

# **NR110**

**Intel® 845 Motherboard**

## ***USER'S MANUAL***

**Pentium®4 Processor Motherboard  
Rev. 1.0**

## Revision History

Revision	Date	Description
1.0		Initial release of NR110 motherboard user's manual

## Item Checklist

- 1 NR110 Motherboard**
- 1 Floppy Cable**
- 1 ATA Cable 66/100**
- 1 I/O Shield**
- 1 Heatsink Retention Module**
- 1 CD for Motherboard Driver**
- NR110 User Manual**
- Quick Installation Guide**

## Safety Instructions

Please follow some precautions when operating your computer.

1. Always unplug the power cord when inserting any add-on card or module inside the system.
2. Use a grounded wrist strap before handling computer components. If one is not available, touch both of your hands to a safely grounded object or to a metal object.
3. Place components on a level grounded antistatic pad or on the packaging that came with the components whenever the components are separated from the system.
4. Keep equipment away from moisture and humidity.
5. Keep this User's Manual for future reference.

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# Chapter 1 Introduction

## Motherboard Specifications

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### Form Factor:

- Standard  $\mu$ ATX 9.6"x 9.6"
- 

### Processor:

- Supports single Intel® Pentium® 4 Processor in 478 ball FC-PGA2 package
  - Processor socket mPGA478B
  - 400 MHz system bus
- 

### Cache Memory:

- Processor integrated level-1 cache and level-2 cache.
- 

### System Memory:

- Three 168-pin DIMM socket (90 degree, tin plated contact)
  - Support PC133 SDRAM
  - Support 64Mb, 128Mb, 256Mb, and 512Mb SDRAM devices
  - Support minimum 64MB to 3GB maximum
  - Support suspend -to-RAM sleep state (ACPI S3)
- 

### Core Logic Chipset:

- Intel® i845 MCH (Memory Controller Hub) in 593 ball FC-BGA package
  - Intel 82801BA ICH2 (I/O Controller Hub 2) in 360 ball EBGA package
  - Intel 82802AB 2 Mb FWH (Firmware Hub) or equivalent.
  - AGP Controller
  - AGP v2.0 compliant.
  - Supports 1x/2x/4x AGP signaling and 2x/4x Fast Writes
  - Optimized point-to-point topology using 1.5V signaling in 4x mode.
  - 66 MHz asynchronous clock AGP-to-Host interface.
- 

### PCI bus:

- PCI 2.2 compliant
  - PME# and 3.3Vaux signals to support power management.
- 

### Audio:

- ADI AD1885 analog CODEC
  - AC'97 Revision 2.1 compliant (Integrated in ICH2)
  - Three mini-DIN audio jacks (Line-out, Line-in, and Mic-in)
  - Two audio headers, locking type: CD-in, Aux-in
-

**On board EIDE:**

- 2x PCI IDE ports supporting up to 4 devices
  - Support ATA-33/66/100, PIO up to mode 4
- 

**On board I/O:**

- Low Pin Count (LPC) 3.3V interface between FWH and ICH2
  - 2 serial ports - DB9 (16550 UART).
  - 1 Parallel Port - DB25 with ECP/EPP support.
  - 1 Floppy port with 1.2MB, 1.44MB and 2.88MB support.
  - 1 PS/2 mouse connector, 1 PS/2 keyboard connector.
  - 3 fan output headers.
  - 4 USB Ports: 2 ports with RJ-45/USB connector in back panel, 2 ports with 2X5 header for front panel connection.
- 

**BIOS:**

- Plug & Play BIOS (AMI).
  - 2 Mb Firmware Hub
  - ACPI v2.0 – WfM 2.0 – SMBIOS v2.3 – DMI v2.1 – PC2001.
  - Auto detect for: CPU Speed – AGP 4X – ATA-100.
  - Wake-on PS/2 (KB, Mouse) & USB devices.
  - Rapid Boot support
  - WOL, ASF support
  - Power management: ACPI S3, S4 support
- 

**Additional Features:**

- Case intrusion header
  - Thermal sensor & CPU monitoring.
  - NIC with integrated MBA boot (complete WOL support)
  - BIOS recovery & Boot-Block overwrite via jumper.
  - Hardware Monitor Capability (SMSC LPC47M192).
- 

