub.



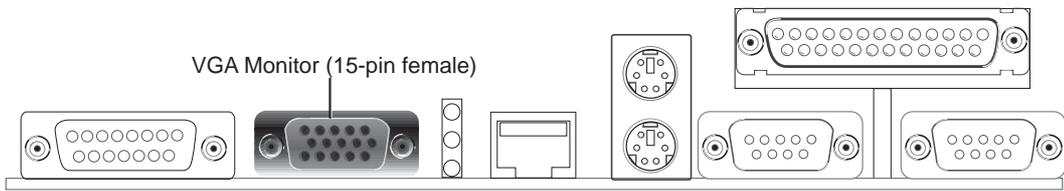
		LED OFF	LED ON
1	Speed	10Mbps	100Mbps
2	Activity	No data	Data transfer
3	Link	Bad connection	Good connection

# 3. HARDWARE SETUP

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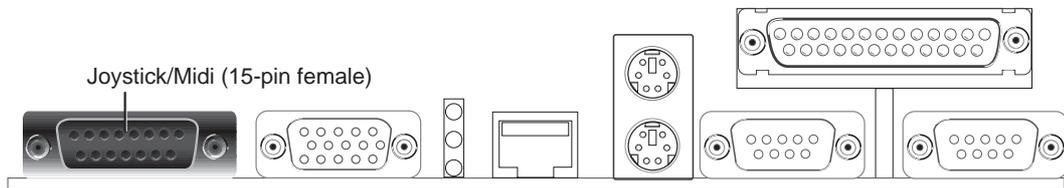
## 7) Monitor Connector (15-pin VGA)

This connector is for output to a VGA-compatible device.



## 8) Joystick/MIDI Connector (15-pin GAME)

You may connect game joysticks or game pades to this connector for playing games. Connect MIDI devices for playing or editing professional audio.



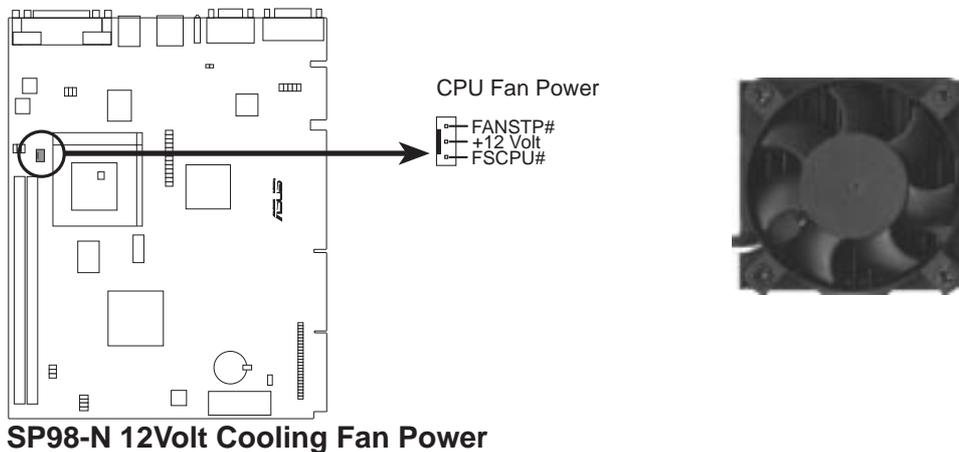
# 3. HARDWARE SETUP

## 3.8.2 Midboard Connectors

### 1) Chassis & CPU Fan Connectors (3-pin CHASIS\_, CPU\_FAN)

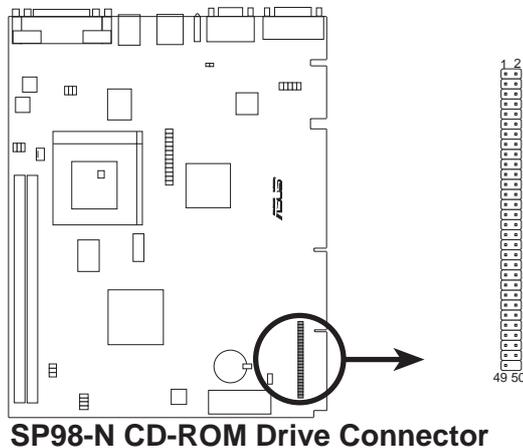
These connectors support cooling fans of 500mA (6 Watts) or less. Orientate the fans so that the heat sink fins allow airflow to go across the onboard heat sink(s) instead of the expansion slots. Depending on the fan manufacturer, the wiring and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of the connector. **NOTE: The "Rotation" signal is to be used only by a specially designed fan with rotation signal.**

**WARNING!** The CPU and/or motherboard will overheat if there is no airflow across the CPU and onboard heatsinks. Damage may occur to the motherboard and/or the CPU fan if these pins are incorrectly used. **These are not jumpers, do not place jumper caps over these pins.**



### 2) CD-ROM Connector (50-1 pin CDR0M)

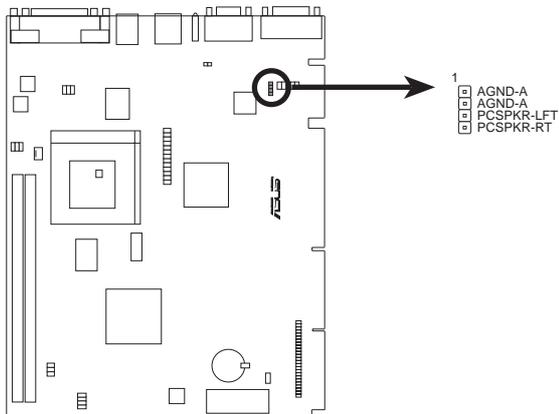
This is a proprietary CD-ROM connector which requires a converter in order to attach to a slim CD-ROM. Only a slim CD-ROM will fit into the NLX system housing.



# 3. HARDWARE SETUP

## 3) Internal Speaker Connector (4-pin)

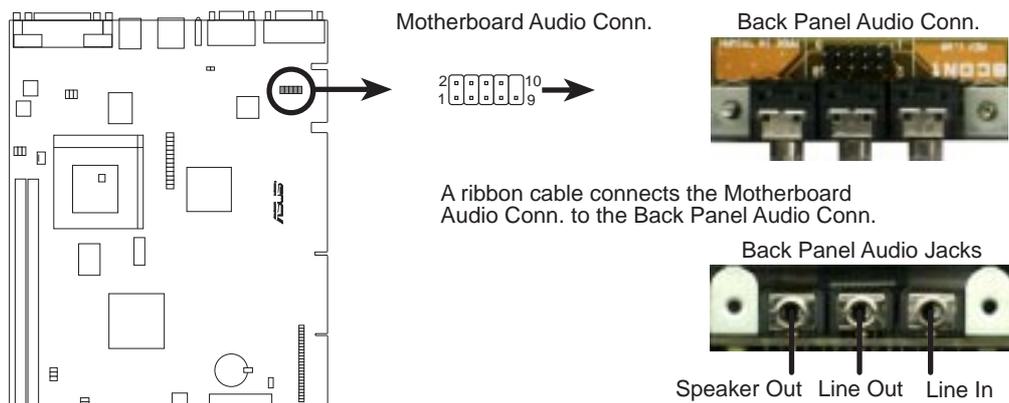
This connector is used to connect to an internal speaker.



**SP98-N Internal Speaker Connector**

## 4) Audio Jack Connector (10-1 pin JACK\_CON)

This header is provided for audio input and output signals.



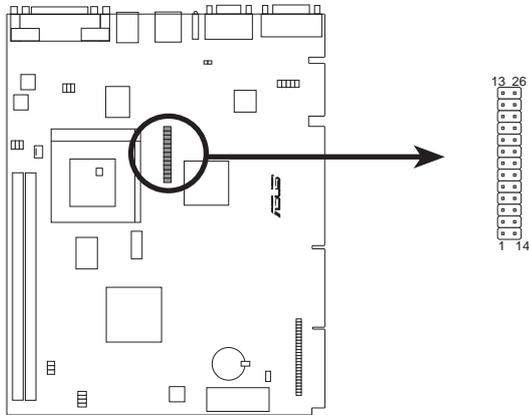
**SP98-N Audio Jack Connector**

# 3. HARDWARE SETUP

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## 5) Video Feature Connector (26-pin FEATURE)

This connector is used for third party video accessories, such as video capture cards or television tuners.



**SP98-N Video Feature Connector**

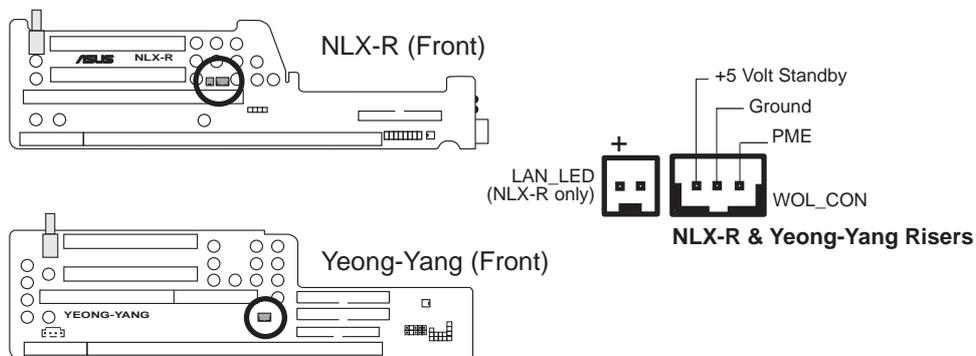
# 3. HARDWARE SETUP

## 3.8.3 Riser Card Connectors

### 1) LAN Activity Connectors

These connectors support Local Area Network (LAN) cards such as the ASUS PCI-L101 (see **7.1 ASUS PCI-L101 Fast Ethernet Card**) with output signals for data transfer activity. The LAN\_LED connector allows the front panel LED to flash during transfer activity between the network and the computer. The WOL\_CON connector allows the system to power up when there is a wakeup package (signal) received from the network.

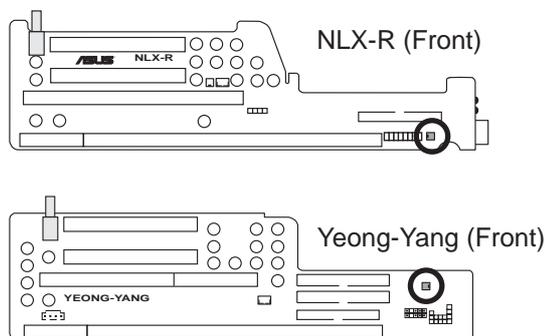
**IMPORTANT:** This feature requires that **Wake On LAN** is set to *Enabled* (see **4.5.1 Power Up Control**) and that your system has an NLX power supply with at least 720mA +5V standby power.



### LAN Activity Connectors

### 2) Front Panel Microphone Connector

This connector is used to connect the front panel microphone jack to the motherboard through a ribbon cable.



The front panel's 1/8" microphone jack connects to the riser card through a ribbon cable



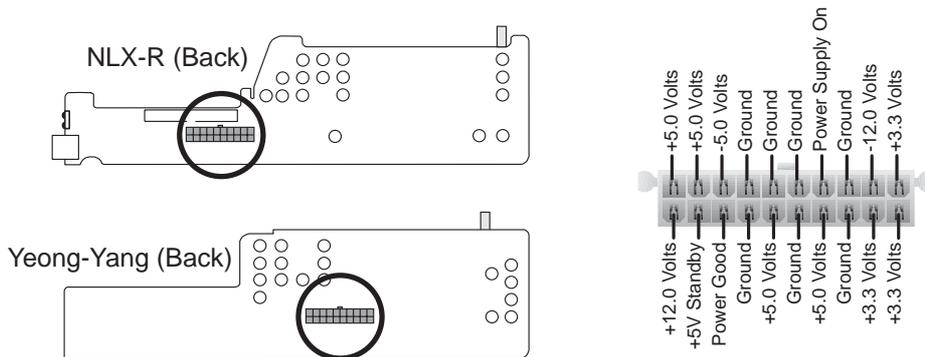
### Front Panel Microphone Jack

# 3. HARDWARE SETUP

## 3) NLX Power Supply Connector

This connector connects to an NLX power supply. The plug from the power supply will only insert in one orientation because of the different size holes. Find the proper orientation and push down firmly making sure that the pins are aligned.

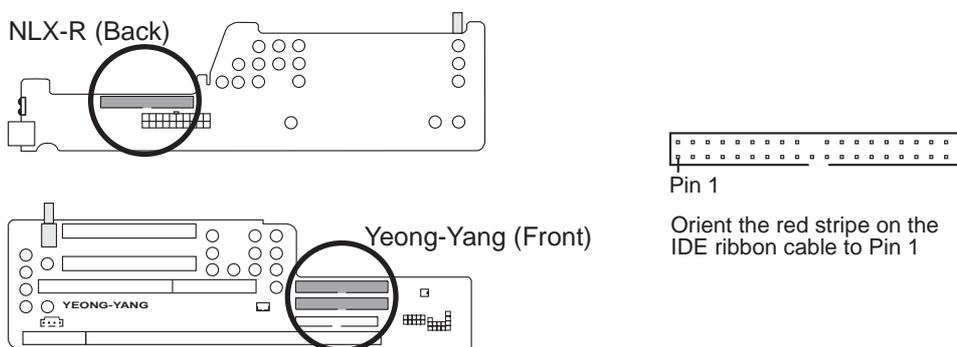
**IMPORTANT:** Make sure that the NLX power supply can deliver at least 720mA on the 5volt standby lead (+5VSB). You may experience difficulty in powering on your system if your power supply cannot support the load. For Wake-On-LAN support, your NLX power supply must supply at least 720mA +5VSB.



NLX Power Supply Connector

## 4) IDE Connectors

This connector supports the provided IDE hard disk drive ribbon cable. After connecting one end to the riser card, connect the other end to a hard disk drive. The primary IDE channel supports both a master and a slave IDE device but the system housing size only permits a standard IDE hard drive to be installed.



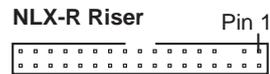
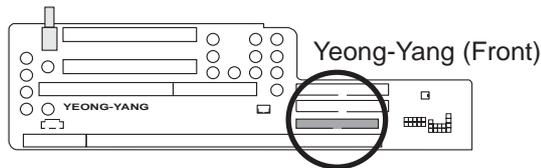
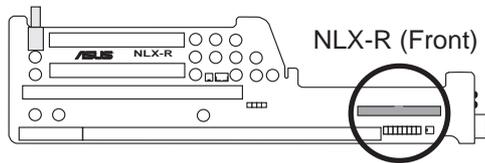
IDE Connectors

**IMPORTANT:** Ultra DMA/66 devices require a 40-pin 80-conductor cable to be enabled and/or for Ultra DMA Mode 4.

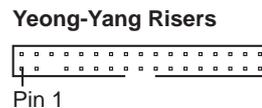
# 3. HARDWARE SETUP

## 5) 3.5" Floppy Disk Drive Connector

This connector supports the provided floppy drive ribbon cable. After connecting the single end to the riser card, connect the other end to a 3.5" floppy disk drive. **(Pin 5 is removed to prevent inserting in the wrong orientation when using ribbon cables with pin 5 plugged).**



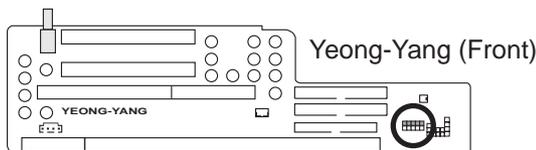
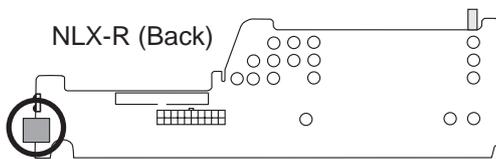
Orient the red stripe on the floppy ribbon cable to Pin 1



### Floppy Disk Drive Connector

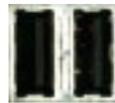
## 6) Universal Serial Bus (USB) Ports / USB Module Connector

If you have the NLX-R or B9-N risers, two Universal Serial Bus (USB) ports are available for connecting USB devices. If you have the Yeong-Yang riser, a 5-pin block is available for connecting an external connector set. This connector set can be mounted to an open slot on your computer's chassis. **USB Function** must be set to *Enabled* and **USB IRQ** to *Auto* in **4.4.3 PCI Configuration** to use USB features.



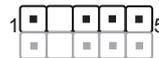
### NLX-R Riser

Port 1 Port 2



The USB ports show through the front panel

### Yeong-Yang Riser



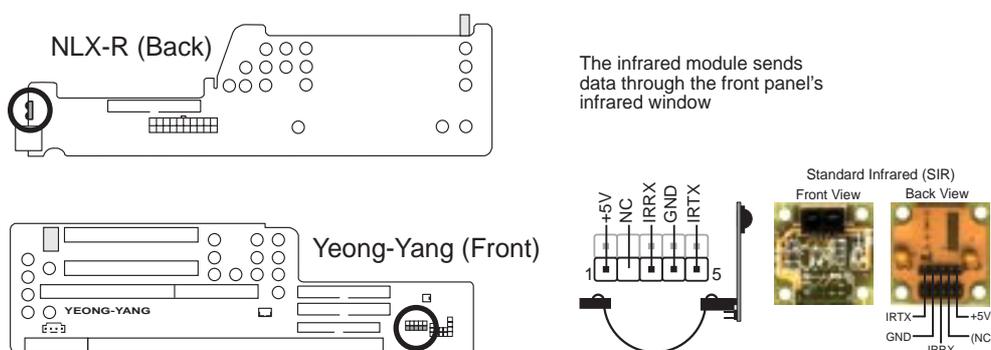
1: USB +5 Volt  
2: (no connection)  
3: USB Port 0+  
4: USB Port 0-  
5: USB +5Volt

### Universal Serial Bus (USB) Ports / USB Module Connector

# 3. HARDWARE SETUP

## 7) IrDA-Compliant Infrared Module / Infrared Module Connectors

The NLX-R riser includes an onboard infrared module for wireless transmitting and receiving of data through the front panel infrared lense. The B9-N and Yeong-Yang risers include an infrared module connector that supports an optional wireless transmitting and receiving infrared module. This module mounts to a small opening on system cases that support this feature. You must also configure the setting through **UART2 Use Infrared** (see **4.4.2 I/O Device Configuration**) to select whether UART2 is directed for use with COM2 or IrDA. Use the five pins as shown in Back View and connect an appropriate ribbon cable from the module to the motherboard's IR connector according to the pin definitions. An optional consumer infrared (CIR) set connects to the CIR and IR connectors simultaneously for both wireless transmitting and remote control functions through one external infrared module.



