Arima

NK12X 1U
USER MANUAL

Arima Computer Corp.
Building Your Competitive Advantage

TABLE OF CONTENTS:

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Technical Support

If a problem arises with your system during installation or operation and is unable to be resolved from the user manual, consult the following list of resources for help:

✓ Contact the place of purchase for help. This is the recommended solution as they can provide the quickest assistance.

✓ Visit Arima Computer Corp. website for up to the minute FAQ, guides and updates. The website can be found at: http://www.arima.com.tw/server

✓ Or contact our support staff at: server@arima.com.tw

About this User Guide

This manual contains some special icons that accompany special sections that are meant to help you along in the installation process. The special sections contain useful and/or critical information that you should know. Watch for these icons as you read through the manual.

Type of icons:	Description:
NOTE	This icon indicates useful and timely information that will aid you in the setup.
WARNING	This icon indicates information on dangerous and/or costly behavior to avoid.

Safety Instruction

- ✓   Keep this manual for future reference.
- ✓   Keep the equipments in a safe, cool, dry place.
- ✓   Perform the installation on a dry, flat surface.
- ✓   Ground yourself by touching a plugged-in power supply, which displaces static electricity.
- ✓   Adjust the power source to the proper voltage before connecting the equipment to the power outlet.
- ✓   Place the power cord in such a manner as to ensure that no one can step on it or trip over it.
- ✓   Always unplug the power cord when performing installation.
- ✓   Do not have liquid nearby as electrical shock can occur if liquid spills onto the equipment.
- ✓   Operating temperature: 10ºC to 35ºC or 50ºF to 95ºF.
- ✓   Pay attention to the warnings in the installation instructions when appropriate.
- ✓   In the following cases, do not try to fix the problem yourself, contact a party in Technical Support
    - •   The power cord or plug is damaged.
    - •   Liquid has been spilled onto the equipment.
    - •   Obvious sign of damage can be detected on the equipment.

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Chapter 1. Getting Started

1.1 Congratulations

You have in possession one of the most powerful and versatile 1-way AMD Opteron processor solutions, the NK12X 1U. It well designedly forms 2 nodes in 1U system that can save you chassis, power supply, and rack cost. It also delivers higher power utilization, reduces maintenance/management costs, and fits the customer's requirements for HPC computing cluster; data center; search engine nodes; and high-availability applications. Powered by cutting edge nVIDIA MCP55 Professional chipset, NK12X 1U efficiently utilizes the combined strength of 2000MT/s HyperTransport, two PCI-E x16 riser card slots, four port GbE, two 10/100M RJ45 connectors on rear for OPMA, and SATAII controllers with SATA Backplane supporting up to four 3.5" Hot-Swap HDD, to name just a few. NK12X 1U is provided Arima's server management solution to improve the manageability of enterprise IT systems, lower total cost of ownership and prevent system downtime. In just a couple of pages, a detailed specification will provide you with a comprehensive view of the capabilities of NK12X 1U. Thank you for purchasing Arima Computer Corp. family of products.

1.2 Unpacking

Arima Computer Corp. provides a number of accessories for your convenience. Below is an accessory list of the things that are included in this purchase:

1 x Power cord 180cm UL/CSA
1 x Screw kit A (24pcs)
1 x Screw kit B (24pcs)
1 x Rail kit
2 x Heat sink kit
1 x MB Quick Installation Guide
1 x NK12X 1U QIG
1 x Driver CD
1 x Aquarius Driver CD
1 x Aquarius QIG
1 x Check List Paper

1.2.1 MB Quick Installation Guide
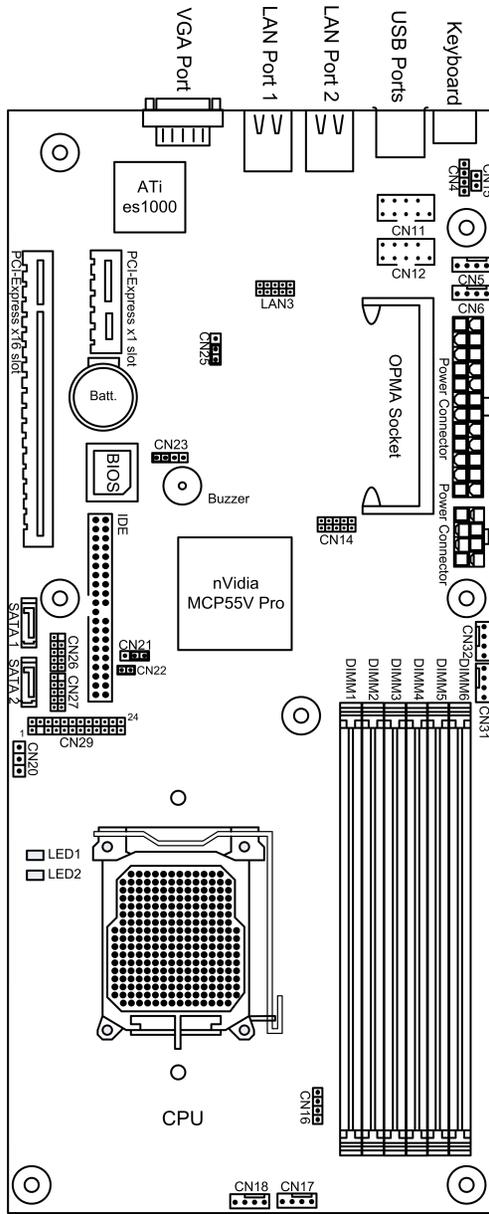
CN21   Clear CMOS Select Jumper

1-2	2-3
Clear CMOS	Normal (default)