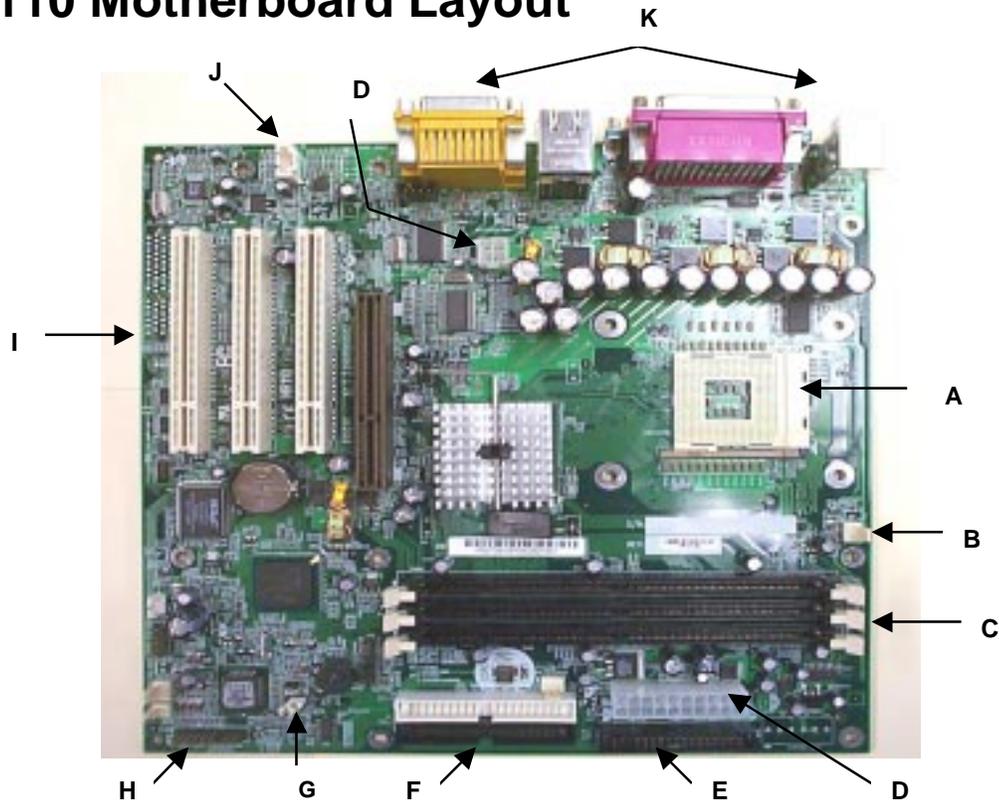
**Expansion Slots:**

- 1 AGP Slot (2X/4X mode).
  - 3 PCI Slots (including 1 shared PCI/CNR Slot)
- 

**Other:**

- Front panel I/O 2X9 header, key pin 14.
  - On-board buzzer.
-

# NR110 Motherboard Layout



A	CPU Socket	G	Jumper Connector
B	CPU Fan Socket	H	Front Panel Connector
C	Memory Sockets	I	Expansion Slots
D	Power Supply Connector	J	Audio Connector
E	Floppy Connector	K	Back Panel Connectors
F	IDE Connectors		



Front Panel Connector Pin Definition

Pin	Signal Name	I/O	Description
1	HD_PWR	O	Hard Disk LED pull-up to VCC
2	HDR_BLNK_GRN	O	Front panel Green LED signal
3	HDA*	O	Hard Disk Active LED signal
4	HDR_BLNK_YEL	O	Front panel Yellow LED signal
5	GND	-	<b>Ground</b>
6	FPBUT_IN	I	Front panel On/Off button signal
7	FP_RESET*	I	Front panel Reset button signal
8	GND	-	Ground
9	VCC	O	
10	FPSLP*	I	Front panel sleep button signal
11	IRRX	I	IRDA serial input
12	GND	-	Ground
13	GND	-	Ground
14	KEY	-	KEY
15	IRTX	O	IRDA serial output
16	VCC	O	
17	NC	-	not connected
18	NC	-	not connected

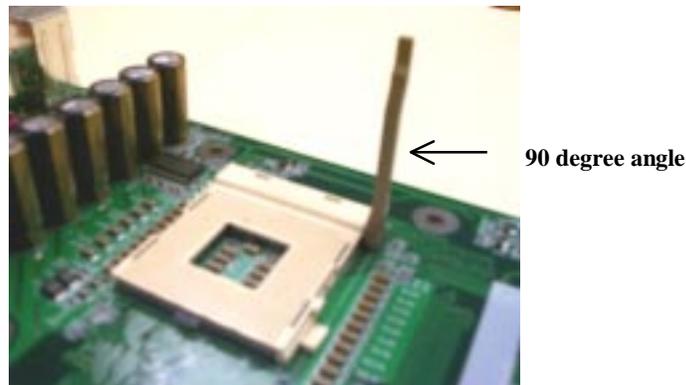
## Chapter 2 Hardware Installation Process