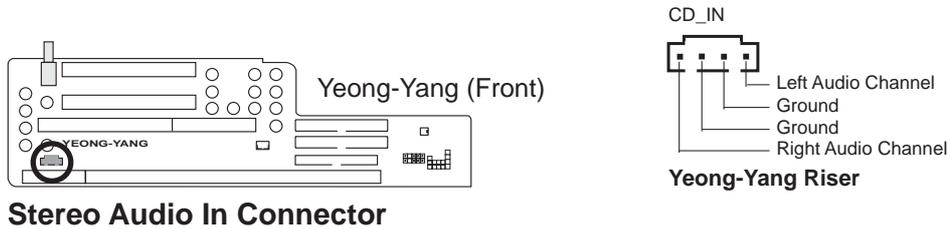
The infrared module sends data through the front panel's infrared window

**Infrared Module / Infrared Module Connector**

# 3. HARDWARE SETUP

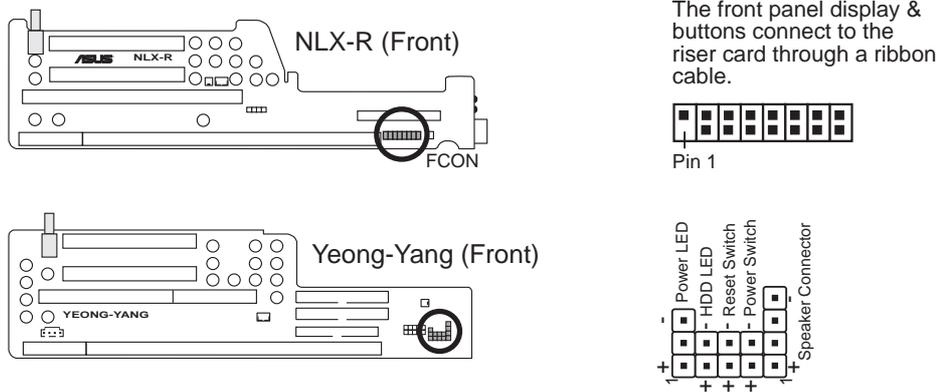
## 8) Stereo Audio In Connector

This connector lets you receive stereo audio input from an internal CD-ROM drive or other sound sources, such as a TV tuner or MPEG card.



## 9) Front Panel Connector

This connector is used to connect the front panel display LEDs and buttons to the motherboard through a ribbon cable.



Front Panel Display and Button Connector

3. HW SETUP  
Connectors

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# 3. HARDWARE SETUP

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## 3.9 Power Connection Procedures

1. After all connections are made, close the system case cover.
2. Be sure that all switches are off (in some systems, marked with ○).
3. Connect the power supply cord to the power supply located on the back of your system case according to your system user's manual.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. You may then turn on your devices in the following order:
  - a. Your monitor
  - b. External SCSI devices (starting with the last device on the chain)
  - c. Your system power

For ATX power supplies, you need to switch ON the power supply if a switch is provided as well as press the ATX power switch on the front of the case.

6. The power LED on the front panel of the system case will light. For ATX power supplies, the system LED will light when the ATX power switch is pressed. The LED on the monitor may light up or switch between orange and green after the system's if it complies with "green" standards or if it has a power standby feature. The system will then run power-on tests. While the tests are running, additional messages will appear on the screen. If you do not see anything within 30 seconds from the time you turn on the power, the system may have failed a power-on test. Check your jumper settings and connections again or call your retailer for assistance.
7. During power-on, hold down <Delete> to enter BIOS setup. Follow the instructions in **4. BIOS SETUP**.

- \* **Powering Off your computer:** You must first exit or shut down your operating system before switching off the power switch. For ATX power supplies, you can press the ATX power switch after exiting or shutting down your operating system. If you use Windows 95/98, click the **Start** button, click **Shut Down**, and then click **Shut down the computer?**. The power supply should turn off after Windows shuts down.

**NOTE:** The message "You can now safely turn off your computer" will not appear when shutting down with ATX power supplies.

## 4. BIOS SETUP

### 4.1 Managing and Updating Your BIOS

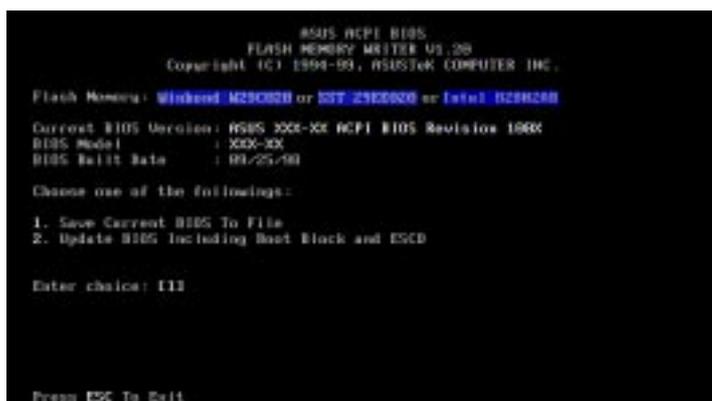
#### 4.1.1 Upon First Use of the Computer System

It is recommended that you save a copy of the original motherboard BIOS along with a Flash Memory Writer utility (AFLASH.EXE) to a bootable floppy disk in case you need to reinstall the BIOS later. **AFLASH.EXE** is a Flash Memory Writer utility that updates the BIOS by uploading a new BIOS file to the programmable flash ROM on the motherboard. This file works only in DOS mode. To determine the BIOS version of your motherboard, check the last four numbers of the code displayed on the upper left-hand corner of your screen during bootup. Larger numbers represent a newer BIOS file.

1. Type **FORMAT A:/S** at the DOS prompt to create a bootable system floppy disk. **DO NOT** copy AUTOEXEC.BAT & CONFIG.SYS to the disk.
2. Type **COPY D:\AFLASH\AFLASH.EXE A:\** (assuming D is your CD-ROM drive) to copy AFLASH.EXE to the just created boot disk.

**NOTE:** AFLASH works only in DOS mode. It will not work with DOS prompt in Windows and will not work with certain memory drivers that may be loaded when you boot from your hard drive. It is recommended that you reboot using a floppy.

3. Reboot your computer from the floppy disk. **NOTE:** BIOS setup must specify “Floppy” as the first item in the boot sequence.
4. In DOS mode, type **A:\AFLASH <Enter>** to run AFLASH.



```
ASUS ACPI BIOS
FLASH MEMORY WRITER V1.20
Copyright (C) 1994-99, ASUSTek COMPUTER INC.

Flash Memory: Winbond W25C020 or SST 25C020 or Intel ICH256

Current BIOS Version: ASUS 3005-02 ACPI BIOS Revision 1005
BIOS Model          : 3005-02
BIOS Build Date     : 09/25/98

Choose one of the followings:

1. Save Current BIOS To File
2. Update BIOS Including Boot Block and ESCD

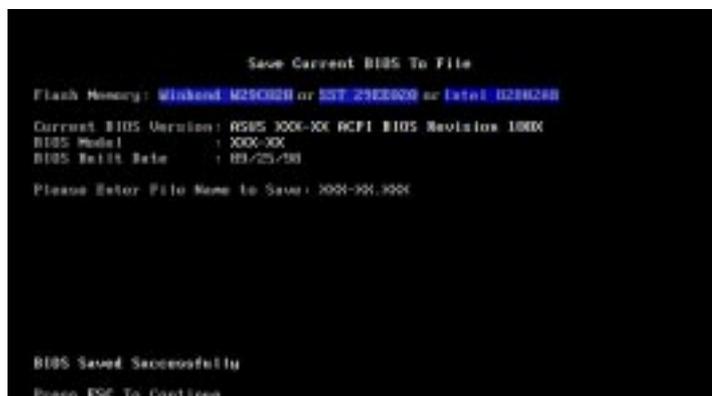
Enter choice: 111

Press ESC To Exit
```

**IMPORTANT:** If “unknown” is displayed after **Flash Memory:**, the memory chip is either not programmable or is not supported by the ACPI BIOS and therefore, cannot be programmed by the Flash Memory Writer utility.

## 4. BIOS SETUP

5. Select **1. Save Current BIOS to File** from the Main menu and press <Enter>. The **Save Current BIOS To File** screen appears.



6. Type a filename and the path, for example, **A:\XXX-XX.XXX** and then press <Enter>.

### 4.1.2 Updating BIOS Procedures (only when necessary)

1. Download an updated ASUS BIOS file from the Internet (WWW or FTP) (see ASUS CONTACT INFORMATION on page 3 for details) and save to the disk you created earlier.
2. Boot from the disk you created earlier.
3. At the “A:\” prompt, type **AFLASH** and then press <Enter>.
4. At the **Main Menu**, type **2** and then press <Enter>. The **Update BIOS Including Boot Block and ESCD** screen appears.
5. Type the filename of your new BIOS and the path, for example, **A:\XXX-XX.XXX**, and then press <Enter>.

**NOTE:** To cancel this operation, press <Enter>.



# 4. BIOS SETUP

6. When prompted to confirm the BIOS update, press **Y** to start the update.

```
Update BIOS Including Boot Block and ESCD
Flash Memory: Winbond W83C02B or SST 29C0209 or Intel 29C0218
BIOS Version
CURRENT 3 85FS 3000-00 ACPI BIOS Revision 1000
FlashMem3 85FS 3000-00 ACPI BIOS Revision 1000
BIOS Model
CURRENT 3 3000-00
FlashMem3 3000-00
Date of BIOS Build
CURRENT 3 05/25/98
FlashMem3 05/25/98
Notice: Boot Block is different. Check sum of 1881.F1B is F206.
File you want (Y/N) Y
Press ESC To Return to Main Menu
```

7. The utility starts to program the new BIOS information into the flash ROM. The boot block will be updated automatically only when necessary. This will minimize the chance of a failed updating. When the programming is finished, *Flashed Successfully* will be displayed.

```
Update BIOS Including Boot Block and ESCD
Flash Memory: Winbond W83C02B or SST 29C0209 or Intel 29C0218
BIOS Version
CURRENT 3 85FS 3000-00 ACPI BIOS Revision 1000
FlashMem3 85FS 3000-00 ACPI BIOS Revision 1000
BIOS Model
CURRENT 3 3000-00
FlashMem3 3000-00
Date of BIOS Build
CURRENT 3 05/25/98
FlashMem3 05/25/98
Notice: Boot Block is different. Check sum of 1881.F1B is F206.
File you want (Y/N) Y Y
Block Erasing -- Done
Programming -- 3FFFF
Flashed Successfully
Press ESC To Continue
```

8. Follow the onscreen instructions to continue.

```
BIOS ACPI BIOS
FLASH MEMORY WRITER V1.20
Copyright (c) 1996-99, ASTUTEK COMPUTER INC.
Flash Memory: Winbond W83C02B or SST 29C0209 or Intel 29C0218
Current BIOS Version: 85FS 3000-00 ACPI BIOS Revision 1000
BIOS Model : 3000-00
BIOS Build Date : 05/25/98
Choose one of the following:
1. Save Current BIOS To File
2. Update BIOS Including Boot Block and ESCD
Enter choice: 2
You have flashed the EPROM. It is recommended that you turn off
the power, enter SETUP and Load Setup Defaults to have CMOS
updated with new BIOS when exits.
Press ESC To Exit
```

**WARNING!** If you encounter problems while updating the new BIOS, DO NOT turn off your system since this might prevent your system from booting up. Just repeat the process, and if the problem still persists, update the original BIOS file you saved to disk above. If the Flash Memory Writer utility was not able to successfully update a complete BIOS file, your system may not be able to boot up. If this happens, your system will need servicing.

# 4. BIOS SETUP

## 4.2 BIOS Setup

The motherboard supports two programmable Flash ROM chips: 5 volts and 12 volts. Either of these memory chips can be updated when BIOS upgrades are released. Use the Flash Memory Writer utility to download the new BIOS file into the ROM chip as described in detail in this section.

All computer motherboards provide a Setup utility program for specifying the system configuration and settings. If your motherboard came in a computer system, the proper configuration entries may have already been made. If so, run the Setup utility, as described later, and take note of the configuration settings for future reference, in particular, the hard disk specifications.

If you are installing the motherboard, reconfiguring your system or you receive a Run Setup message, you will need to enter new setup information. This section describes how to configure your system using this utility.

The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the system provides you with the opportunity to run this program. This appears during the Power-On Self Test (POST). Press <Delete> to call up the Setup utility. If you are a little bit late pressing <Delete>, POST will continue with its test routines, thus preventing you from calling up Setup. If you still need to call Setup, reset the system by pressing <Ctrl> + <Alt> + <Delete>, or by pressing the Reset button on the system case. You can also restart by turning the system off and then back on again. Do this only, however, if the first two methods fail.

When you run Setup, the CMOS SETUP UTILITY main program screen will appear with the following options:



**NOTE:** Because the BIOS software is constantly being updated, the BIOS screens and descriptions are for reference purposes only and may not exactly reflect your BIOS screens.

# 4. BIOS SETUP

## 4.2.1 Load Defaults

**Load BIOS Defaults** loads the minimum settings for troubleshooting. **Load Setup Defaults**, on the other hand, is for loading optimized defaults for regular use. Choosing defaults at this level, will modify all applicable settings.

A section at the bottom of the above screen displays the control keys for this screen. Take note of these keys and their respective uses. Another section just below the control keys section displays information on the currently highlighted item in the list.

## 4.3 Standard CMOS Setup

**Standard CMOS Setup** allows you to record some basic system hardware configuration and set the system clock and error handling. If the motherboard is already installed in a working system, you will not need to select this option anymore. However, if the configuration stored in the CMOS memory on the board gets lost or damaged, or if you change your system hardware configuration, you will need to respecify the configuration values. The configuration values usually get lost or corrupted when the power of the onboard CMOS battery weakens.



The preceding screen provides you with a list of options. At the bottom of this screen are the control keys for this screen. Take note of these keys and their respective uses.

User-configurable fields appear in a different color. If you need information on the selected field, press <F1>. The help menu will then appear to provide you with the information you need. The memory display at the lower right-hand side of the screen is read-only and automatically adjusts accordingly.

### 4.3.1 Details of Standard CMOS Setup

#### Date

To set the date, highlight the “Date” field and then press either <Page Up>/<Page Down> or <+>/<-> to set the current date. Follow the month, day and year format. Valid values for month, day and year are: **Month: (1 to 12), Day: (1 to 31), Year: (up to 2079)**

# 4. BIOS SETUP

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## Time

To set the time, highlight the “Time” field and then press either <Page Up>/<Page Down> or <+>/<-> to set the current time. Follow the hour, minute and second format. Valid values for hour, minute and second are: (**Hour: (00 to 23)**, **Minute: (00 to 59)**, **Second: (00 to 59)**).

**NOTE:** You can bypass the date and time prompts by creating an AUTOEXEC.BAT file. For information on how to create this file, please refer to the MS-DOS manual.

## Hard Disks

This field records the specifications for all non-SCSI hard disk drives installed in your system. The onboard PCI IDE connectors provide Primary and Secondary channels for connecting up to four IDE hard disks or other IDE devices. Each channel can support up to two hard disks; the first of which is the “master” and the second is the “slave”.

Specifications for SCSI hard disks need not to be entered here since they operate using device drivers and are not supported by the BIOS. If you install other SCSI controller cards, refer to their respective documentations on how to install the required SCSI drivers.

### For IDE hard disk drive setup, you can:

- Use the *Auto* setting for detection during bootup.
- Use the IDE HDD AUTO DETECTION in the main menu to automatically enter the drive specifications.
- Enter the specifications yourself manually by using the “User” option.

The entries for specifying the hard disk type include **CYLS** (number of cylinders), **HEAD** (number of read/write heads), **PRECOMP** (write precompensation), **LANDZ** (landing zone), **SECTOR** (number of sectors) and **MODE**. The **SIZE** field automatically adjusts according to the configuration you specify. The documentation that comes with your hard disk should provide you with the information regarding the drive specifications.

The **MODE** entry is for IDE hard disks only, and can be ignored for MFM and ESDI drives. This entry provides three options: *Normal*, *Large*, *LBA*, or *Auto* (see below). Set **MODE** to the *Normal* for IDE hard disk drives smaller than 528MB; set it to *LBA* for drives over 528MB that support Logical Block Addressing (LBA) to allow larger IDE hard disks; set it to *Large* for drives over 528MB that do not support LBA. *Large* type of drive can only be used with MS-DOS and is very uncommon. Most IDE drives over 528MB support the *LBA* mode.

# 4. BIOS SETUP

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## **Auto detection of hard disks on bootup**

For each field: Primary Master, Primary Slave, Secondary Master, and Secondary Slave, you can select *Auto* under the TYPE and MODE fields. This will enable auto detection of your IDE hard disk during bootup. This will allow you to change your hard disks (with the power off) and then power on without having to reconfigure your hard disk type. If you use older hard disks that do not support this feature, then you must configure the hard disk in the standard method as described earlier by the “User” option.

**NOTE:** After the IDE hard disk drive information has been entered into BIOS, new IDE hard disk drives must be partitioned (such as with FDISK) and then formatted before data can be read from and write on. Primary IDE hard disk drives must have its partition set to *active* (also possible with FDISK).