### Installing the Central Process Unit (CPU)

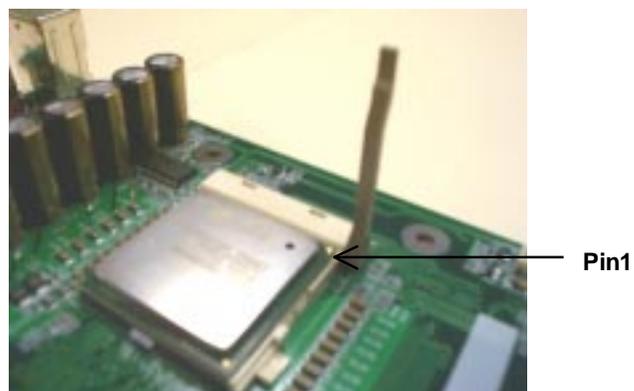
#### CPU Installation

1. Unlock the CPU socket by pulling the lever up to a 90-degree angle.
2. Position the CPU above the socket such that the **marked** corner (pin1) matches the corner near the base of the lever.
3. Place the CPU into the socket. If the CPU is unable to insert properly, check its orientation and attempt to re-install.  
**Warning!** Do not force the CPU into the socket. Doing so will prompt bending of the pins and create damage to the CPU.
4. Close the socket by lowering the lever and locking the lever in place.

#### Step 1



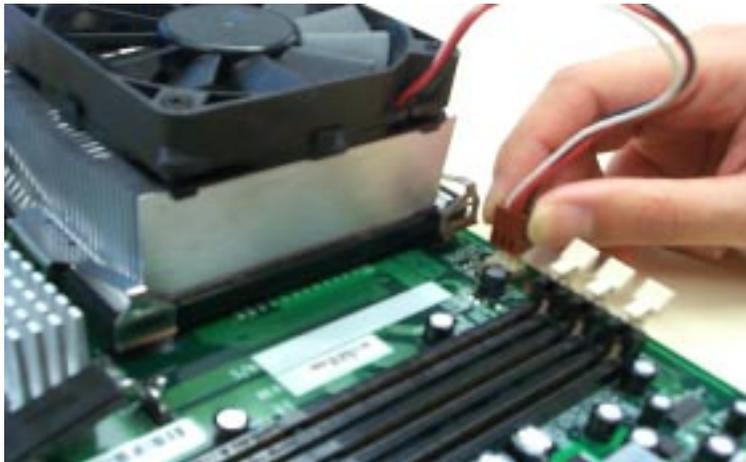
#### Step 2



## Installing the Central Process Unit (CPU) *cont.*

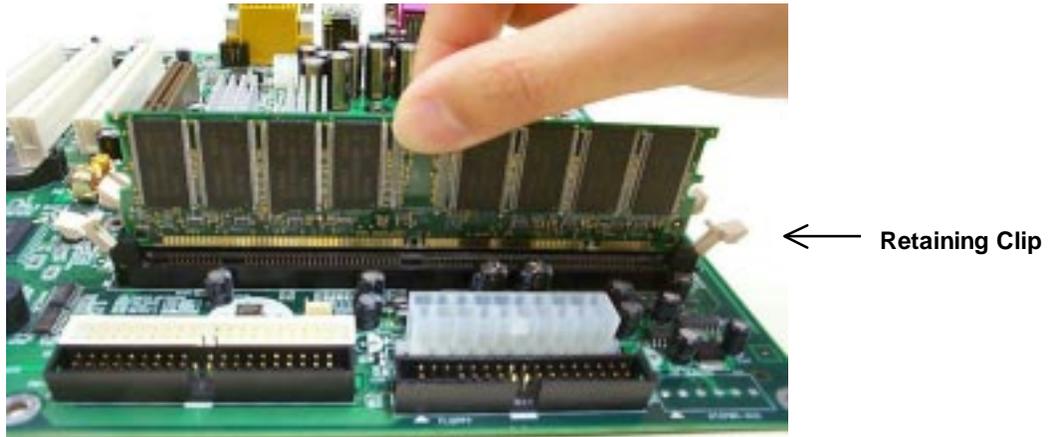
### CPU Heat Sink Installation

1. Read the related CPU heat sink user's manual for more detailed installation procedures.
2. Connect CPU fan power cable into the CPU fan connector on the motherboard.



## Installing Memory Modules

1. Push the white retaining clips on each of the memory socket outwards.
2. Match the notches on the contact edge of the memory module to the ridges in the memory socket.
3. Insert the memory module vertically into place. When properly inserted, the white retaining clips will move inward to lock in the module.
4. Repeat installation process when adding additional modules.

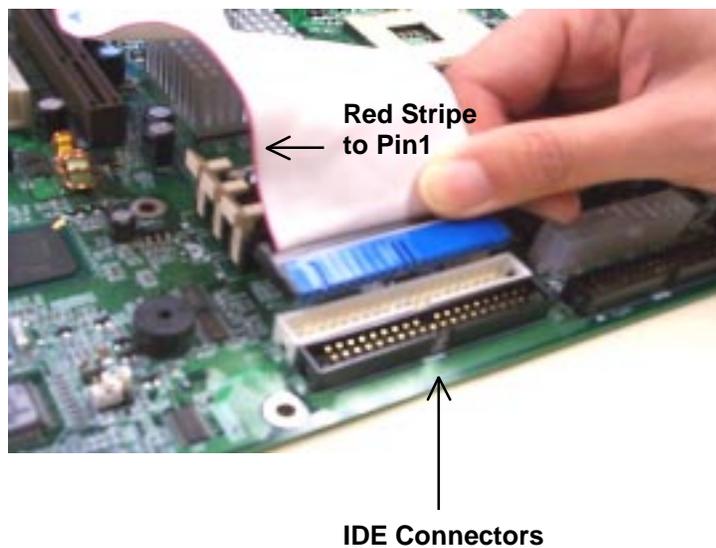
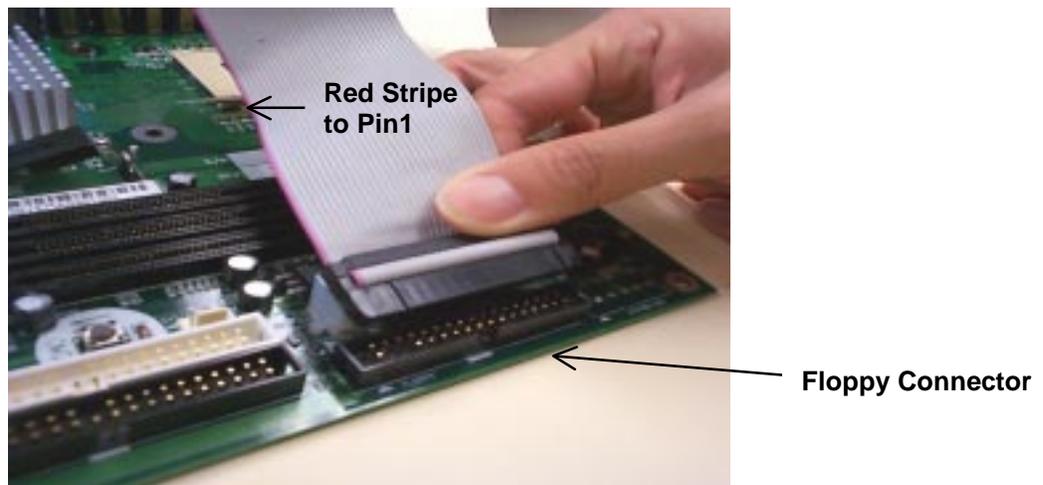


### Total Memory Sizes With Unbuffered SDRAM DIMM

Devices used on DIMM	1 DIMMx64/x72	2 DIMMsx64/x72	3 DIMMsx64/x72
64 Mbit (2Mx8x4 banks)	128 MBytes	256 MBytes	384 MBytes
64 Mbit (1Mx16x4 banks)	64 MBytes	128 MBytes	192 MBytes
128 Mbit (4Mx8x4 banks)	256 MBytes	512 MBytes	786 MBytes
128 Mbit (2Mx16x4 banks)	128 MBytes	256 MBytes	384 MBytes
256 Mbit (8Mx8x4 banks)	512 MBytes	1 GByte	1.5 GBytes
256 Mbit (4Mx16x4 banks)	256 MBytes	512 MBytes	768 Mbytes
512 Mbit (16Mx8x4 banks)	1 GByte	2 GBytes	3 GBytes
512 Mbit (8Mx16x4 banks)	512 MBytes	1 GByte	1.5 GBytes

## Connecting IDE and Floppy Disk Cables

1. **Connecting the floppy disk ribbon cable into the motherboard.** The side of the cable with the red stripe needs to be inserted into the Pin1 side of the floppy disk connector.
2. **Connecting the IDE ribbon cable into the motherboard.** The side of the cable with the red stripe should be inserted into Pin1 side of the IDE connector.