**NOTE:** SETUP Defaults are noted in parenthesis next to each function heading.

## **Drive A / Drive B (None)**

These fields record the types of floppy disk drives installed in your system. The available options for drives A and B are: *360K, 5.25 in.; 1.2M, 5.25 in.; 720K, 3.5 in.; 1.44M, 3.5 in.; 2.88M, 3.5 in.; None*

To enter the configuration value for a particular drive, highlight its corresponding field and then select the drive type using the <page up>/<page down> or <+>/<-> keys.

## **Floppy 3 Mode Support (Disabled)**

This is the Japanese standard floppy drive. The standard stores 1.2MB in a 3.5inch diskette. This is normally disabled but you may choose from either: *Drive A, Drive B, Both, and Disabled*

## **Video (EGA/VGA)**

Set this field to the type of video display card installed in your system. The options are *EGA/VGA, CGA 40, CGA 80, and MONO* (for Hercules or MDA).

If you are using a VGA or any higher resolution card, choose *EGA/VGA*.

## **Halt On (All Errors)**

This field determines which types of errors will cause the system to halt. Choose from *All Errors; No Errors; All,But Keyboard, All,But Diskette; and All,But Disk/Key*.

# 4. BIOS SETUP

## 4.4 BIOS Features Setup

**BIOS Features Setup** consists of configuration entries that allow you to improve your system performance, or let you set up some system features according to your preference. Some entries are required by the motherboard's design to remain in their default settings.



**NOTE:** SETUP Defaults are noted in parenthesis next to each function heading.

### 4.4.1 Details of BIOS Features Setup

#### Boot Virus Detection (Enabled)

This field allows you to set boot virus detection, ensuring a virus-free boot sector. This new antivirus solution is unlike native BIOS tools, which offer limited virus protection typically by write-protecting the partition table. With this new solution, your computer is protected against boot virus threats earlier in the boot cycle, that is, before they have a chance to load into your system. This ensures your computer boots to a clean operating system. The system halts and displays a warning message when it detects a virus. If this occurs, you can either allow the operation to continue or use a virus-free bootable floppy disk to restart and investigate your system. Because of conflicts with new operating systems, for example, during installation of new software, you may have to set this to *Disabled* to prevent write errors.

#### CPU Internal Cache (Enabled)

Choose *Disable* to turn off the CPU's built-in level 1 cache.

#### External Cache (Enabled)

Choose *Disable* to turn off the CPU's external level 2 cache.

#### Quick Power On Self Test (Enabled)

This field speeds up the Power-On Self Test (POST) routine by skipping retesting a second, third, and fourth time. A complete test of the system is done on each test.

# 4. BIOS SETUP

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## **HDD Sequence SCSI/IDE First (IDE)**

When using both SCSI and IDE hard disk drives, IDE is always the boot disk using drive letter C (default setting of *IDE*). This field allows a SCSI hard disk drive to be the boot disk when set to *SCSI*. This allows multiple operating systems to be used on both IDE and SCSI drives or the primary operating system to boot using a SCSI drive

## **Boot Sequence (A,C)**

This field determines where the system looks first for an operating system. Options are *A,C; C,A; A,CDROM,C; CDROM,C,A; D,A; E,A; F,A; C only; LS/ZIP, C; LAN,A,C;* and *LAN,C,A*. The setup default setting, *A, C*, is to check first the floppy disk and then the hard disk drive.

## **Boot Up Floppy Seek (Disabled)**

When enabled, the BIOS will seek drive A one time.

## **Floppy Disk Access Control (R/W)**

This allows protection of files from the computer system to be copied to floppy disk drives by allowing the setting of *Read Only* to only allow reads from the floppy disk drive but not writes. The setup default *R/W* allows both reads and writes.

## **IDE HDD Block Mode Sectors (HDD MAX)**

This field enhances hard disk performance by making multi-sector transfers instead of one sector per transfer. Most IDE drives, except older versions, can utilize this feature. Selections are *HDD MAX, Disabled, 2, 4, 8, 16,* and *32*.

## **HDD S.M.A.R.T. capability (Disabled)**

This allows the enabling or disabling of the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) system which utilizes internal hard disk drive monitoring technology. This feature is normally disabled because system resources used in this feature may decrease system performance.

## **PS/2 Mouse Function Control (Auto)**

*Auto* allows the BIOS to detect the PS/2 mouse on bootup. If detected, IRQ12 will be used for the PS/2 Mouse. If not detected, IRQ12 will be reserved for expansion cards. *Enabled* will always reserve IRQ12 for devices on the PS/2 mouse port.

## **OS/2 Onboard Memory > 64M (Disabled)**

When using OS/2 operating systems with installed DRAM of greater than 64MB, you need to *Enable* this option otherwise leave this on the setup default of *Disabled*.

.....

## **PCI/VGA Palette Snoop (Disabled)**

Some display cards that are nonstandard VGA such as graphics accelerators or MPEG Video Cards may not show colors properly. The setting *Enabled* should correct this problem. Otherwise leave this on the setup default setting of *Disabled*.

## 4. BIOS SETUP

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### **Video ROM BIOS Shadow (Enabled)**

This field allows you to change the video BIOS location from ROM to RAM. Relocating to RAM enhances system performance, as information access is faster than the ROM.

### **C8000-CBFFF to DC000-DFFFF (Disabled)**

These fields are used for shadowing other expansion card ROMs. If you install other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow them specifically. Shadowing a ROM reduces the memory available between 640KB and 1024KB by the amount used for this purpose.

### **Boot Up NumLock Status (On)**

This field enables users to activate the Number Lock function upon system boot.

### **Typematic Rate Setting (Disabled)**

When enabled, you can set the two typematic controls listed next.

### **Typematic Rate (Chars/Sec) (6)**

This field controls the speed at which the system registers repeated keystrokes. Options range from 6 to 30 characters per second. Setup default setting is **6**; other settings are **8, 10, 12, 15, 20, 24, and 30**.

### **Typematic Delay (Msec) (250)**

This field sets the time interval for displaying the first and second characters. Four delay rate options are available: 250, 500, 750, and 1000.

### **Security Option (System)**

This field determines when the system prompts for the password. The default setting is *System*, where the system prompts for the User Password every time you boot up. The other option is *Setup*, where the system always boots up, and prompts for the Supervisor Password only when the Setup utility is called up. You can specify a password by using the *Supervisor Password* or *User Password* option from the main screen as explained later in this section..

# 4. BIOS SETUP

## 4.5 Chipset Features Setup

Chipset Features Setup controls the configuration of the board's chipset. Control keys for this screen are the same as for the previous screen.



**NOTE:** SETUP Defaults are noted in parenthesis next to each function heading.

### 4.5.1 Details of Chipset Features Setup

#### EDO/FPM Configuration (60ns DRAM)

The default setting of *60ns DRAM* automatically sets the optimal timings for items 2–7 for 60ns DRAM modules. If you are using 70ns DRAM modules, change this item to *70ns DRAM*. See **3.5 System Memory (DIMM)** for memory installation information. *Disabled* allows you to configure RAS Precharge Time, RAS to CAS Delay, CAS Precharge Time, CAS Pulse Width (Read and Write), and Refresh RAS Assertion. For DRAM Read Leadoff Time, leave this item on its default setting of **5T**.

**SDRAM Configuration (12ns SDRAM):** Leave on default setting.

**SDRAM Read Leadoff Time (Normal):** Leave on default setting.

#### CPU to PCI Posted Write (Enabled)

This is a mechanism that, when *Enabled*, improves the performance of CPU to PCI memory write and CPU to Idle data port write.

**ROM Cycle Wait States (1-Wait):** Timing for 16-bit ISA cards. Leave on default.

**16-bit I/O Recovery Time (5 BUSCLK):** Timing for 16-bit ISA cards. Leave on default.

**8-bit I/O Recovery Time (8 BUSCLK):** Timing for 8-bit ISA cards. Leave on default.

**ISA Bus Clock (PCICLK/4):** Timing for the ISA bus clock. Leave on default.

# 4. BIOS SETUP

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## **Memory Hole at Address (None)**

This feature reserves memory address space, *15M-16M*, *14M-16M*, or *12M-16M*, to ISA expansion cards that specifically require this setting. This, however, makes the memory from the specified and up unavailable to the system because expansion cards can only access memory up to 16MB.

## **Refresh Cycle Time (187.2 us)**

This function sets the DRAM refresh rate. A slow refresh cycle time increases the bandwidth available for data transfers. **NOTE:** Some DRAMs are known to lose data without frequent refreshing so the default is set at *187.2 us*.

## **Delayed Transaction (Enabled)**

The default setting of *Enabled* frees the PCI Bus during CPU accessing of 8-bit ISA cards, which normally consume about 50–60 PCI clocks without PCI delayed transaction. For PCI bus masters that cannot use the PCI Bus and some ISA cards that are not PCI 2.1 compliant, set this to *Disabled*.

## **Onboard VGA Memory Size (1MB)**

This function allows the user to allocate either 1MB, 2MB or 4MB memory for the onboard video controller. Larger memory allows more colors and a higher resolution to be selected within each operating system.

## **Onboard VGA Memory Clock (Leave on default setting of Fast)**

This function allows the selection of the video speed. Normal uses 50MHz, Fast uses 60MHz, and Fastest uses 66MHz. If your monitor displays unrecognizable information, *you must* decrease the speed to match your monitor's frequency rate.

.....

## **Onboard FDC Controller (Enabled)**

When enabled, this field allows you to connect your floppy disk drives to the onboard floppy drive connector instead of a separate controller card. If you want to use a different controller card, set this field to *Disabled*.

## **Onboard FDC Swap A & B (No Swap)**

This field allows you to reverse the hardware drive letter assignments of your floppy disk drives. Two options are available: *No Swap* and *Swap AB*. If you want to switch drive letter assignments through the onboard chipset, set this field to *Swap AB*.

## **Onboard Serial Port 1 (3F8H/IRQ4)**

Settings are *3F8H/IRQ4*, *2F8H/IRQ3*, *3E8H/IRQ4*, *2E8H/IRQ10*, and *Disabled* for the onboard serial connector.

## **Onboard Serial Port 2 (2F8H/IRQ3)**

Settings are *3F8H/IRQ4*, *2F8H/IRQ3*, *3E8H/IRQ4*, *2E8H/IRQ10*, and *Disabled* for the onboard serial connector.

# 4. BIOS SETUP

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## **Onboard Parallel Port (378H/IRQ7)**

This field sets the address of the onboard parallel port connector. You can select either *3BCH/IRQ 7*, *378H/IRQ 7*, *278H/IRQ 5*, or *Disabled*. If you install an I/O card with a parallel port, ensure that there is no conflict in the address assignments. The PC can support up to three parallel ports as long as there are no conflicts for each port.

## **Parallel Port Mode (ECP+EPP)**

This field allows you to set the operation mode of the parallel port. The setting *Normal*, allows normal-speed operation but in one direction only; *EPP* allows bidirectional parallel port operation at maximum speed; *ECP* allows the parallel port to operate in bidirectional mode and at a speed faster than the maximum data transfer rate; *ECP+EPP* allows normal speed operation in a two-way mode.

## **ECP DMA Select (3)**

This selection is available only if you select *ECP* or *ECP+EPP* in the **Parallel Port Mode**. Select either DMA Channel *1*, *3*, or *Disabled*.

## **UART2 Use Infrared (Disabled)**

When *Enabled*, this field activates the onboard infrared feature and sets the second serial UART to support the infrared module connector on the motherboard using the IrDA standard. Select *ASKIR* to enable the Japanese infrared standard. If your system already has a second serial port connected to the onboard COM2 connector, it will no longer work if you enable the infrared feature. By default, this field is set to *Disabled*, which leaves the second serial port UART to support the COM2 serial port connector.

## **Onboard PCI IDE Enable (Both)**

You can select to enable the *Primary* IDE channel, *Secondary* IDE channel, *Both*, or *Disable* both channels (for systems with only SCSI drives).

## **IDE Ultra DMA Mode (Auto)**

This sets the IDE UltraDMA to be active when using UltraDMA-capable IDE devices. The BIOS will automatically adjust or disable this setting for slower IDE devices so that Auto or high settings will not cause problems for older IDE devices. Choose *Disable* if you do not want this feature for all devices.

## **IDE 0 Master/Slave PIO/DMA Mode, IDE 1 Master/Slave PIO/DMA Mode (Auto)**

Each channel (0 & 1) has both a master and a slave making four IDE devices possible. Because each IDE device may have a different Mode timing (0, 1, 2, 3, 4), it is necessary for these to be independent. PIO and DMA timings can be independently set. The default setting of *Auto* will allow autodetection to ensure optimal performance.

# 4. BIOS SETUP

## 4.6 Power Management Setup

**Power Management Setup** allows you to reduce power consumption. This feature turns off the video display and shuts down the hard disk after a period of inactivity.



**NOTE:** SETUP Defaults are noted in parenthesis next to each function heading.

### 4.6.1 Details of Power Management Setup

#### Power Management (User Define)

This field acts as the master control for the power management modes. *User Define* allows you to set power saving options according to your preference; *Disable* disables the power saving features; *Min Saving* puts the system into power saving mode after 40 min of system inactivity; *Max Saving* puts the system into power saving mode after 30 sec of system inactivity.

**IMPORTANT:** Advanced Power Management (APM) should be installed to keep the system time updated when the computer enters suspend mode activated by the BIOS Power Management. For DOS environments, you need to add the statement, `DEVICE=C:\DOS\POWER.EXE`, in your `CONFIG.SYS`. For Windows 3.x and Windows 95, you need to install Windows with the APM feature. A battery and power cord icon labeled “Power Management” will appear in the “Control Panel.” Choose “Advanced” in the Power Management Field.

#### Video Off Option (Susp,Stby -> Off )

This field determines when to activate the video off feature for monitor power management. The settings are *All Modes -> Off*; *Always On*; *Suspend -> Off*; and *Susp,Stby -> Off*.

#### Video Off Method (DPMS OFF)

This field defines the video off features. The following options are available: *DPMS OFF*, *DPMS Reduce ON*, *Blank Screen*, *V/H SYNC+Blank*, *DPMS Standby*, and *DPMS Suspend*. The DPMS (Display Power Management System) features allow

# 4. BIOS SETUP

the BIOS to control the video display card if it supports the DPMS feature. *Blank Screen* only blanks the screen (use this for monitors without power management or “green” features. If set up in your system, your screen saver will not display with *Blank Screen* selected). *V/H SYNC+Blank* blanks the screen and turns off vertical and horizontal scanning.

---

## *PM Timers*

This section controls the time-out settings. The fields included in this section are **HDD Power Down**, which places the hard disk into its lowest power consumption mode, and the **Doze**, **Standby** and **Suspend** system inactivation modes. The system automatically “wakes up” from any power saving mode when there is system activity, such as when a key is pressed from the keyboard, or when there is activity detected from the enabled IRQ channels.

### **HDD Power Down (Disable)**

This shuts down any IDE hard disk drives in the system after a period of inactivity, configurable to *1 Min-10 Min, 20 Min* or *Disable*. This feature does not affect SCSI hard disks.

### **Doze Mode, Standby Mode, Suspend Mode (Disable)**

These fields set the period of time after which each of these modes activate: *20 Sec, 1 Min, 5 Min, 10 Min, 15 Min, 20 Min, 30 Min, 40 Min*, and *Disable*.

---

## *Power Up Control*

This section determines the ways the system can be controlled when modem activity is detected, or when power to the computer is interrupted and reapplied.

### **Ring Power Up Act (Enable)**

Allows either settings of *Enable* or *Disable* for powering up the computer (turns the ATX power supply on) when the modem begins receiving or transmitting data while the computer is off.

### **Wake On LAN (Disabled)**

This allows you to remotely power up your system through your network by sending a wake-up frame or signal. With this feature, you can remotely upload/download data to/from systems during off-peak hours. *Enabled* sets this feature.

**IMPORTANT:** This feature requires the optional network interface (see **7. Network Interface**) and an ATX power supply with at least 720mA +5V standby power.

### **Automatic Power Up (Disable)**

This field allows you to have an unattended or automatic power up of your system. You may configure your system to power up at a certain time of the day by selecting *Enable*, which will allow you to set the days (*SUN-SAT*) and time (hh:mm:ss) when you want this function to activate.

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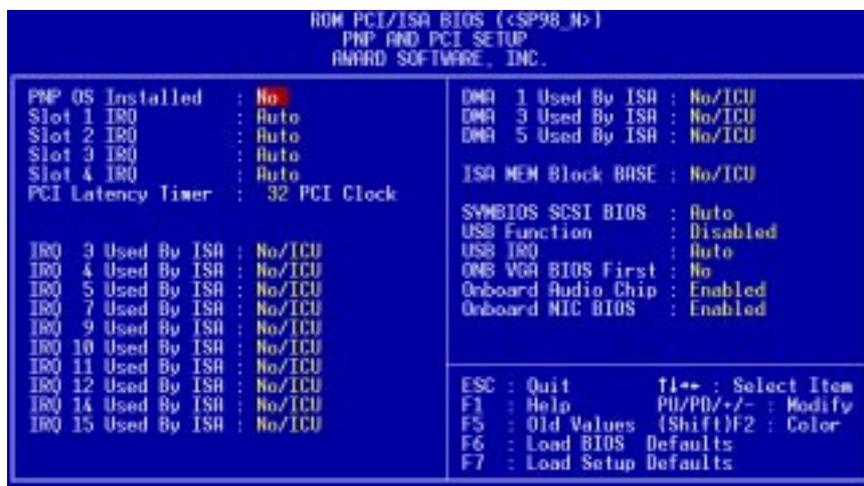
### **IRQ3 (device)-IRQ15 (device)**

You can individually *Enable* or *Disable* each IRQ to include in the sleep function. IRQ8 (RTC Alarm) is usually set to *Disable* so that any software alarm clock or event calendar can wake up the system.

# 4. BIOS SETUP

## 4.7 PNP and PCI Setup

**PNP and PCI Setup** configures the PCI bus slots. All PCI bus slots on the system use INTA#, thus all installed PCI cards must be set to this value.