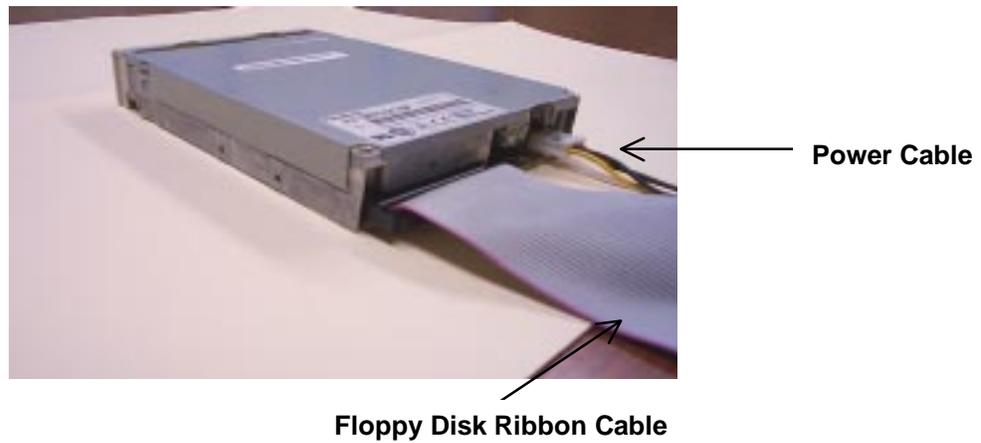


## Connect Floppy and IDE Drives

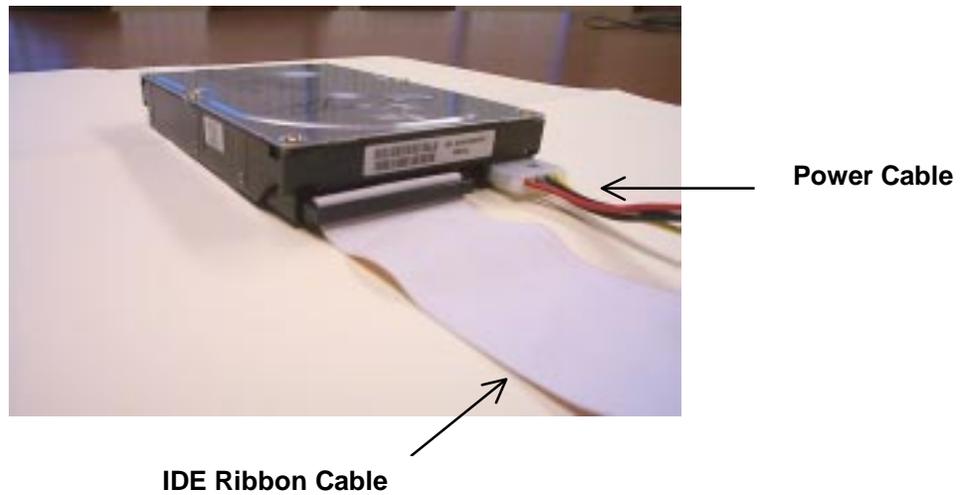
**NOTE:** If installing two IDE devices on the same ribbon cable, one device is to be set as “master” and the second as “slave”. Please refer to IDE device manuals for master and slave settings.

1. Mount the desired drives into the case.
2. Connect the floppy disk ribbon cable and power cable into the device.
3. Connect the IDE ribbon cable and power cable into the device.

### Floppy Disk Drive



### Hard Disk Drive



## Installing Expansion Cards

1. Read the related expansion card's installation instructions before inserting the expansion card into the motherboard.
2. Remove the slot covers from the chassis case where the expansion cards will be placed.
3. Press the expansion card firmly into the expansion slot of the motherboard.
4. Secure the card with the screw provided.
5. Repeat same procedure when adding additional expansion cards.

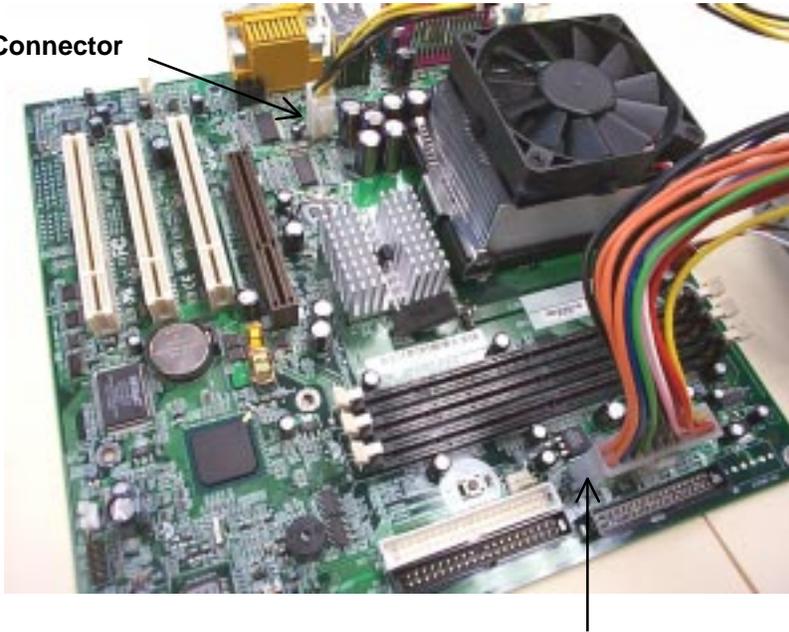


## Connect the Power Supply Cables

NOTE: The ATX power connector is keyed for proper insertion.

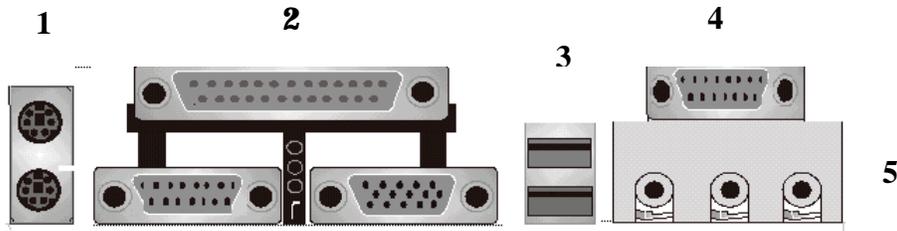
1. Place the plastic clip of the power connector over the plastic tab on the motherboard power connector. The plastic clip should lock into the plastic tab.

**Power Supply Connector**

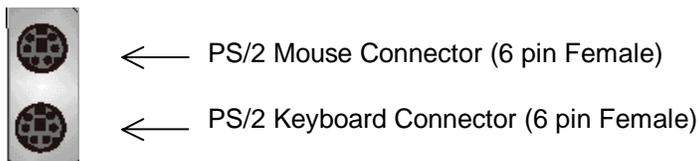


**Power Supply Connector**

## I/O Back Panel Introduction

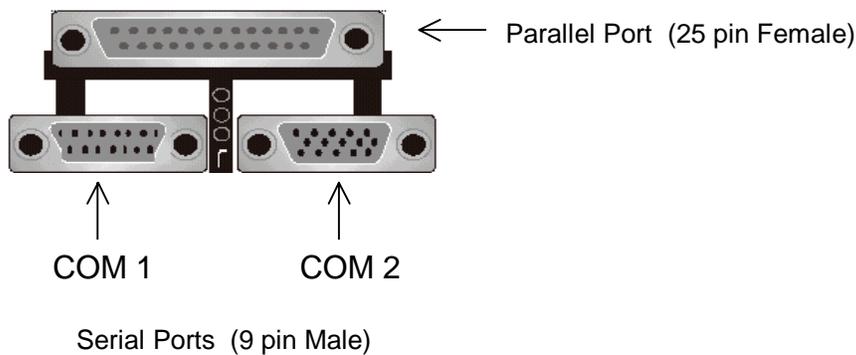


### (1) PS/2 Keyboard and PS/2 Mouse Connector



✚ This connector supports standard PS/2 keyboard and PS/2 mouse.

### (2) Parallel Port and Serial Ports (COM1/COM2)



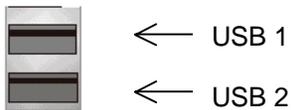
✚ This connector supports 2 standard COM ports and 1 Parallel port.

✚ Devices (i.e. printer) can be connected into the Parallel port.

✚ Devices (i.e. mouse and modem etc. can be connected into the Serial ports.

## I/O Back Panel Introduction *cont....*

### (3) USB Connector



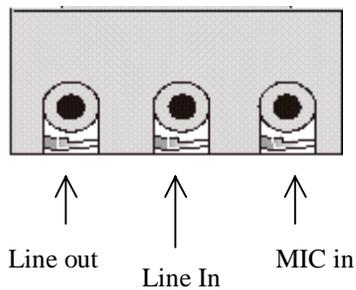
- ✚ Before connecting device(s) into the USB connections, determine if devices have a standard interface.
- ✚ Make sure your computer Operating System (OS) supports the USB controller. If not, contact your OS or device(s) vendors for more information.

### (4) Game Port



- ✚ This connector supports joystick, MIDI keyboard and other related audio devices.

### (5) Audio Connectors

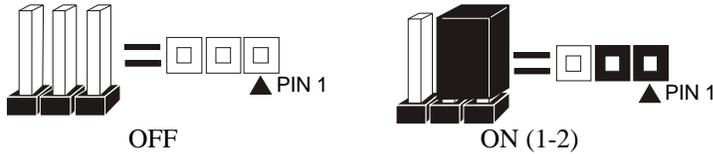


- ✚ Once onboard audio driver has been installed, the speakers may be connected into the Line out jack, audio devices such as CD-ROM etc., and a microphone into the MIC in jack.

## Jumper Introduction

### Jumper Settings

The following graphic shows the meaning of the jumper with cover and without cover.



### FWH Lock

This jumper allows you to set FWH lock.

Reference: JP4  
Connector Type: 1 x 3

JP4		Description	Jumper Placement
1-2		FWH Lock	Put the jumper cover on pin1 and pin2.
2-3		FWH Unlock (Default)	Put the jumper cover on pin2 and pin3.

### BIOS Configuration

This jumper allows you to set CPU speed.

Reference: JP5  
Connector Type: 1 x 3

JP5		Description	Jumper Placement
1-2		Normal Mode (Default)	Put the jumper cover on pin1 and pin2.
2-3		BIOS Conf. (save speed)	Put the jumper cover on pin2 and pin3.
OPEN		BIOS Recovery	Remove jumper from JP5.

## Jumper Introduction *cont....*

### Clear CMOS (Optional)

This jumper allows you to clear the content of the CMOS.

Reference: JP3  
 Connector Type: 1 x 3

JP3		Description	Jumper Placement
1-2		Normal	Put the jumper cover on pin1 and pin2.
2-3		Clear content of CMOS	Put the jumper cover on pin2 and pin3.

### Clear Password

This jumper allows you to clear the password of the BIOS.

Reference: JP6  
 Connector Type: 1 x 3

JP6		Description	Jumper Placement
1-2		Normal (Default)	Put the jumper cover on pin1 and pin2.
2-3		Clear BIOS password	Put the jumper cover on pin2 and pin3.