**NOTE:** SETUP Defaults are noted in parenthesis next to each function heading.

### 4.7.1 Details of PNP and PCI Setup

#### PNP OS Installed (No)

When Plug and Play operating systems (OS) are installed, interrupts may be reassigned by the OS when *Yes* is selected. When a non-Plug and Play OS is installed or to prevent reassigning of interrupt settings, select *No*.

#### Slot 1 IRQ/Slot 2 IRQ/Slot 3 IRQ/Slot 4 IRQ (Auto)

These fields set how IRQ use is determined for each PCI slot on the riser card. The default setting for each field is *Auto*, which uses autorouting to determine IRQ use. The other options are the manual settings of *NA*, *3*, *4*, *5*, *7*, *9*, *10*, *11*, *12*, *14*, or *15* for each slot.

#### PCI Latency Timer (32 PCI Clock)

The default setting enables maximum PCI performance for this motherboard.

#### IRQ xx Used By ISA (No/ICU)

These fields indicate whether or not the displayed IRQ for each field is being used by a legacy (non-PnP) ISA card. Two options are available: *No/ICU* and *Yes*. *No/ICU* indicates either that the displayed IRQ is not used or an ISA Configuration Utility (ICU) is being used to determine if an ISA card is using that IRQ. If you install a legacy (non-PnP) ISA card that requires a unique IRQ, and you are not using an ICU, set the field for that IRQ to *Yes*.

#### DMA x Used By ISA (No/ICU)

These fields indicate whether or not the displayed DMA channel for each field is being used by a legacy ISA card. Available options include: *No/ICU* and *Yes*. *No/ICU* indicates either that the displayed DMA channel is not used or an ICU is being used to determine if an ISA card is using that channel. If you install a legacy ISA card that requires a unique DMA channel, and you are not using an ICU, you must set the field for that channel to *Yes*.

# 4. BIOS SETUP

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## **ISA MEM Block BASE (No/ICU)**

This field allows you to set the base address and block size of a legacy ISA card that uses any memory segment within the C800, CC00, D000, D400, D800, and DC00 address range. If you have such a card, and you are not using an ICU to specify its address range, select a base address from the six available options; the **ISA MEM Block SIZE** field will then appear for selecting the block size. If you have more than one legacy ISA card in your system that requires to use this address range, you can increase the block size to either 8K, 16K, 32K, or 64K. If you are using an ICU to accomplish this task, leave **ISA MEM Block BASE** to its default setting of *No/ICU*.

## **SYMBIOS SCSI BIOS (Auto)**

The default uses *Auto* settings for the onboard SCSI BIOS. If you do not want to use the onboard SCSI BIOS, choose *Disabled*.

## **USB Function (Disabled)**

The motherboard supports Universal Serial Bus (USB) devices but current operating systems do not. The default is set to *Disabled*. If you have the necessary support disks and USB devices, set this function to *Enabled* to use the onboard USB connector.

## **USB IRQ (Auto)**

When USB devices are connected to the onboard USB connector, the resource settings or IRQs for these devices are, by default, automatically assigned by the BIOS. You may manually select the settings: 5, 7, 9, 10, 11, 12, 14, and 15. If you are not using any USB devices, you may set this field to *N/A*.

## **ONB VGA BIOS First (No)**

This allows you to select whether you want to use the onboard VGA BIOS as the primary VGA BIOS. *No* allows external VGA cards to take precedent when detected. *Yes* always uses the onboard VGA BIOS, even when an external VGA card is installed.

## **Onboard Audio Chip (Enabled)**

This allows you to select whether you want to use the onboard audio or not. *Disabled* allows you to use an external audio card.

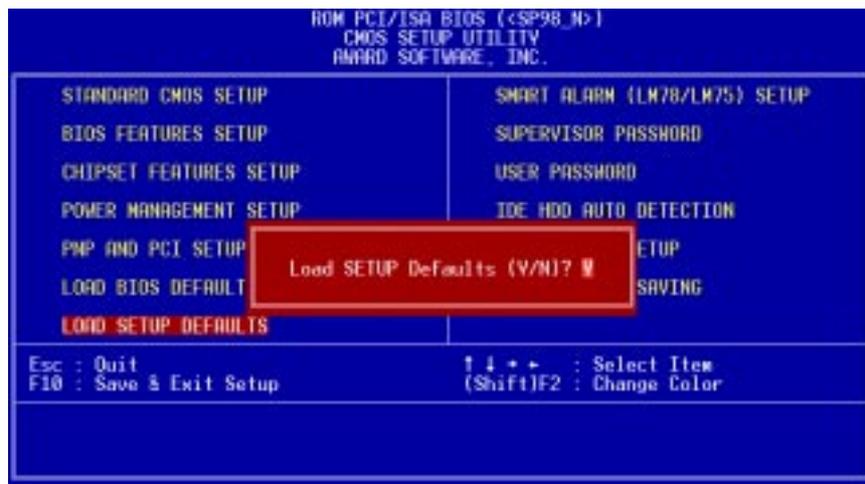
## **Onboard NIC BIOS (Enabled)**

The default setting enables the onboard NIC BIOS so that your computer, with the appropriate interface and configuration, can be connected to a network. If you do not want to use the onboard NIC BIOS, choose *Disabled*.

# 4. BIOS SETUP

## 4.8 Load BIOS Defaults

**Load BIOS Defaults** option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high performance features. This feature does not affect the fields on the Standard CMOS Setup screen.



## 4.9 Load Setup Defaults

**Load Setup Defaults** option allows you to load the default values to the system configuration fields. These default values are the optimized configuration settings for the system. This feature does not affect the fields on the Standard CMOS Setup screen.

# 4. BIOS SETUP

## 4.10 Smart Alarm (LM78/LM75) Setup

Smart Alarm (LM78/LM75) Setup allows you to set up your hardware monitoring options. This feature monitors the fan, CPU and motherboard temperature, and voltage.

### *Fan Monitor (xxxxRPM)*

The onboard hardware monitor is able to detect the CPU Fan Speed in Rotations Per Minute (RPM). These values refresh upon any key entries in the BIOS setup screen. Set to *Ignore* if one of these are not used so that error messages will not be given.

### *Thermal Monitor (xxxC/xxxF)*

The onboard hardware monitor is able to detect the CPU and MB (motherboard) temperatures. These values refresh upon key entries. Set to *Ignore* only if necessary.

### *Voltage Monitor (xx.xV)*

The onboard hardware monitor is able to detect the voltages put out by the voltage regulators. These values refresh upon key entries. Set to *Ignore* only if necessary.

**NOTE:** If any of the monitored items are out of range, you will be prompted by this message: “Hardware Monitor found an error, enter POWER MANAGEMENT SETUP for details” The bottom of the screen will instruct you to: “Press **F1** to continue, **DEL** to enter SETUP”.



# 4. BIOS SETUP

## 4.11 Supervisor and User Password

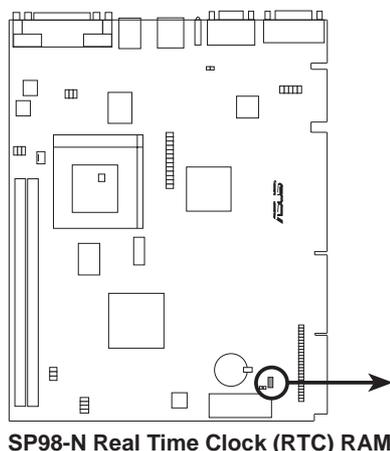
These two options set the system passwords. **Supervisor Password** sets a password that will be used to protect the system and the Setup utility; **User Password** sets a password that will be used exclusively on the system. By default, the system comes without any passwords. To specify a password, highlight the type you want and then press <Enter>. A password prompt appears on the screen. Taking note that the password is case sensitive, and can be up to 8 alphanumeric characters long, type in your password and then press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically reverts to the main screen.



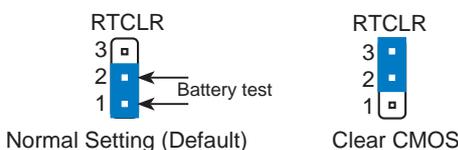
To implement the password protection, specify in the “Security Option” field of **4.4 BIOS Features Setup** when the system will prompt for the password. If you want to disable either passwords, press <Enter> instead of entering a new password when the “Enter Password” prompt appears. A message confirms the password has been disabled.

### 4.11.1 Forgot the Password?

If you forgot the password, you can clear the password by erasing the CMOS Real Time Clock (RTC) RAM. The RAM data containing the password information is powered by the onboard button cell battery. To erase the RTC RAM: (1) Unplug your computer, (2) Short the solder points, (3) Turn ON your computer, (4) Hold down <Delete> during bootup and enter BIOS setup to re-enter user preferences.



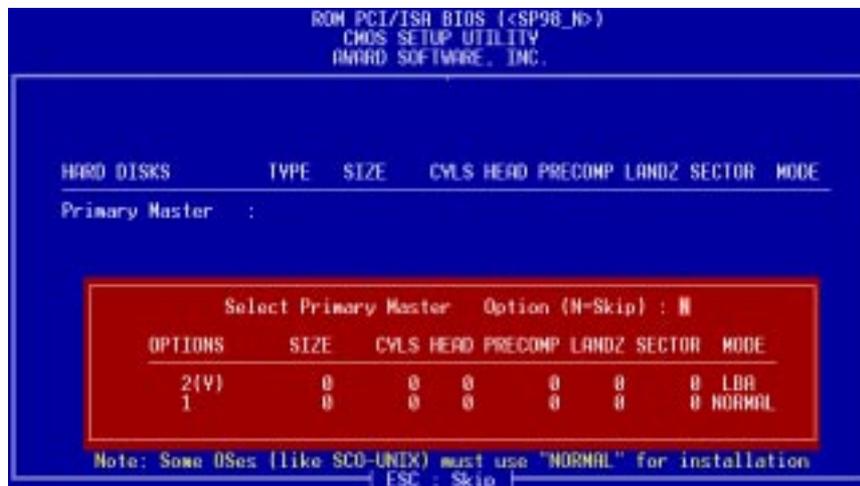
**WARNING!** Move the jumper to the “Clear CMOS” setting only when clearing RTC data. Otherwise, BIOS setup information *may* be cleared.



# 4. BIOS SETUP

## 4.12 IDE HDD Auto Detection

This “IDE HDD Auto Detection” option detects the parameters of an IDE hard disk drive, and automatically enters them into the “Standard CMOS Setup” screen.



Up to four IDE drives can be detected, with parameters for each listed inside the box. To accept the optimal entries, press <Y>, otherwise select from the numbers displayed under the OPTIONS field (2, 1, 3 in this case); to skip to the next drive, press <N>. If you accept the values, the parameters will appear listed beside the drive letter on the screen. The process then proceeds to the next drive letter. Pressing <N> to skip rather than to accept a set of parameters causes the program to enter zeros after that drive letter.

If you are using another IDE controller that does not feature Enhanced IDE support for four devices, you can only install two IDE hard disk drives. Your IDE controller must support the Enhanced IDE features to use Drive E and Drive F. The onboard PCI IDE controller supports Enhanced IDE, with two connectors for connecting up to four IDE devices. If you want to use another controller that supports four drives, you must disable the onboard IDE controller in the Chipset Features Setup screen.

When autodetection is completed, the program automatically enters all entries you accepted on the field for that drive in the “Standard CMOS Setup” screen. Skipped entries are ignored and are not entered in the screen.

If you are autodetecting a hard disk that supports the LBA mode, three lines will appear in the parameter box. Choose the line that lists LBA for an LBA drive. Do not select Large or Normal.

The autodetection feature can only detect one set of parameters for a particular IDE hard disk. Some IDE drives can use more than one set. This is not a problem if the drive is new and there is nothing on it.

# 4. BIOS SETUP

**IMPORTANT:** If your hard disk was already formatted on an older previous system, incorrect parameters may be detected. You will need to enter the correct parameters manually or use low-level format if you do not need the data stored on the hard disk.

If the parameters listed differ from the ones used when the drive was formatted, the drive will not be readable. If the autodetected parameters do not match the ones that should be used for your drive, do not accept them. Press <N> to reject the presented settings and enter the correct ones manually from the “Standard CMOS Setup” screen.

## 4.13 Save and Exit Setup

Select this option to save into the CMOS memory all modifications you specify during the current session. To save the configuration changes, highlight “Save & Exit Setup” on the main screen, type “Y”, and then press <Enter>.



## 4.14 Exit Without Saving

Select this option to exit the Setup utility without saving the modifications you specify during the current session. To exit without saving, highlight “Exit Without Saving” on the main screen, type “Y”, and then press <Enter>.

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# 5. SOFTWARE CONTENTS

## 5.1 ASUS Support CD

Insert the support CD or double-click your CD drive icon in “My Computer” to bring up the autorun menu or run **Setup.exe** in the root directory of the Support CD.

**NOTE:** The support CD contents are subject to change at any time without notice.

### 5.1.1 Support CD Main Menu

- **LDCM Local Setup:** Installs software to monitor the local system. The LANDesk Client Manager must be installed to use the hardware manager features.
- **LDCM Administrator Setup:** Installs software to monitor PC systems on the network within the same



- bridge address with the Local software installed. The administrator should install both Local and Administrator Software.
- **LDCM Introduce (MPEG VCD):** Plays an overview of LDCM in MPEG format.
- **Install ASUS PC Probe:** Installs a simple utility to monitor your computer’s fan, temperature, and voltages. (**NOTE:** This utility will not run with LDCM installed.) A user’s manual in Adobe Acrobat PDF format is available under the ASUSLM folder created on your system during setup.
- **Install ADOBE Acrobat Reader:** Installs the Adobe Acrobat Reader software necessary to view the LDCM manual in the LDCM directory.
- **Install YAMAHA Audio Driver:** Installs the necessary audio drivers and utilities to access the features of the built-in PCI audio chipset.
- **Install IDE Driver:** Installs the BusMaster IDE driver for improved performance. (Available only for Windows NT)
- **Install Display Driver:** Installs the video driver and utilities for the integrated VGA controller.
- **Install LAN Driver:** Installs the driver needed to access the onboard LAN controller.
- **Browse this CD:** Allows you to see the contents of the ASUS support CD.
- **Read Me:** View additional notes with Notepad.
- **Exit:** Exit the selection menu.

**Additional CD Contents:** DMI Configuration Utility in the **DMI** directory, Flash BIOS writer in the **AFLASH** directory, and XingMPEG Player in the **XING** directory.

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# 6. SOFTWARE REFERENCE

## 6.1 Intel LANDesk Client Manager

With the growth of the computer industry, computer systems have become more complex and difficult to manage. Intel LANDesk Client Manager is a computer management application that simplifies many aspects of managing a computer and assists in troubleshooting common computer problems.

Use Client Manager to:

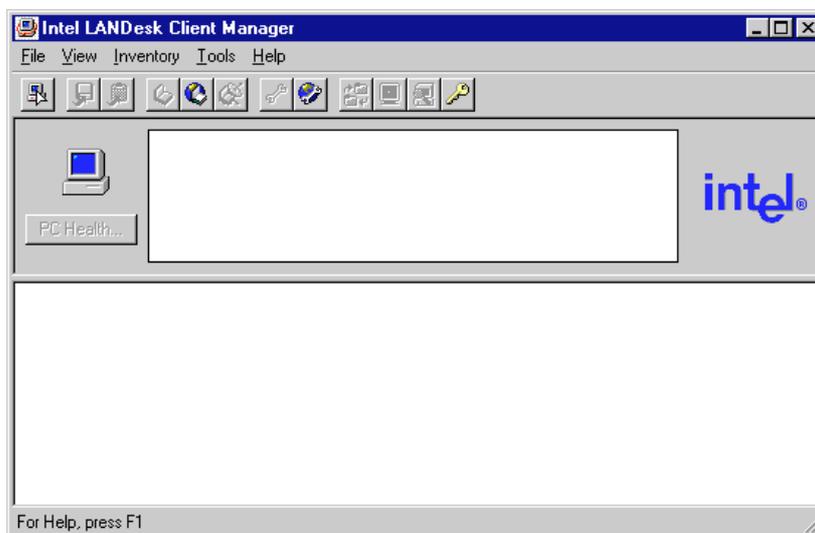
- Review system inventory
- View DMI-compliant component information
- Backup and restore system files
- Troubleshoot
- Monitor your computer's health
- Receive notifications for system events

Client Manager has been implemented in two different ways:

The client version enables you to view information and manage alerts for a local computer. This version does not permit you to select remote computers, transfer files, or reboot other computers.

The first time you run Client Manager, it searches your network for other computers running Client Manager. Client Manager creates a list of the computers it finds and saves the list to the Windows registry. From this point on, when you run Client Manager or open the Select Computer dialog box, Client Manager checks to see if these computers (listed in the registry) are available and healthy.

### 6.1.1 Main Client Manager Window



## 6. SOFTWARE REFERENCE

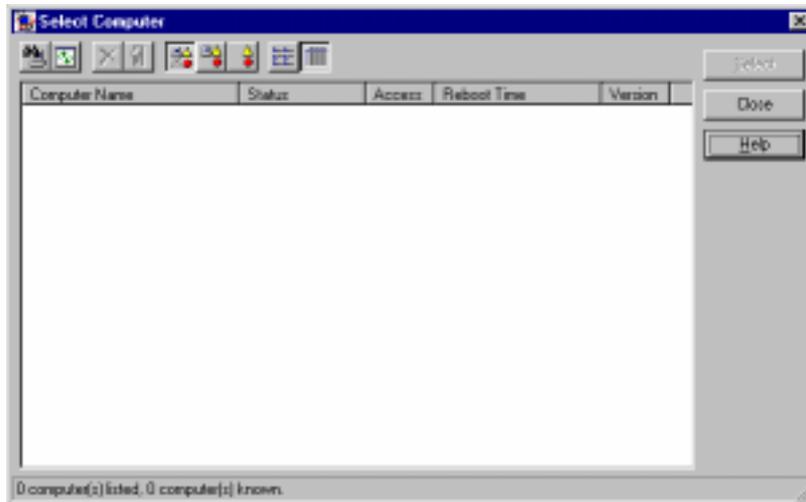
### 6.1.2 Using the Taskbar icons

#### Toolbar Descriptions

	Opens the Select Computer dialog box	File   Select Computer
	Opens the Export dialog box to export the inventory to a file	File   Export
	Exports the inventory to the clipboard	File   Export to clipboard
	Opens the notification log	View   Notification Log
	Opens the global notification log	View   Global Notification Log
	Opens the remote access log	View   Remote Access Log
	Opens the Configure Notifications dialog box	Tools   Configure Notifications
	Opens the Configure Global Notifications dialog box	Tools   Configure Global
	Opens the File Transfer dialog box	Tools   Transfer Files
	Reboots the computer	Tools   Reboot
	Opens the DMI Explorer	Tools   DMI Explorer
	Opens the Set Access Rights dialog box	Tools   Set Access Rights

# 6. SOFTWARE REFERENCE

## 6.1.3 Using the Select Computer Dialog Box



-  Discovers new computers on the network
-  Refreshes the health of known computers
-  Removes a computer from the list of discovered computers
-  Wakes up a sleeping computer
-  Shows all discovered computers
-  Shows only available computers
-  Shows only unhealthy computers
-  Shows a simple list view
-  Shows a detailed list view

## 6. SOFTWARE REFERENCE

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### To select a computer

1. From the main Client Manager window, click **File | Select Computer**.
2. In the *Select Computer* dialog box, click the computer you want to view.
3. Click the **Select** button.

### To discover new computers

- In the *Select Computer* dialog box, click the **Discover** button on the toolbar or press <Shift>+<F5>.

**TIP:** Use the **Discover** button each time you add a computer to the network, change a computer's network adapter, or upgrade a computer to a newer version Client Manager.

### To refresh PC health

- In the *Select Computer* dialog box, click the **Refresh Known Computers** button on the toolbar or press <F5>.

**TIP:** PC health does not automatically update as changes occur. For example, if a computer's health changes while you are displaying the *Select Computer* dialog box, you need to refresh the list in order to view the correct PC health.

### To remove a computer from the list

1. In the *Select Computer* dialog box, click the computer name you want to remove.
2. Click the **Remove Computer** button on the toolbar or press Delete.
3. At the prompt, click the **Yes** button.

**TIP:** Perform this task each time you remove a computer from the network, since the name of that computer is not automatically removed from this list.

### To wake up a computer

1. In the *Select Computer* dialog box, click the computer name you want to wake up. You can also <Shift>+click to select a continuous group of computers or <Ctrl>+click to select individual computers in the list.

**TIP:** You can only attempt to wake up computers that have a status of Unavailable or Wakeable. If the *Select Computer* dialog box does not display any computers with a status of Unavailable or Wakeable and you suspect it should, the list view may be filtered to display only unhealthy or available computers. You may need to change your list view to display all computers.

2. Click the **Wake Up Computer** button on the toolbar to wake up the selected computer(s) or press <Alt>+<W>.

## 6. SOFTWARE REFERENCE

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After you attempt to wake up a computer, the status of that computer changes in the list view to a Wake Pending status. If the attempt to wake up a computer is successful, the Wake Pending status changes to a status reflecting the computer's health (such as Normal, Warning, or Critical). If the computer does not wake up after five minutes, a message box appears stating possible reasons why the computer did not respond. (For example, the computer may be disabled or may not support Wake-On-LAN.) After clicking OK, the Wake Pending status reverts to its original status of Unavailable or Wakeable.

**NOTE:** Your computer must have a Wake-On-LAN network adapter to support this feature. Some computers that support the Wake-On-LAN technology may have remote wakeup disabled in the BIOS by default. Before Client Manager can wake up a remote computer, you will need to enable this option in the BIOS configuration of each remote computer.

### 6.1.4 Displaying the Properties of a Client Computer

You can display the properties of any discovered client computer even if you cannot otherwise access the computer because of access limitations or Unavailable status. If you display the properties of an unavailable computer, the properties are read from a database in the Windows registry on your computer. Since the Operating System information is not stored in this same database, that information is not available for a computer with a status of Unavailable. Remember that some items may not be current if the properties have changed while the computer was off the network.

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### 6.1.5 Understanding the Computer Status Icons

When you open the Select Computer dialog box, each computer in the list displays an icon indicating the current status of that computer. The table below describes the seven states a computer may be in.

	<b>Unavailable</b>	The computer is currently in a powered-down state.
	<b>Wakeable</b>	The computer is currently in a powered-down state but supports Remote Wakeup technology.
	<b>Wake Pending</b>	A temporary status (not to exceed five minutes) while Client Manager attempts to wake up a computer. (A computer that is in the process of booting without having received a wakeup instruction is listed as <i>Unavailable</i> , not <i>Wake Pending</i> .)
	<b>Normal</b>	The computer is operating within normal tolerances.
	<b>Warning</b>	A computer that has exceeded a warning tolerance level. For example, the PC Health indicator can be configured to display a warning icon if a hard disk is running low on space.
	<b>Critical</b>	A computer that has exceeded a critical tolerance level. For example, if the hard disk is running critically low on available space, the PC Health indicator displays a critical icon.
	<b>Unknown</b>	A computer that is powered on, but the health status (Normal, Warning, or Critical) is not known.
	<b>Normal (Mobile)</b>	A computer that includes support for mobile PC features, such as mobile battery. Mobile computers display the same array of health icons (above) used for non-mobile computers.

# 6. SOFTWARE REFERENCE

## 6.2 ASUS PC Probe

ASUS PC Probe is a convenient utility to monitor the computer system's vital components: fan rotations, voltages, and temperatures.

### 6.2.1 Starting ASUS PC Probe

When ASUS PC Probe starts, a splash screen appears allowing you to “Show Monitor” or “Hide”. You can select whether you want the splash screen to show the next time it opens.



Click **ASUS PC Probe** from the **Start** button to run the utility if you exit the utility or did not set it to “Run when Windows Starts.”

The PC Probe icon  will appear on the taskbar's system tray indicating that ASUS PC Probe is running. Left-clicking the icon will allow you to see your PC status.



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## 6.2.2 Using the ASUS PC Probe

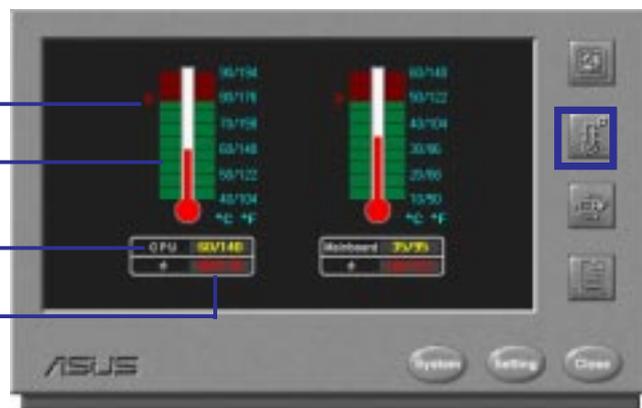
### Fan Rotation Status

- Analog view of PC's fan rotation
- Digital view of PC's fan rotation
- PC's Fan warning threshold adjustment



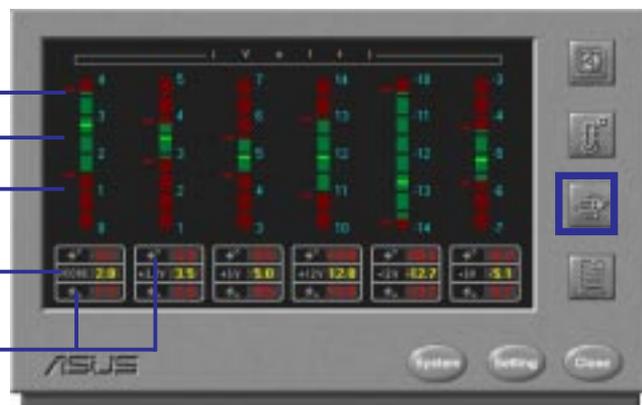
### PC Temperature Status

- Temperature Warning threshold adjustment
- Analog view of PC's temperature
- Digital view of PC's temperature
- Digital view of PC's temperature warning threshold



### PC Voltage Status

- Upper warning threshold adjustment
- Analog view of PC's voltages
- Lower warning threshold adjustment
- Digital view of PC's voltages
- Digital view of PC's voltage warning thresholds



### PC Status Summary

- PC's Fan Rotations per minute
- PC's Temperature °C/°F
- PC's Voltages



# 6. SOFTWARE REFERENCE

## PC Probe System Info.



Get information on your mainboard and BIOS from this screen.



## PC Probe Settings



Change PC Probe refresh times here

Click here to start PC Probe each time you enter Windows.

Click the items you wish to reset to its default values and click this button.



## PC Probe Task Bar Icon

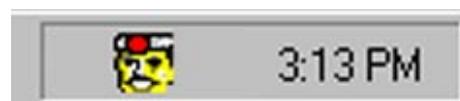
Right clicking the PC Probe icon will bring up a menu to turn on, off, or exit ASUS PC Probe.



The icon appears dimmed when off or unavailable.



When there is a problem, the icon's head mirror flashes red, the PC speaker beeps, and the ASUS PC Probe monitor is displayed.



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### 6.3 SVGAUTL.EXE

#### 6.3.1 General Description

SVGAUTL.EXE is one of the utilities of SiS 5597/5598. It supports three functions:

(1) **Video Mode Setting**

SiS 5597/5598 supports many enhanced Text and Graphic Modes. SVGAUTL.EXE can be used to select the desired video mode.

(2) **Frame Rate Setting**

For 640x480, 800x600, 1024x768, and 1280x1024 resolutions, SiS 5597/5598 supports multiple frame rates. If your monitor supports these frame rates, SVGAUTL.EXE can be used to select a desired rate.

(3) **Power Saving Setting**

SiS 5597/5598 supports VESADPMS Power Saving Modes. SVGAUTL.EXE can be used to set any of the supported modes.

#### 6.3.2 General Usage

##### To use SVGAUTL.EXE:

1. Type "SVGAUTL" in the directory where it resides and then press <Enter>. For example: **C:\> SVGAUTL <Enter>** (assuming SVGAUTL.EXE is in C:\)
2. The Main Menu appears and directs you to configure SiS 5597/5598.
3. When you have completed the configuration, you may save your preferences to AUTOEXEC.BAT and use it as your power-on (or hardware reset) default environment. (See **6.1.3 Commandline Options**)

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### 6.3.3 Commandline Options

Syntax:

```
>SVGAUTL [/D:mode_no] [/F0:n0] [/F1:n1] [/F2:n2] [/F3:n3] [/PA:ta] [/PB:tb]
```

where

/D: Set the Video Mode to be mode\_no which is a hex number.

For example: Set 1024x768 256 color graphic mode.

```
>SVGAUTL /D:38 <Enter>
```

/F0: For 640x480, set frame rate to be n0 Hz.

Three available frame rates are 60, 72, and 75 Hz.

For example : Set 640x480 graphic mode with 60Hz frame rate

```
>SVGAUTL /F0:60 <Enter>
```

/F1: For 800x600, set frame rate to be n1 Hz.

Four available frame rates are 56, 60, 72, and 75 Hz.

For example : Set 800x600 graphic mode with 72Hz frame rate.

```
>SVGAUTL /F1:72 <Enter>
```

/F2: For 1024x768, set frame rate to be n2 Hz.

Four available frame rates are 87 (Interlace), 60, 70, and 75 Hz.

For example : Set 1024x768 graphic mode with 60Hz frame rate.

```
>SVGAUTL /F2:60 <Enter>
```

/F3: For 1280x1024, set frame rate to be n3 Hz.

Two available frame rates are 87 (Interlace) and 60 Hz.

For example : Set 1280x1024 graphic mode with 60Hz frame rate.

```
>SVGAUTL /F3:60 <Enter>
```

/PA: Set Standby Timer to be ta minutes. (0 < ta < 15 min.)

For example : Set Standby Timer be 5 minutes.

```
>SVGAUTL /PA:5 <Enter>
```

/PB: Set Suspend Timer to be tb minutes. (0 < tb < 15 min.)

For example : Set Suspend Timer be 5 minutes.

```
>SVGAUTL /PB:5 <Enter>
```

**NOTE:** 1. Suspend Time would be “ta + tb”. (i.e. standby time + suspend time)

2. The timers will not be very accurate and would just be around the time.

# 6. SOFTWARE REFERENCE

## 6.3.A1. Video Modes

### 6.3.A1.1 Standard VGA Modes

MODE	TYPE	DISPLAY SIZE	COLORS SHADES	ALPHA FORMAT	BUFFER START	BOX SIZE	MAX PAGES
0	A/N	320x200	16	40x25	B800	8x8	8
0*	A/N	320x350	16	40x25	B800	8x14	8
0+	A/N	360x400	16	40x25	B800	9x16	8
1	A/N	320x200	16	40x25	B800	8x8	8
1*	A/N	320x350	16	40x25	B800	8x14	8
1+	A/N	360x400	16	40x25	B800	9x16	8
2	A/N	640x200	16	80x25	B800	8x8	8
2*	A/N	640x350	16	80x25	B800	8x14	8
2+	A/N	720x400	16	80x25	B800	9x16	8
3	A/N	640x200	16	80x25	B800	8x8	8
3*	A/N	640x350	16	80x25	B800	8x14	8
3+	A/N	720x400	16	80x25	B800	9x16	8
4	APA	320x200	4	40x25	B800	8x8	1
5	APA	320x200	4	40x25	B800	8x8	1
6	APA	640x200	2	80x25	B800	8x8	1
7	A/N	720x350	4	80x25	B000	9x14	8
7+	A/N	720x400	4	80x25	B000	9x16	8
0D	APA	320x200	16	40x25	A000	8x8	8
0E	APA	640x200	16	80x25	A000	8x8	4
0F	APA	640x350	2	80x25	B000	8x14	2
10	APA	640x350	16	80x25	A000	8x14	2
11	APA	640x480	2	80x30	A000	8x16	1
12	APA	640x480	16	80x30	A000	8x16	1
13	APA	320x200	256	40x25	A000	8x8	1

**NOTE:** 1. A/N: Alpha/Numeric  
2. APA: All Point Addressable (Graphics)

## 6. SOFTWARE REFERENCE

MODE	DISPLAY SIZE	COLORS SHADES	FRAME RATE.	H-SYNC.	VIDEO FREQ.
0	320x200	16	70	31.5 K	25.1 M
0*	320x350	16	70	31.5 K	25.1 M
0+	360x400	16	70	31.5 K	28.3 M
1	320x200	16	70	31.5 K	25.1 M
1*	320x350	16	70	31.5 K	25.1 M
1+	360x400	16	70	31.5 K	28.3 M
2	640x200	16	70	31.5 K	25.1 M
2*	640x350	16	70	31.5 K	25.1 M
2+	720x400	16	70	31.5 K	28.3 M
3	640x200	16	70	31.5 K	25.1 M
3*	640x350	16	70	31.5 K	25.1 M
3+	720x400	16	70	31.5 K	28.3 M
4	320x200	4	70	31.5 K	25.1 M
5	320x200	4	70	31.5 K	25.1 M
6	640x200	2	70	31.5 K	25.1 M
7*	720x350	4	70	31.5 K	28.3 M
7+	720x400	4	70	31.5 K	28.3 M
0D	320x200	16	70	31.5 K	25.1 M
0E	640x200	16	70	31.5 K	25.1 M
0F	640x350	2	70	31.5 K	25.1 M
10	640x350	16	70	31.5 K	25.1 M
11	640x480	2	60	31.5 K	25.1 M
12	640x480	16	60	31.5 K	25.1 M
13	320x200	256	70	31.5 K	25.1 M

**NOTE:** i - interlaced mode  
n - noninterlaced mode

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## 6.3.A1.2 Enhanced Video Modes

MODE	TYPE	DISPLAY SIZE	COLORS SHADES	ALPHA FORMAT	BUFFER START	BOX SIZE	MAX. PAGES
22	A/N	1056x352	16	132x44	B800	8x8	2
23	A/N	1056x350	16	132x25	B800	8x14	4
24	A/N	1056x364	16	132x28	B800	8x13	4
25	APA	640x480	16	80x60	A000	8x8	1
26	A/N	720x480	16	80x60	B800	9x8	3
29	APA	800x600	16	100x37	A000	8x16	1
2A	A/N	800x600	16	100x40	B800	8x15	4
2D	APA	640x350	256	80x25	A000	8x14	1
2E	APA	640x480	256	80x30	A000	8x16	1
2F	APA	640x400	256	80x25	A000	8x16	1
30	APA	800x600	256	100x37	A000	8x16	1
37	APA	1024x768	16	128x48	A000	8x16	1
38	APA	1024x768	256	128x48	A000	8x16	1
39	APA	1280x1024	16	160x64	A000	8x16	1
3A	APA	1280x1024	256	160x64	A000	8x16	1
40	APA	320x200	32K	40x25	A000	8x8	1
41	APA	320x200	64K	40x25	A000	8x8	1
42	APA	320x200	16.8M	40x25	A000	8x8	1
43	APA	640x480	32K	80x30	A000	8x16	1
44	APA	640x480	64K	80x30	A000	8x16	1
45	APA	640x480	16.8M	80x30	A000	8x16	1
46	APA	800x600	32K	100x37	A000	8x16	1
47	APA	800x600	64K	100x37	A000	8x16	1
48	APA	800x600	16.8M	100x37	A000	8x16	1
49	APA	1024x768	32K	128x48	A000	8x16	1
4A	APA	1024x768	64K	128x48	A000	8x16	1
4B	APA	1024x768	16.8M	128x48	A000	8x16	1
4C	APA	1280x1024	32K	160x64	A000	8x16	1
4D	APA	1280x1024	64K	160x64	A000	8x16	1