## AMI® BIOS Setup

### Entering Setup

To enter the setup menu, first power up the computer and press <Delete> key to enter the CMOS setup.

### The Main Menu

When you enter the AMI® HIFLEX Setup Utility, the below Main Menu will appear. The Main menu allows you to select and modify your computer system. To navigate through the menu, simply use the arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

```

                AMI HIFLEX SETUP UTILITY - VERSION 1.38
                ©2001 AMERICAN MEGATRENDS, INC.  ALL RIGHTS RESERVED

                NR110 BIOS Rev: 1.03

                Standard CMOS Features
                Advanced BIOS Features
                Advanced Chipset Features
                Power Management Setup
                PCI / Plug and Play Setup
                Peripheral Setup
                Hardware Monitor Setup
                Auto-Detect Hard Disks
                Change User Password
                Change Supervisor Password
                Auto Configuration with Optimal Setting
                Auto Configuration with Fail Safe Settings
                Save Settings and Exit
                Exit without Saving

                Standard CMOS setup for changing time, date, hard disk type, etc.
                ESC: Exit  ↑↓: Sel  F2/F3: Color  F10: Save and Exit
```

## Standard CMOS Setup

The items listed in the Standard CMOS Features Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired value for each item.

```

                AMIBIOS SETUP - STANDARD CMOS SETUP
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Date (mm/dd/yyyy) :   Wed   Nov 28,2001           Base Memory: 639KB
Time (hh/mm/ss)   :                                           Extd Memory: 127MB

Floppy Drive A:
Floppy Drive B:

                Type      Size  Cyln  Head  Wpcom  Sec  LBA  BLK  PIO  32Bit
                Mode      Mode  Mode  Mode  Mode  Mode Mode Mode Mode
Pri Master:    Auto
Pri Slave:     Auto
Sec Master:    Auto
Sec Slave:     Auto

Boot Sector Virus Protection:   Disabled

Month: Jan-Dec           ESC: Exit  ↑↓: Sel
Day: 01-31              PgUp/PgDn: Modify
Year: 1980-2099         F2/F3: Color
```





## Power Management Setup

The items listed in the Power Management Setup Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

AMIBIOS SETUP - POWER MANAGEMENT SETUP ©2001 AMERICAN MEGATRENDS, INC. ALL RIGHTS RESERVED		
ACPI Standby State	S3/STR	Available Options:                 ESC: Exit    ↑↓: Sel PgUp/PgDn: Modify F2/F3: Color
Re-Call VGA BIOS at S3 Resuming	Disabled	
Power Management/APM	Enabled	
Video Power Down Mode	Suspend	
Hard Disk Power Down Mode	Standby	
Suspend Time Out (Minute)	Disabled	
Throttle Slow Clock Ratio	50.0%	
Fan Speed Control	By Thermal	
CPU Fan's Duty Cycle	100%	
SYS Fan's Duty Cycle	100%	
Power Button Function	On/Off	
Restore on AC/Power Loss	Last State	
Resume on Ring	Disabled	
Resume on LAN	Disabled	
Resume On PME	Disabled	
Resume On RTC Alarm	Disabled	
RTC Alarm Date	15	
RTC Alarm Hour	12	
RTC Alarm Minute	30	
RTC Alarm Second	30	





## Hardware Monitor Setup

The items listed in the Hardware Monitor Setup may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

AMIBIOS SETUP - HARDWARE MONITOR SETUP ©2001 AMERICAN MEGATRENDS, INC. ALL RIGHTS RESERVED		
CPU Ratio Selection	15.0x	Available Options:
---= System Hardware Monitor =---		
Chassis Intrusion	Enabled	
CPU Temperature	51°C/123°F	
System Temperature	35°C/95°F	
CPU Fan Speed	0 RPM	
Chassis Fan Speed	0 RPM	
Vccp	1.717V	
+1.5V	1.501V	
+1.8V	1.806V	
+3.3V	3.423V	
+5.0V	5.202V	
+12.0V	11.875V	
Hvcc (+3.3VSB)	3.351V	
		ESC: Exit   ↑↓: Sel
		PgUp/PgDn: Modify
		F2/F3: Color

## Auto-Detect Hard Disk

The items listed in the Auto-Detect Hard Disk Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

AMIBIOS SETUP - STANDARD CMOS SETUP									
©2001 AMERICAN MEGATRENDS, INC. ALL RIGHTS RESERVED									
Date (mm/dd/yyyy) : Wed Nov 28,2001					Base Memory: 639KB				
Time (hh/mm/ss) :					Extd Memory: 127MB				
Floppy Drive A:									
Floppy Drive B:									
						LBA	BLK	PIO	32Bit
	Type	Size	Cyln	Head	Wpcom	Mode	Mode	Mode	Mode
Sec									
Pri Master:	Auto								On
Pri Slave:	Auto								On
Sec Master:	Auto								On
Sec Slave:	Auto								On
Boot Sector Virus Protection: Disabled									
Month: Jan-Dec					ESC: Exit ↑↓: Sel				
Day: 01-31					PgUp/PgDn: Modify				
Year: 1980-2099					F2/F3: Color				