**NOTE:** 1. A/N: Alpha/Numeric  
2. APA: All Point Addressable (Graphics)

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MODE	DISPLAY SIZE	COLORS SHADES	FRAME RATE.	H-SYNC.	VIDEO FREQ.
22	1056x352	16	70	30.5 K	40.0 M
23	1056x350	16	70	30.5 K	40.0 M
24	1056x364	16	70	30.5 K	40.0 M
25	640x480	16	60	31.5 K	25.1 M
26	720x480	16	60	31.5 K	25.1 M
29	800x600	16	56	35.1 K	30.0 M
29*	800x600	16	60	37.9 K	40.0 M
29+	800x600	16	72	48.0 K	50.0 M
29#	800x600	16	75	46.8 K	50.0 M
29###	800x600	16	85	53.7 K	56.3 M
2A	800x600	16	56	35.1 K	36.0 M
2D	640x350	256	70	31.5 K	25.1 M
2E	640x480	256	60	31.5 K	25.1 M
2E*	640x480	256	72	37.9 K	31.5 M
2E+	640x480	256	75	37.5 K	31.5 M
2E++	640x480	256	85	43.4 K	36.0 M
2F	640x400	256	70	31.5 K	25.1 M
30	800x600	256	56	35.1 K	36.0 M
30*	800x600	256	60	37.9 K	40.0 M
30+	800x600	256	72	48.0 K	50.0 M
30#	800x600	256	75	46.8 K	50.0 M
30###	800x600	256	85	53.7 K	56.3 M
37i	1024x768	16	87	35.5 K	44.9 M
37n	1024x768	16	60	48.4 K	65.0 M
37n+	1024x768	16	70	56.5 K	75.0 M
37n#	1024x768	16	75	60.2 K	80.0 M
37n##	1024x768	16	85	68.7 K	94.5 M
38i	1024x768	256	87	35.5 K	44.9 M
38n	1024x768	256	60	48.4 K	65.0 M
38n+	1024x768	256	70	56.5 K	75.0 M
38n#	1024x768	256	75	60.2 K	80.0 M
38n##	1024x768	256	85	68.7 K	94.5 M
39i	1280x1024	16	87	48.8 K	80.0 M
39n	1280x1024	16	60	65.0 K	110.0 M
39n+	1280x1024	16	75	80.0 K	135.0 M
3Ai	1280x1024	256	87	48.8 K	80.0 M
3An	1280x1024	256	60	65.0 K	110.0 M
3An+	1280x1024	256	75	80.0 K	135.0 M
40	320x200	32K	70	31.5 K	25.1 M
41	320x200	64K	70	31.5 K	25.1 M
42	320x200	16.8M	70	31.5 K	25.1 M
43	640x480	32K	60	31.5 K	25.1 M
43*	640x480	32K	72	37.9 K	31.5 M
43+	640x480	32K	75	37.5 K	31.5 M
43++	640x480	32K	85	43.4 K	36.0 M
44	640x480	64K	60	31.5 K	25.1 M
44*	640x480	64K	72	37.9 K	31.5 M
44+	640x480	64K	75	37.5 K	31.5 M

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MODE	DISPLAY SIZE	COLORS SHADES	FRAME RATE.	H-SYNC.	VIDEO FREQ.
44++	640x480	64K	85	43.4 K	36.0 M
45	640x480	16.8M	60	31.5 K	25.1 M
45*	640x480	16.8M	72	37.9 K	31.5 M
45+	640x480	16.8M	75	37.5 K	31.5 M
45++	640x480	16.8M	85	43.4 K	36.0 M
46	800x600	32K	56	35.1 K	36.0 M
46*	800x600	32K	60	37.9 K	40.0 M
46+	800x600	32K	72	48.0 K	50.0 M
46#	800x600	32K	75	46.8 K	50.0 M
46##	800x600	32K	85	53.7 K	56.3 M
47	800x600	64K	56	35.1 K	36.0 M
47*	800x600	64K	60	37.9 K	40.0 M
47+	800x600	64K	72	48.0 K	50.0 M
47#	800x600	64K	75	46.8 K	50.0 M
47##	800x600	64K	85	53.7 K	56.3 M
48	800x600	16.8M	56	35.1 K	36.0 M
48*	800x600	16.8M	60	37.9 K	40.0 M
48+	800x600	16.8M	72	48.0 K	50.0 M
48#	800x600	16.8M	75	46.8 K	50.0 M
48##	800x600	16.8M	85	53.7 K	56.3 M
49i	1024x768	32K	87	35.5 K	44.9 M
49n	1024x768	32K	60	48.4 K	65.0 M
49n+	1024x768	32K	70	56.5 K	75.0 M
49n#	1024x768	32K	75	60.2 K	80.0 M
49n##	1024x768	32K	85	68.7 K	94.5 M
4Ai	1024x768	64K	87	35.5 K	44.9 M
4An	1024x768	64K	60	48.4 K	65.0 M
4An+	1024x768	64K	70	56.5 K	75.0 M
4An#	1024x768	64K	75	60.2 K	80.0 M
4An##	1024x768	64K	85	68.7 K	94.5 M
4Bi	1024x768	16.8M	87	35.5 K	44.9 M
4Bn	1024x768	16.8M	60	48.4 K	65.0 M
4Bn+	1024x768	16.8M	70	56.5 K	75.0 M
4Bn#	1024x768	16.8M	75	60.2 K	80.0 M
4Bn##	1024x768	16.8M	85	68.7 K	94.5 M
4Ci	1280x1024	32K	89	48.8 K	80.0 M
4Di	1280x1024	64K	89	48.8 K	80.0 M

**NOTE:** i - interlaced mode  
n - noninterlaced mode

**\*Due to the memory bandwidth limitation in a 1MB DRAM configuration, the following video modes is not supported in 1MB configuration: modes 45\*, 45+, 46+, 46#, 47+, and 47#.**

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To make use of the advance features of SiS 5597/5598, extended graphic and text modes are supported by software application drivers developed by SiS. The following applications are currently supported:

- Microsoft Windows 3.1
- Microsoft Windows 95
- Microsoft Windows NT Ver. 3.1, 3.5, 3.51, 4.0
- AutoCAD/386 Release 11, 12
- Auto Shade/386 Ver. 2.0
- 3D Studio Ver. 3.0
- OS/2 Presentation Manager 2.1 & 3.0

## 6.4 Windows 3.1

### 6.4.1 Version Notes

The following descriptions apply to SiS 5597/5598 Driver Release V1.03 and later. The descriptions, however, are subject to change at anytime without notice.

### 6.4.2 Driver Files

1. The enclosed SiS 5597/5598 Windows 3.1 driver contains SETUP.EXE and other installation-related files.

### 6.4.3 Installation

#### 6.4.3.1 *Unpack & Copy*

To unpack and copy drivers to where they should reside, do the following procedures:

1. Boot up Windows using standard VGA mode.
2. In Windows Program Manager Screen, choose “File” item.
3. In “File Item List”, choose “Run” item.
4. In “Run” Screen, select your driver source, e.g., D:\MM\WIN31\SETUP.EXE.
5. Follow the directions that appear on the screen to complete the unpacking and copying procedures.
6. After unpacking and copying is completed, an “SiS Multimedia Vx.xx” program group is created and shown onscreen.

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7. In the “SiS Multimedia Vx.xx” program group, five icons are created:
  - (1) **SiS Multimedia Manager**: Creates a shortcut bar on your desktop for single-click access to the display utilities.
  - (2) **SVGA Setup**: Accesses the SiS VGA graphics configuration system.
  - (3) **SiS MMPlayer**: Creates an “SiS MMPlayer” VCP-like icon on the screen.
  - (4) **Center Screen**: Lets you adjust the position of the display on the screen.
  - (5) **Uninstall** utility: Uninstalls all the installed driver files and utilities.

### 6.4.3.2 Graphics Setup

1. In the SiS Multimedia Vx.xx program group, double-click the **SVGA Setup** icon. The SiS VGA Configuration System dialog box will appear with several options to configure your VGA system.
2. In the SiS VGA Configuration System box, configure the options you would like to use. Click **OK** after completing your selections.

**NOTE:** Any changes that you made will only take effect when you restart Windows. Click **Restart Windows** to restart Windows using your new settings or click **Continue** to continue your current Windows session (your new settings will, however, will not be shown — it will only take effect when you restart Windows).

### 6.4.3.3 Power Saving Setup in Windows

1. In the SiS VGA Configuration System box, click the **Power Saver** button to open the **Power Saver** dialog box.
2. In the **Power Saver** box, configure the options you would like to enable or change. Click **OK** after completing your selections. The power saver options you selected will take effect as configured.

**NOTE:** The Power Saver’s timer settings are still in effect even when you quit Windows to use DOS.

### 6.4.3.4 Zoom\_Key Setup

In the SiS VGA Configuration System box, click the **Zooming** button to define the hot keys to zoom-in or zoom-out your screen, that is, you can change the resolution on-the-fly, without activating **SVGA Setup**.

The operating principles of this feature are:

- (1) **Zoom-in sequence:**  
1024x768    800x600    640x480
- (2) **Zoom-out sequence:**  
640x480    800x600    1024x768

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- (3) You must first zoom-in before you can zoom-out, that is, you cannot zoom out to a resolution larger than what you initially set or defined.

### **To use this feature, do the following:**

1. In the SiS VGA Configuration System box, click the **Zooming** button to open the **Zooming Hotkey** dialog box.
2. In the **Zooming Hotkey** box, click the hot key/s you would like to use for **ZoomIn** and **ZoomOut**. Click **OK** after completing your selections.
3. After completing setup, you may use the hot key/s you defined to zoom-in or zoom-out.

### 6.4.4 Video Operations

#### *6.4.4.1 DCI Function*

SiS 5597/5598 supports the Display Control Interface (DCI) software interface standard for software MPEG playback and other media player programs that can take advantage of DCI.

The SiS 5597/5598 DCI driver is automatically loaded during the driver installation and therefore, should be transparent to the end-user.

#### *6.4.4.2 SiS MMPlay (SW MPEG)*

To make SW MPEG playback more user-friendly than the original SW MPEG player supplier provided, SiS provides an MMPlayer application program with a VCP-like (Video Cassette Player) interface.

To take advantage of the SiS MMPlayer, you must first install "SW MPEG Player". All the SiS provided is just an interface but not a SW MPEG Player at present. If the SW MPEG Player does not exist, the SiS MMPlayer will not work. (Xing or Mediamatics SW MPEG Player supported)

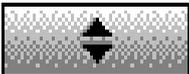
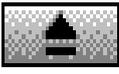
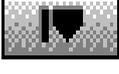
### **To use the SiS MMPlayer, do the following procedures:**

1. In the SiS Multimedia Vx.xx program group, double-click the **Sis MMPlayer** icon. The SiS MMPlayer VCP-like icon appears.
2. The SW MPEG playback is now ready for your use.

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## 6.4.4.3 MMPLAY.EXE Button Description

	Power On/Off
	Open File & Type Control
	Minimize This Application
	Eject CD Title (Not implemented yet.)
	Fast Backward
	Fast Forward
	Mark in
	Mark out
	Pause
	Play
	Stop
	End
	Begin
	Volume increase (Not implemented yet.)
	Volume decrease (Not implemented yet.)

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### 6.5 Windows 95

#### 6.5.1 Version Note

The following descriptions apply to SiS 5597/5598 Driver Release V1.03 and later. The descriptions, however, are subject to change at anytime without notice.

#### 6.5.2 Driver Files

1. The SiS 5597/5598 Windows 95 drivers files include  
**SETUP.EXE**                      **SIS597.DRV**                      **SIS597.INF**  
**SISMINI.VXD**                      **Other Files**
2. All the 16-color, 256-color, 32K/64K-color, and 16M-color drivers are available.

#### 6.5.3 Installation

1. Start Windows 95.
2. In Windows 95, double-click the **My Computer** icon.
3. In **My Computer**, double-click the **Control Panel** icon.
4. Click the **Display** icon in the **Control Panel**.
5. In the **Display Properties** dialog box, click the **Settings** tab and then click the **Change Display Type** button.
6. In the **Change Display Type** box, click **Adapter Type** and then the **Change** button.
7. In the **Select Device** box, click the **Have Disk...** button.
8. In the **Install From Disk** box, select your driver source, e.g., A:\WIN95.
9. In the **Select Device** box, **SiS 5597/5598** appears. Click **OK** to begin installation.
10. When setup finishes copying the necessary files, the **Change Display Type** box appears. Click **Close**.
11. The **Display Properties** box appears. Click either **Close** or **Apply**.
12. In the **System Settings Change** box, click **Yes** to restart your computer.
13. After restarting, Windows 95 will run on 640x480x256 color, 60NI (non-interlaced).

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### 6.5.4 Using “Display Modes”

1. When you open the **Display Properties** box after the driver installation, **Display Modes** will have been added.
2. Click **Display Modes** and select the desired resolution by dragging the **Desktop area** slider to the desired resolution, desired color by changing the **Color palette** value, desired font size by changing **Font size**, and desired refresh rate by changing **Refresh rate**.
3. After completing your selections, click **OK** or **Apply** to complete the installation.
4. In the **SiS 5597/5598 Settings** box, click **OK**.
5. Two cases may happen:
  - a) You did not change “color” and/or “font size”.
    1. **SiS 5597/5598 Settings** box appears again,
    2. Click **Yes**. You may begin working on your selected mode now.
  - b) You changed “color” and/or “font size”.
    1. System will restart.
    2. You may begin working on your selected mode now.

### 6.5.5 Utilities

#### 6.5.5.1 Installation

1. Click **Start** and then point to **Run**.
2. In the **Run** box, type the source execution file.  
For example, D:\MM\WIN95\SETUP.EXE
3. In the **SiS Multimedia Setup Ver x.xx** box, click **OK**.
4. A **SiS Multimedia Vx.xx** program group will be created and shown on screen. Click **Restart Now**.
5. Three icons will be created in the program group:
  - (1) **SiS Multimedia Package**: Creates a shortcut bar on your desktop for single-click access to the display utilities.
  - (2) **SiS MMPlayer**: Creates an **SiS MMPlayer** VCP-like icon on the screen.
  - (3) **Center Screen**: Allows you to adjust the position of display on the screen.
6. **SiS Multimedia V x.xx** program group will be created, click **Restart Now**.

#### 6.5.5.2 Operation

1. For Video Operations (**SiS MMPlay**), refer to section 6.4.4.2.

## 6. SOFTWARE REFERENCE

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### 6.6 Windows NT 3.5 & 3.51

#### 6.6.1 Version Note

The following descriptions apply to SiS 5597/5598 Driver Release V1.03. The descriptions, however, are subject to change at anytime without notice.

#### 6.6.2 Driver Files

(1) The enclosed SiS 5597/5598 Windows NT 3.5 & 3.51 drivers are SISTAG, SISV.SYS, SISV256.DLL, SISV.DLL, OEMSETUP.INF.

(2) All the 16-color, 256-color, 32K/64K-color, and 16M-color drivers are available.

#### 6.6.3 Installation

1. Double-click the **Display** icon under Control Panel.
2. Click **Change Display Type** from the **Display Settings** box.
3. Click **Change** from the **Display Type** box.
4. Click **Other** from the **Select Device** box.
5. Insert the SiS 5597/5598 CD disk into your CD-ROM Drive.
6. When the **Install from Disk** dialog box appears, type the location of the drivers (D:\MM\WINNT\WINNT35, assuming your CD-ROM drive is D:) and click **OK**.
7. Click **Install** and click **Yes** when the **Installing Driver** dialog box appears.
8. Click **New** when the **Windows NT Setup** dialog box appears.
9. Click **Continue**. A message appears stating that the drivers were successfully installed. Click **OK**. You must now restart Windows NT 3.51.

#### 6.6.4 Selecting resolution and color depth

1. Double-click the **Display** icon under Control Panel.
2. Click **Color Palette** to change to either 16 colors, 256 colors, 32768 colors, 65536 colors, or 16777216 colors.
3. To select desktop resolution size, drag the slider in the **Desktop area** box to change resolution to either 640x480, 800x600, 1024x768, or 1280x1024.
4. Click **Test** to test the resolution.  
If the display test screen is acceptable, then click **Yes** when the **Testing Mode** dialog box appears. If the display test screen is unacceptable, then click **No**. Windows NT will give you an error message.
5. If the display test screen is acceptable and you clicked **Yes**, Windows NT 3.51 will prompt you to restart Windows NT 3.51.

# 6. SOFTWARE REFERENCE

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## 6.7 Windows NT 4.0

### 6.7.1 Version Note

The following descriptions apply to **SiS 5597/5598 Driver Release V1.03**. The descriptions, however, are subject to change at anytime without notice.

### 6.7.2 Driver Files

- (1) The enclosed SiS 5597/5598 Windows NT 4.0 drivers are SISV.SYS, SISV256.DLL, SISV.DLL, SISV5597.INF.
- (2) All the 16-color, 256-color, 32K/64K-color, and 16M-color drivers are available.

### 6.7.3 Installation

1. Click **Start** and then double-click the **Display** icon under Control Panel.
2. Click **Settings** in **Display Properties**.
3. Click **Display Type**.
4. Click **Change** from the **Adapter Type** box.
5. Click **Have Disk** in the **Change Display** box.
6. Insert the SiS 5597/5598 CD disk into your CD-ROM Drive.
7. When the **Install from Disk** dialog box appears, type the location of the drivers (D:\MM\WINNT\WINNT35, assuming your CD-ROM drive is D:) and click **OK**.
8. When the **Change Display** dialog box appears, click **OK**.
9. When the **Third-party Drivers** dialog box appears, click **Yes**. A message appears stating that the drivers were successfully installed. Click **OK**. You must now restart Windows 4.0.

### 6.7.4 Selecting resolution and color depth

1. Double-click the **Display** icon under Control Panel.
2. Click **Color Palette** to change to either 16 colors, 256 colors, 32768 colors, 65536 colors, or 16777216 colors.
3. To select desktop resolution size, drag the slider in the **Desktop area** box to change resolution to either 640x480, 800x600, 1024x768, or 1280x1024.
4. Click **Test** to test the resolution.  
If the display test screen is acceptable, then click **Yes** when the **Testing Mode** dialog box appears. If the display test screen is unacceptable, then click **No**. Windows NT will give you an error message.
6. Click **OK**. If the display test screen is acceptable and you clicked **Yes**, Windows NT 4.0 will change the mode without restarting Windows NT 4.0.

## 6. SOFTWARE REFERENCE

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### 6.8 Autodesk ADI 4.2 -Protected Mode

#### 6.8.1 General Description

##### 6.8.1.1 Driver Files

1. The enclosed SiS 5597/5598 ADI driver contains the following file:  
**RCPSIS.EXP** SiS ADI Driver (for all resolutions & colors)  
Note: This version of ADI driver does not support 16-color operation.
2. This driver is compatible with some Autodesk Inc. products including:
  - (1) AutoCAD/386 R11
  - (2) AutoCAD/386 R12
  - (3) AutoShade/386 V2.0
  - (4) 3D Studio V3.0
3. The installation procedures are different from one program to the other. Only the first step of the installation is the same for all these programs, that is, section **6.8.1.2 Unpack & Copy**. Therefore, we will state this step below.
4. As to the installation procedures for each program, see sections 6.8.2—6.8.5.

##### 6.8.1.2 Unpack & Copy

To unpack and copy drivers to where they should reside, do the following:

1. Run “INSTDRV.EXE” where it resides.
2. In “SiS Super VGA Drivers Installation” menu, select “A. ADI 4.2” to unpack and copy drivers. (To select, type “A”)
3. In “Unpack & Copy ADI 4.2 Drivers” screen, **key in the “drive:\directory” where these drivers would reside** (default C:\ADI42). Program would unpack & copy all related driver files to where you assign.
4. After “unpack and copy” is completed, exit the INSTDRV.EXE program.
5. Refer to sections 6.8.2—6.8.5 for detailed installation procedures of each program.

# 6. SOFTWARE REFERENCE

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## 6.8.2 AutoCAD R11 Setup

1. The following procedures assume that
  - (1) You have completed the “unpack & copy” procedure (section 6.8.1.2).
  - (2) Your ADI 4.2 drivers are located in C:\ADI42.
2. Add the following setting to your own batch file for AutoCAD R11 (e.g., ACADR11.BAT) or to your “AUTOEXEC.BAT” file:  
`SET DSPADI=\ADI42\RCPSIS.EXP <Enter>`
3. Delete the configure file ACAD.CFG in the \ACAD directory.
4. Type ACADR11 <Enter> to configure your AutoCAD R11 system.
5. In “Select Display Device:” item, choose “ADI P386 V4.0/4.1 display”
6. In “Select Display Resolution” screen, choose which display driver you want to use.
7. Go through the whole instructions, and the system would start with the desired display setting.

## 6.8.3 AutoCAD R12 Setup

1. The following procedures assume that
  - (1) You have completed the “unpack & copy” procedure (section 6.8.1.2).
  - (2) Your SiS ADI 4.2 drivers are located in C:\ADI42.
  - (3) Your AutoCAD R12 program is located in C:\ACADR12.
  - (4) Your AutoCAD R12 default drivers are located in C:\ACADR12\DRV.
  - (5) Your AutoCAD R12 configure file ACAD.CFG is located in C:\ACADR12.
2. Copy the following driver file to C:\ACADR12\DRV: RCPSIS.EXP.  
You may complete this step by typing “COPY C:\ADI42\RCPSIS.EXP C:\ACADR12\DRV”.
3. Delete your original ACAD.CFG file. You may complete this step by typing “DEL C:\ACADR12\ACAD.CFG”.
4. Restart your AutoCAD R12 program as usual.
5. AutoCAD R12 will ask you to complete the configuration procedures because it cannot find the configure file ACAD.CFG.
6. Follow the instructions of AutoCAD R12 to proceed with the configuration.
7. In “Available Video Displays:” item, choose “SiS Super VGA ADI v4.2 Display and Rendering driver”.
8. In “Select Display Resolution” screen, choose which display driver you want to use.
9. Go through the whole procedure. The system starts with the selected display setting.

## 6. SOFTWARE REFERENCE

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### 6.8.4 AutoShade R2.0 Setup

1. The following procedures assume that
  - (1) You have completed the “unpack & copy” procedure (section 6.8.1.2).
  - (2) Your ADI 4.2 drivers are located in C:\ADI42.
2. Add the following settings to your batch file for AutoShade R2.0 ( e.g., SHADE2.BAT) or to your “AUTOEXEC.BAT” file.
  - (a) For display driver setting, SET DSPADI=\ADI42\RCPSIS.EXP.
  - (b) For rendering driver setting, SET RDPADI=\ADI42\RCPSIS.EXP.
3. Delete the configure file SHADE.CFG.
4. Type SHADE2 <Enter> to re-configure the AutoShade.
5. When prompted to “Select display device:”, choose “P386 AutoDesk Device Interface display driver.”
6. When prompted to “Select rendering display driver:”, choose “P386 AutoDesk Device Interface rendering driver.”
7. Go through all the procedures. The system starts with the selecte display setting.

### 6.8.5 3D Studio Version 3.0 Setup

1. The following procedures assume that
  - (1) You have completed the “unpack & copy” procedure (section 6.8.1.2).
  - (2) Your ADI 4.2 drivers are located in C:\ADI42.
2. Create your own **3D Studio V3.0 batch file** (e.g., 3DS3.BAT) and add the following settings to it, or add the following settings to your “AUTOEXEC.BAT” file.
  - (1) **SET RCPADI=C:\ADI42\RCPSIS.EXP**
  - (2) **SET RDPADI=C:\ADI42\RCPSIS.EXP**
3. Execute the new 3DS batch file or reboot the computer using the new “AUTOEXEC.BAT” to make the new settings effective.
4. Change your current working directory to \3DS3 (where your 3D Studio V3.0 usually resides).
5. Delete the original configuration file “3DADI.CFG”.
6. Type **3DS VIBCGF** <Enter> to configure your display environment.
7. After the “Company Register Screen” appears, press <Enter> to continue.

## 6. SOFTWARE REFERENCE

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8. The “Video Environment Configuration Screen” will appear.  
Do the following procedures to configure your video display environment.
  - (1) In Main-Display” item,
    - (a) Press <Enter> The selection menu will appear.
    - (b) In the selection menu, move cursor to “RCPADI”.  
Press <Enter> to select.
  - (2) In “Material-Display” item,
    - (a) Press <Enter> The selection menu will appear.
    - (b) In the selection menu, move cursor to “RCPADI”.  
Press <Enter> to select.
  - (3) In “Render-Display” item,
    - (a) Press <Enter> The selection menu will appear.
    - (b) In the selection menu, move cursor to “RCPADI” or “RDPADI”.  
Press <Enter> to select.
  - (4) Complete the other selections and exit configuration.
9. After exiting configuration, 3DS will boot automatically using the environment you have just selected.
10. If your previous configuration is OK, 3DS will ask you to make a detailed configuration for the SiS 5597/5598 drivers. If this does not occur, make sure that you followed the previous procedures.
11. In the detailed configuration for the SiS 5597/5598 drivers, follow the instructions that appear on the screen and make your own choice.
12. After the detailed configuration, you will enter the 3DS main display screen. You may begin your 3D Studio work in the environment that you previously created.
13. Once the detailed configuration is finished, you may enter 3D Studio with the same configuration by simply typing \3DS\3DS <Enter> next time.
14. If you want to change your video configuration, just follow the procedures mentioned before to re-configure.

# 6. SOFTWARE REFERENCE

## GENERAL NOTES FOR THE OS/2 DRIVERS:

- The descriptions apply to “SiS 5597/5598 Driver Release V1.03”. The descriptions, however, are subject to change at anytime without notice.
- All OS/2 Warp Versions up to SiS 5597/5598 driver Rev. 1.03 would be installed as described in “7. OS/2 V3.0 (Warp)” except for Double Bytes OS/2 Warp (e.g., Chinese, Japanese, and Korea).
- For Double Bytes OS/2 Warp installation, refer to section **6.11 Double Bytes OS/2 Warp**.

## 6.9 OS/2 V2.1

### 6.9.1 Driver Files

1. The enclosed SiS 5597/5598 OS/2 2.1 driver contains the following files:

<b>SISINST.CMD</b>	SiS driver install program
<b>SVGA.EXE</b>	SiS PMI Generator
<b>S768256.DL@</b>	SiS IBMDEV32.DLL Display Driver
<b>OTHERS</b>	other files required during installation

### 6.9.2 Installation

Before installing the SiS 5597/5598 OS/2 drivers, make sure to:

1. Install your OS/2 system using “**VGA display**” option (i.e., standard VGA).
2. Start your OS/2 system.

#### Install SiS 5597/5598 OS/2 2.1 drivers as follows:

1. Enter “OS/2 window” or “OS/2 full screen”.
2. Change to the directory where the SiS 5597/5598 OS/2 2.1 display drivers are located and type SISINST <Enter>. For example, A:\OS2\SBCS.21>SISINST
3. All the Driver Files will be copied to a subdirectory C:\SISDRV and the “Select Screen parameters for SiS SVGA” menu appears and all the resolution (and color) and frame rate supported would be shown on the screen.
4. Choose which one you would like to use and click **OK**.
5. The installation program would then complete all installation process and create a “SiS Setup” for future change mode usage.
6. Shutdown and reboot OS/2 (your settings will only take effect when you reboot OS/2).

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### 6.10 OS/2 V3.0 (Warp)

#### 6.10.1 Driver Files

The enclosed SiS 5597/5598 OS/2 3.0 driver contains the following files:

<b>SISINST.CMD</b>	SiS driver install program
<b>SVGA.EXE</b>	SiS PMI Generator
<b>S768256.DL@</b>	SiS IBMDEV32.DLL Display Driver
<b>OTHERS</b>	other files required during installation

#### 6.10.2 Installation

**Before install SiS 5597/5598 OS/2 drivers, make sure:**

1. Install your OS/2 system using “**VGA display**” option (i.e. standard VGA).
2. Start your OS/2 system.

**Install SiS 5597/5598 OS/2 Warp drivers as following procedures:**

1. Enter “OS/2 window” or “OS/2 full screen”.
2. Change to the directory where the SiS 5597/5598 OS/2 3.0 display drivers are located and type SISINST <Enter>.  
For example, A:\OS2\SBCS.30>SISINST
3. All the Driver Files will be copied to a subdirectory C:\SISDRV and the “Select Screen parameters for SiS SVGA” menu appears and all the resolution (and color) and frame rate supported would be shown on the screen.
4. Choose which one you would like to use and click **OK**.
5. Then installation program would then complete all installation process and create a “SiS Setup” for future change mode usage.
6. Shutdown and reboot OS/2 (your settings will only take effect when you reboot OS/2).

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### 6.11 Double Bytes OS/2 Warp

#### 6.11.1 Driver Files

The enclosed SiS 5597/5598 Double Byte OS/2 3.0 driver contains the following files:

<b>SETUP.CMD</b>	SiS driver install program
<b>SVGA.EXE</b>	SiS PMI Generator
<b>S768256.DL@</b>	SiS IBMDEV32.DLL Display Driver
<b>OTHERS</b>	other files required during installation

#### 6.11.2 Installation

**Due to some limitations in Double Byte OS/2 Warp, the installation process is a two-phased.**

**1st phase:** copy files, modify “config.sys”, create “SiS Install” icon then shutdown and re-boot OS/2.

**2nd phase:** double click the “SiS Install” icon to complete the installation

**Before install SiS 5597/5598 OS/2 drivers, make sure:**

1. Install your OS/2 system using “**VGA display**” option (i.e., standard VGA).
2. Start your OS/2 system.

**Install SiS 5597/5598 OS/2 Warp drivers as following procedures:**

##### **1st phase**

1. Enter “OS/2 window” or “OS/2 full screen”.
2. Change to the directory where the SiS 5597/5598 OS/2 3.0 display drivers are located and type SETUP <Enter>.  
For example, A:\OS2\DBCS.30>SETUP
3. All the Driver Files will be copied to a subdirectory C:\SISDRV and an “SiS Install” icon would be created.
4. After completing setup, shutdown and reboot OS/2.

##### **2nd phase**

5. After rebooting OS/2, double click the “SiS Install” icon. The “SiS Install” icon would then be executed automatically and “Select Screen parameters for SiS SVGA” screen would appear on the screen.
6. Select the desired resolution (and color) and frame rate from this screen, then click **OK** to complete installation. An “SiS Setup” icon would be created for future change modes and frame rate usage.
7. After completing installation, shutdown and reboot OS/2 (your settings will only take effect when you reboot OS/2).

## 6. SOFTWARE REFERENCE

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### 6.12 Desktop Management Interface (DMI)

#### 6.12.1 Introducing the ASUS DMI Configuration Utility

This motherboard supports DMI within the BIOS level and provides a DMI Configuration Utility to maintain the Management Information Format Database (MIFD). DMI is able to auto-detect and record information pertinent to a computer's system such as the CPU type, CPU speed, and internal/external frequencies, and memory size. The onboard BIOS will detect as many system information as possible and store those collected information in a 4KB block in the motherboard's Flash EPROM and allow the DMI to retrieve data from this database. Unlike other BIOS software, the BIOS on this motherboard uses the same technology implemented for Plug and Play to allow dynamic real-time updating of DMI information versus creating a new BIOS image file and requiring the user to update the whole BIOS. This DMI Configuration Utility also allows the system integrator or end user to add additional information into the MIFD such as serial numbers, housing configurations, and vendor information. Those information not detected by the motherboard BIOS and has to be manually entered through the DMI Configuration Utility and updated into the MIFD. This DMI Configuration Utility provides the same reliability as PnP updating and will prevent the refreshing failures associated with updating the entire BIOS.

#### 6.12.2 Starting the ASUS DMI Configuration Utility

The DMI Configuration Utility (DMICFG2.EXE) must be used in real mode in order for the program to run, the base memory must be at least 180K. Memory managers like HIMEM.SYS (required by windows) must not be installed. You can boot up from a system diskette without AUTOEXEC.BAT and CONFIG.SYS files, "REM" HIMEM.SYS in the CONFIG.SYS, or press <Shift>+<F5> during bootup to bypass your AUTOEXEC.BAT and CONFIG.SYS files.

1. In Windows, copy DMICFG2.EXE to your hard disk drive.
2. Restart your computer and press <Shift>+<F5> during bootup to enter safe mode command prompt.
3. Go to the directory containing DMICFG2.EXE.
4. Type DMICFG2 and press <Enter> to run.

# 6. SOFTWARE REFERENCE

## 6.12.3 Using the ASUS DMI Configuration Utility

**NOTE:** The following screen displays are provided as examples only and may not reflect the screen contents on your system.

Edit DMI (or delete)



Use the ←→ (left-right) cursors to move the top menu items and the ↑↓ (up-down) cursor to move between the left hand menu items. The bottom of the screen will show the available keys for each screen. Press enter at the menu item to enter the right hand screen for editing. “Edit component” appears on top. The reversed color field is the current cursor position and the blue text are available for editing. The orange text shows auto-detected information and are not available for editing. The blue text “Press [ENTER] for detail” contains a second pop-up menu is available, use the + - (plus-minus) keys to change the settings. Enter to exit *and save*, ESC to exit *and not save*.

If the user has made changes, ESC will prompt you to answer Y or N. Enter Y to go back to the left-hand screen *and save*, enter N to go back to left-hand screen and *not save*. If editing has not been made, ESC will send you back to the left hand menu without any messages.

### Notes

A heading, \*\*\* BIOS Auto Detect \*\*\*, appears on the right for each menu item on the left side that has been auto detected by the system BIOS.

A heading, \*\*\* User Modified \*\*\*, will appear on the right for menu items that have been modified by the user.



# 6. SOFTWARE REFERENCE

## Save MIFD



You can save the MIFD (normally only saved to flash ROM) to a file by entering the drive and path here. If you want to cancel save, you may press ESC and a message “Bad File Name” appears here to show it was not saved.

## Load MIFD



You can load the disk file to memory by entering a drive and path and file name here.

## Load BIOS Defaults



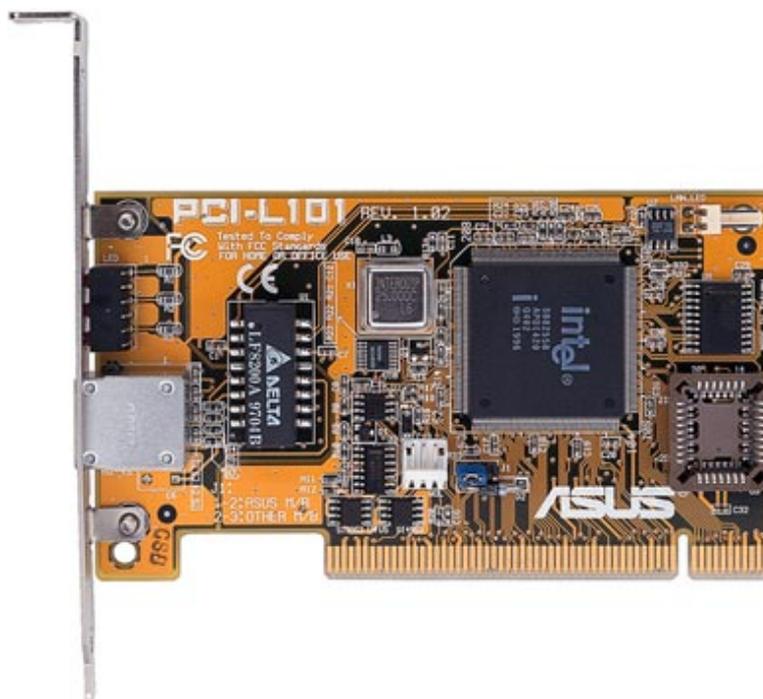
You can load the BIOS defaults from a MIFD file and can clear all user modified and added data. You must reboot your computer in order for the defaults to be saved back into the Flash BIOS.