## Change User Password

The items listed in the Auto-Detect Hard Disk Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

```

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                NR110 BIOS Rev: 1.03

                Standard CMOS Features
                Advanced BIOS Features
                Advanced Chipset Features
                Power Management Setup
                PCI / Plug and Play Setup

                Enter new user password: _

                Change User Password
                Change Supervisor Password
                Auto Configuration with Optimal Setting
                Auto Configuration with Fail Safe Settings
                Save Settings and Exit
                Exit without Saving

                Standard CMOS setup for changing time, date, hard disk type, etc.
                ESC: Exit  ↑↓: Sel  F2/F3: Color  F10: Save and Exit
```

## Change Supervisor Password

The items listed in the Change Supervisor Password Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

AMI HIFLEX SETUP UTILITY - VERSION 1.38 ©2001 AMERICAN MEGATRENDS, INC. ALL RIGHTS RESERVED
NR110 BIOS Rev: 1.03
Standard CMOS Features
Advanced BIOS Features
Advanced Chipset Features
Power Management Setup
PCI / Plug and Play Setup
Enter new supervisor password: _
Change User Password
Change Supervisor Password
Auto Configuration with Optimal Setting
Auto Configuration with Fail Safe Settings
Save Settings and Exit
Exit without Saving
Standard CMOS setup for changing time, date, hard disk type, etc.
ESC: Exit    ↑↓: Sel    F2/F3: Color    F10: Save and Exit

## Auto Configuration with Optimal Setting

The items listed in the Auto Configuration with Optimal Setting Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

AMI HIFLEX SETUP UTILITY - VERSION 1.38 ©2001 AMERICAN MEGATRENDS, INC. ALL RIGHTS RESERVED
NR110 BIOS Rev: 1.03
Standard CMOS Features Advanced BIOS Features Advanced Chipset Features Power Management Setup PCI / Plug and Play Setup
Load high performing setting (Y/N)? <u>N</u>
Change User Password Change Supervisor Password Auto Configuration with Optimal Setting Auto Configuration with Fail Safe Settings Save Settings and Exit Exit without Saving
Standard CMOS setup for changing time, date, hard disk type, etc. ESC: Exit    ↑↓: Sel    F2/F3: Color    F10: Save and Exit

## Auto Configuration with Fail Safe Settings

The items listed in the Auto Configuration with Fail Safe Settings Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

AMI HIFLEX SETUP UTILITY - VERSION 1.38 ©2001 AMERICAN MEGATRENDS, INC. ALL RIGHTS RESERVED
NR110 BIOS Rev: 1.03
Standard CMOS Features Advanced BIOS Features Advanced Chipset Features Power Management Setup PCI / Plug and Play Setup
Load failsafe settings (Y/N)? <u>N</u>
<del>Change Supervisor Password</del> Change Supervisor Password Auto Configuration with Optimal Setting Auto Configuration with Fail Safe Settings Save Settings and Exit Exit without Saving
Standard CMOS setup for changing time, date, hard disk type, etc. ESC: Exit    ↑↓: Sel    F2/F3: Color    F10: Save and Exit

## Save Settings and Exit

The items listed in the Save Settings and Exit Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

AMI HIFLEX SETUP UTILITY - VERSION 1.38 ©2001 AMERICAN MEGATRENDS, INC. ALL RIGHTS RESERVED
NR110 BIOS Rev: 1.03
Standard CMOS Features Advanced BIOS Features Advanced Chipset Features Power Management Setup
Save current settings and exit (Y/N)? <u>Y</u>
Change User Password Change Supervisor Password Auto Configuration with Optimal Setting Auto Configuration with Fail Safe Settings Save Settings and Exit Exit without Saving
Standard CMOS setup for changing time, date, hard disk type, etc. ESC: Exit    ↑↓: Sel    F2/F3: Color    F10: Save and Exit

## Exit without Saving

The items listed in the Exit without Saving Features Menu may include no or more than one setup items. Use the arrow keys to navigate through the menu and use the <PgUp> or <PgDn> keys to select the desired option for each item.

```

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                NR110 BIOS Rev: 1.03

                Standard CMOS Features
                Advanced BIOS Features
                Advanced Chipset Features
                Power Management Setup
                PCI / Plug and Play Setup

                Quit without saving (Y/N)? N

                Change User Password
                Change Supervisor Password
                Auto Configuration with Optimal Setting
                Auto Configuration with Fail Safe Settings
                Save Settings and Exit
                Exit without Saving

                Standard CMOS setup for changing time, date, hard disk type, etc.
                ESC: Exit   ↑↓: Sel   F2/F3: Color   F10: Save and Exit

```

## NOTES