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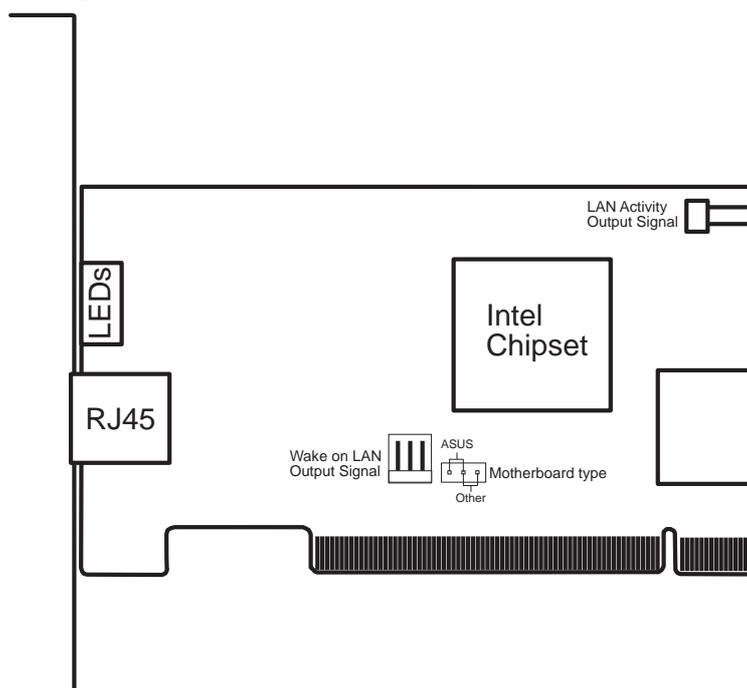
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# 7. APPENDIX

## 7.1 PCI-L101 Fast Ethernet Card



7. APPENDIX  
ASUS LAN Card



If you are using the ASUS PCI-L101 on an ASUS motherboard, leave the jumper on its default setting of “ASUS.” If you are using another brand of motherboard, set the jumper to “Other.” Connect the Wake on LAN (WOL) output signal to the motherboard’s WOL\_CON in order to utilize the wake on LAN feature of the motherboard. Connect the LAN activity output signal (LAN\_LED) to the system cabinet’s front panel LAN\_LED in order to display the LAN data activity.

# 7. APPENDIX

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## 7.1.1 Features

- Intel 82558 Ethernet LAN Controller (Fully integrated 10BASE-T/100BASE-TX)
- Wake-On-LAN Remote Control Function Supported
- PCI Bus Master Complies to PCI Local Bus Rev. 2.1 specifications
- Consists of MAC & PHY (10/100Mbps) interfaces
- Complies to IEEE 802.3 10BASE-T and IEEE 802.3u 100BASE-TX interfaces
- Fully supports 10BASE-T & 100BASE-TX operations through a single RJ45 port
- Supports 32-bit Bus Master Technology / PCI Rev. 2.1
- Enhancements on ACPI & APM
- Adheres to PCI Bus Power Management Interface Rev. 1.0, ACPI Rev. 1.0, and Device Class Power Management Rev. 1.0
- IEEE 802.3u auto-negotiation for 10Mbps/100Mbps Network Data Transfer Rates.
- Provides LED indicators for monitoring network conditions
- Plug and Play

## 7.1.2 Software Driver Support

- **NetWare ODI Drivers** - Novell Netware 3.x, 4.x, DOS, OS/2 Client
- **NDIS 2.01 Drivers** - Microsoft LAN Manager, Microsoft Windows 3.11, IBM LAN Server
- **NDIS 3.0 Drivers** - Microsoft Windows NT, Microsoft Windows 95, Microsoft Windows 3.11

## 7.1.3 Question and Answer

Q: What is Wake-On-LAN ?

A: The Wake-On-LAN feature provides the capability to remotely power on systems supporting Wake-On-LAN by simply sending a wake-up frame. With this feature, remotely uploading/downloading data to/from systems during off-peak hours will be feasible.

Q: What can Wake-On-LAN do for you ?

A: Wake-On-LAN is a remote management tool with advantages that can reduce system management workload, provide flexibility to the system administrator's job, and then of course save you time-consuming efforts and costs.

Q: What components does Wake-On-LAN require to be enable?

A: To enable Wake-On-LAN function, your system requires Ethernet LAN adapter card that can activate Wake-On-LAN function, a client with Wake-On-LAN capability, and software such as LDCM Rev. 3.10 or up that can trigger wake-up frame.

# 7. APPENDIX

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## 7.2 Network Controller

This motherboard features an optional 32-bit 10/100Mbps Ethernet network interface. This interface supports the bus mastering architecture and auto-negotiation feature, which makes it possible to use the common twisted-pair cabling with RJ45 connectors for both 10Mbps and 100Mbps connections. Extensive driver support for commonly-used network systems is also provided.

### 7.2.1 Features

- Intel 82558 Ethernet LAN Controller (Fully integrated 10BASE-T/100BASE-TX)
- Wake-On-LAN Remote Control Function Supported
- PCI Bus Master Complies to PCI Rev. 2.1
- Consists of MAC & PHY (10/100Mbps) interfaces
- Complies to IEEE 802.3 10BASE-T and IEEE 802.3U 100BASE-TX interfaces
- Fully supports 10BASE-T & 100BASE-TX operations
- Single RJ-45 Connector: Auto-Detection of 10Mbps or 100Mbps Network Data Transfer Rates and Connected Cable Types
- 32 bit Bus Master Technology / PCI Rev. 2.1
- Plug and Play
- Enhancements on ACPI & APM
- Adheres to PCI Bus Power Management Interface Rev. 1.0, ACPI Rev. 1.0, and Device Class Power Management Rev. 1.0

# 7. APPENDIX

## 7.2.3 LED Connectors

**Link Indicator:** This connects to an LED to monitor 10Base-T and 100Base-TX connections. The LED lights to indicate a successful network connection, and remains steady if the connection is stable. If this indicator is off, the cable connection between the hub and the computer may be faulty or the driver configuration may be faulty.

**Activity Indicator:** This connects to an LED to monitor network activity. The LED lights when there are network packets sent or received through the RJ45 port. The rate of flashing is proportional to the amount of network traffic. If this is off, the computer is not sending or receiving network data.

**Speed Indicator:** This connects to an LED to monitor connection speed. The LED lights (**On**) when connection is made to a 100Base-TX host. If **Off**, the network connection is operating at 10Mbps.

## 7.2.4 Network Cable Connection

**Twisted Pair Ethernet (TPE)** - Connect a single network cable to the RJ45 connector. For 100BASE-TX, your network cable must be category 5 (not category 3), twisted-pair wiring with RJ45 connectors. If you plan on running the interface at 100 Mbps, it must be connected to a 100BASE-TX hub (not a 100BASE-T4 hub). For 10BASE-T, use category 3, 4, or 5 twisted-pair wiring.

## 7.2.5 Twisted-Pair Cable

The cable used to connect the Ethernet card to a host (generally a Hub) is called a straight-through twisted-pair. The end connectors are called RJ45 connectors, which are not compatible with the standard RJ11 telephone connectors. The illustration shows a connection between a typical Hub and this motherboard's network interface.

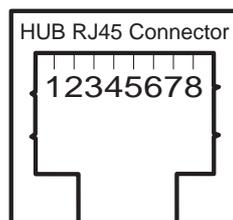
### Straight-Through Cable

Hub	Card
1 IRD+	1 OTD+
2 IRD-	2 OTD-
3 OTD+	3 IRD+
6 OTD-	6 IRD-



## 7.2.6 RJ45 Connector

Pin 1	Output Transmit Data +
Pin 2	Output Transmit Data -
Pin 3	Input Receive Data +
Pin 6	Input Receive Data -
Pins 4,5,7,8	(Reserved)



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## 7.2.7 Troubleshooting

### *If the interface can't connect to the network*

#### **Make sure the cable is installed properly.**

The network cable must be securely attached at both RJ-45 connections (interface and hub). If the cable is attached but the problem persists, try a different cable. The maximum allowable distance from network interface or adapter or interface to hub is 100 meters.

If you're directly connecting two computers (no hub), use a crossover cable. Most hubs require a straight-through cable, while most switches require a crossover cable (see your hub or switch documentation to verify).

#### **Check the LED lights on the network interface or adapter.**

The optional network condition connector module has three diagnostic LEDs. These lights help indicate if there's a problem with the connector, cable, or hub. The table below describes the LEDs.

<b>LED</b>	<b>Indication</b>	<b>Meaning</b>
<b>LNK</b>	<b>On</b>	The interface and hub have acknowledged a connection; the link between the hub and interface is good.
	<b>Off</b>	The cable connection between the hub and interface is faulty; or you have a driver configuration problem.
<b>ACT</b>	<b>On or flashing</b>	The interface is sending or receiving network data. The frequency of the flashes varies with the amount of network traffic.
	<b>Off</b>	The interface is not sending or receiving network data.
<b>SPD</b>	<b>On</b>	Network connection operating at 100 Mbps.
	<b>Off</b>	Network connection operating at 10 Mbps.

#### **Make sure you're using the correct drivers.**

Make sure you're using the drivers that come with your motherboard. The driver filename contains the letter B (for example, E100BODI.DOS).

#### **Make sure the hub port and the network interface or adapter have the same duplex setting.**

If you configured the network interface for full duplex, make sure the hub port is also configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.

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## *Testing the network interface or adapter*

Test the network interface or adapter by running Intel diagnostics. For DOS or Windows 3.1 computers, run Setup on the ASUS Configuration and Drivers disk. For Windows NT and Windows 95 run Intel PROSet by double-clicking the Intel PROSet Icon in the Control Panel. Click Help from the main PROSet window to get complete diagnostics information and instructions.

## *Common problems and solutions*

### **SETUP.EXE reports the network interface or adapter is “Not enabled by BIOS”.**

- The PCI BIOS isn't configuring the network interface or adapter correctly. Try the PCI installation tips.

### **The computer hangs when the drivers are loaded.**

- Change the PCI BIOS interrupt settings. See the next page for PCI installation tips.
- If you are using EMM386, it must be version 4.49 or newer (this version ships with MS-DOS 6.22 or newer).

### **Diagnostics pass, but the connection fails or errors occur.**

- At 100 Mbps use category 5 wiring and make sure the network cable is securely attached.
- For NetWare clients, make sure you specify the correct frame type in the NET.CFG file.
- Make sure the duplex mode setting on the network interface or adapter matches the setting on the hub.
- At 100 Mbps, connect to a 100BASE-TX hub only (not T4).

### **The LNK LED doesn't light.**

- Make sure you've loaded the network drivers.
- Check all connections at the network interface or adapter and the hub.
- Try another port on the hub.
- Make sure the duplex mode setting on the network interface or adapter matches the setting on the hub.
- Make sure you have the correct type of cable between the network interface or adapter and the hub. 100 BASE-TX requires two pairs. Some hubs require a cross-over cable while others require a straight-through cable. See the *Cabling* README file for more information on cabling.

### **The ACT LED doesn't light.**

- Make sure you've loaded the correct network drivers.
- The network may be idle. Try accessing a server.
- The network interface or adapter isn't transmitting or receiving data. Try another network interface or adapter.
- May not be using four-pair cable for TX wiring.

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## **The network interface or adapter stopped working when another network interface or adapter was added to the computer.**

- Make sure the cable is connected to the motherboard's network interface or RJ45 port.
- Make sure your PCI BIOS is current.
- Make sure the other network interface or adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts — OS/2\* doesn't.

## **The interface stopped working without apparent cause.**

- Try reconnecting the cable to the RJ45 port first.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Try another motherboard of the same model.
- Run the diagnostics.

## **The Wake On LAN feature is not working.**

- Make sure the WOL cable is attached and power is applied to the computer.
- Check the BIOS for its WOL setting. Some computers may need to be configured to WOL.
- Make sure the network cable is fully attached to the network interface or adapter.

## **Link LED does not light when power is connected.**

- Make sure WOL cable is attached and power is applied to computer.
- Make sure network cable is attached at both ends.

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## 7.3 Glossary

### AGP (Accelerated Graphics Port)

An interface specification that enables high-performance 3D graphics on mainstream PCs. AGP offers a higher throughput than PCI by providing the graphics controller with direct access to system memory.

Bus	Bus Frequency	Bus Speed
PCI	33MHz	133MB/s
AGP 1X	66MHz	200-300MB/s
AGP 2X	133MHz	528MB/s
AGP 4X	266MHz	1 GB/s

### AUTOEXEC.BAT

AUTOEXEC.BAT is a special-purpose file that is automatically executed by DOS whenever the computer is turned ON or restarted. This file contains important commands that help configure the system to work with certain software and devices. Windows 95 and later has its own startup files and may not use or may ignore parts of the AUTOEXEC.BAT file.

### BIOS (Basic Input/Output System)

BIOS is a set of routines that affect how the computer transfers data between computer components, such as memory, disks, and the display adapter. The BIOS instructions are built into the computer's read-only memory. BIOS parameters can be configured by the user through the BIOS Setup program. The BIOS can be updated using the provided utility to copy a new BIOS file into the EEPROM.

### Bit (Binary Digit)

Represents the smallest unit of data used by the computer. A bit can have one of two values: 0 or 1.

### Boot

Boot means to start the computer operating system by loading it into system memory. When the manual instructs you to "boot" your system (or computer), it means to turn ON your computer. "Reboot" means to restart your computer. When using Windows 95 or later, selecting "Restart" from "Start | Shut Down..." will reboot your computer.

### Bus Master IDE

PIO (Programmable I/O) IDE requires that the CPU be involved in IDE access and waiting for mechanical events. Bus master IDE transfers data to/from the memory without interrupting the CPU. Bus master IDE driver and bus master IDE hard disk drives are required to support bus master IDE mode.

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## **Byte (Binary Term)**

One byte is a group of eight contiguous bits. A byte is used to represent a single alphanumeric character, punctuation mark, or other symbol.

## **COM Port**

COM is a logical device name used by to designate the computer serial ports. Pointing devices, modems, and infrared modules can be connected to COM ports. Each COM port is configured to use a different IRQ and address assignment.

## **CPU (Central Processing Unit)**

The CPU, sometimes called “Processor,” actually functions as the “brain” of the computer. It interprets and executes program commands and processes data stored in memory. Currently, there are socket 370 (for Pentium Celeron-PPGA), socket 7 (for Pentium, AMD, Cyrix, IBM), slot 1 (for Pentium II and III), and slot 2 (for Xeon) processors.

## **Device Driver**

A device driver is a special set of instructions that allows the computer’s operating system to communicate with devices such as VGA, audio, ethernet, printer, or modem.

## **DOS (Disk Operating System)**

DOS is the foundation on which all other programs and software applications operate, including Windows. DOS is responsible for allocating system resources such as memory, CPU time, disk space, and access to peripheral devices. For this reason, DOS constitutes the basic interface between you and your computer.

## **Endian**

Endian is a byte order system used in data transfers. In big-endian architectures, the lower addresses are most significant. In little-endian architectures, the higher bytes are most significant. Mainframe computers, such as those by IBM, use a big-endian architecture. Modern PCs use the little-endian system.

## **Hardware**

Hardware is a general term referring to the physical components of a computer system, including peripherals such as printers, modems, and pointing devices.

## **IDE (Integrated Drive Electronics)**

IDE devices integrate the drive control circuitry directly on the drive itself, eliminating the need for a separate adapter card (in the case for SCSI devices). UltraDMA/33 IDE devices can achieve up to 33MB/Sec transfer.

## **LPT Port (Line Printer Port)**

Logical device name reserved by DOS for the computer parallel ports. Each LPT port is configured to use a different IRQ and address assignment.

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## **MMX**

A set of 57 new instructions based on a technique called Single Instruction, Multiple Data (SIMD), which is built into the new Intel Pentium PP/MT (P55C) and Pentium II (Klamath) CPU as well as other x86-compatible microprocessors. The MMX instructions are designed to accelerate multimedia and communications applications, such as 3D video, 3D sound, video conference.

## **PCI Bus (Peripheral Component Interconnect Local Bus)**

PCI bus is a specification that defines a 32-bit data bus interface. PCI is a standard widely used by expansion card manufacturers.

## **Peripherals**

Peripherals are devices attached to the computer via I/O ports. Peripheral devices allow your computer to perform an almost limitless variety of specialized tasks.

## **POST (Power On Self Test)**

When you turn on the computer, it will first run through the POST, a series of software-controlled diagnostic tests. The POST checks system memory, the motherboard circuitry, the display, the keyboard, the diskette drive, and other I/O devices.

## **PS/2 Port**

PS/2 ports are based on IBM Micro Channel Architecture. This type of architecture transfers data through a 16-bit or 32-bit bus. A PS/2 mouse and/or keyboard may be used on ATX motherboards.

## **RAID (Redundant Array of Independent Disks)**

RAID can be set up to provide mirroring (for fault tolerance), parity (for data guarding), or striping (for data distribution over several drives for increased performance). A RAID card is required to setup a RAID system.

## **RAM (Random Access Memory)**

There are several different types of RAM such as DRAM (Dynamic RAM), EDO DRAM (Extended Data Output DRAM), SDRAM (Synchronous DRAM).

## **ROM (Read Only Memory)**

ROM is nonvolatile memory used to store permanent programs (called firmware) used in certain computer components. Flash ROM (or EEPROM) can be reprogrammed with new programs (or BIOS).

## **SCSI (Small Computer System Interface)**

High speed parallel interface defined by the X3T9.2 committee of the American National Standards Institute (ANSI) for connecting many peripheral devices.

## **System Disk**

A system disk contains the core file of an operating system and is used to boot up the operating system.

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## **UltraDMA/33**

UltraDMA/33 is a new specification to improve IDE transfer rates. Unlike traditional PIO mode, which only uses the rising edge of IDE command signal to transfer data, the DMA/33 uses both rising edge and falling edge. Hence, the data transfer rate is double of the PIO mode 4 or DMA mode 2. (16.6MB/s x2 = 33MB/s).

## **USB (Universal Serial Bus)**

A new 4-pin serial peripheral bus that allows plug and play computer peripherals such as keyboard, mouse, joystick, scanner, printer and modem/ISDN to be automatically configured when they are attached physically without having to install drivers or reboot. With USB, the traditional complex cables from back panel of your PC can be eliminated.