CN25   On-Board VGA Select Jumper

1-2	2-3
VGA Enabled (default)	VGA Disabled

CN4   Mouse Header

Pin	Description
1	GND
2	DATA
3	CLOCK
4	5V_DUAL

CN23   Speaker Header

Pin	Description
1	Speaker
2	Buzzer
3	N/A
4	Speaker Power

CN15   Intrusion Function Pin Header

Pin	Description
1	Intruder
2	GND

CN22   Flash Recovery Pin Header

1-2
Disable (default)

CN20   IPMI Header

Pin	Description
1	FP_ID_LED
2	ALERT_CLEAR
3	FP_ALERT

CN11 / CN12   COM1 & COM2 Headers

Pin	Description	Pin	Description
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	N/A

CN26 / CN27   USB Header

Pin	Description	Pin	Description
1	VCC	2	VCC
3	USB_N0/2	4	USB_N1/3
5	USB_P0/2	6	USB_P1/3
7	GND	8	GND
9		10	N/A

CN29   Front Panel

Power LED Anode	(1)	(2)	5VSB
Key	(3)	(4)	Cooling Fault LED Anode
Power LED Cathode	(5)	(6)	Cooling Fault LED Cathode
HDD Activity LED Anode	(7)	(8)	System Fault LED Anode
HDD Activity LED Cathode	(9)	(10)	System Fault LED Cathode
Power Switch	(11)	(12)	NIC#1 Activity LED Anode
Power Switch (GND)	(13)	(14)	NIC#1 Activity LED Cathode
Reset Switch	(15)	(16)	SMBus SDA
Reset Switch (GND)	(17)	(18)	SMBus SCL
ACPI Sleep Switch	(19)	(20)	Chassis Intrusion
ACPI Sleep Switch (GND)	(21)	(22)	NIC#2 Activity LED Anode
NMI to CPU Switch	(23)	(24)	NIC#2 Activity LED Cathode

LAN Connector Indicator Light

State of Link	Speed LED (Green/Orange)	Link/Activity LED (Green)
No link	OFF	OFF
Link @ 10Mbps	OFF	On
Link @ 100Mbps	ON (Green)	On
Link @ 1000Mbps	ON (Orange)	On
Activity	ON	BLINK

Recommended Memory Configurations

1 DIMM	Slot 5
2 DIMMs	Slot 5, 6
4 DIMMs	Slot 3, 4, 5, 6
6 DIMMs	Slot 1, 2, 3, 4, 5, 6

The Latest BIOS, Manual, Memory AVL, Drivers and Utility can be downloaded from
http://www.arima.com.tw/server

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S1735370G00002

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1.2.2 NK1231U Quick Installation Guide
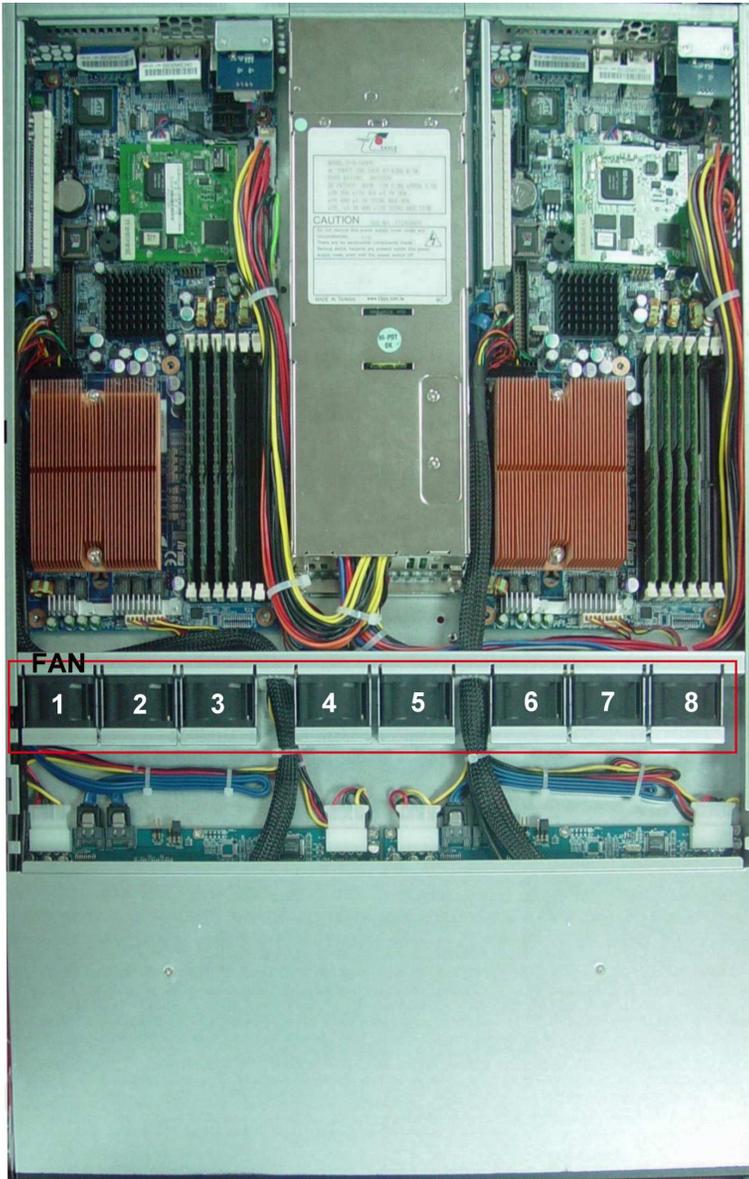
MB : NK123 (Left)

MB : NK123 (Right)

Front Panel

Clear Switch		FAN Fail LED	
System Fault LED		NIC 1 LED	
NIC 2 LED		HDD LED	
Power LED		Power Switch	
Reset Switch		USB	

Rear Panel
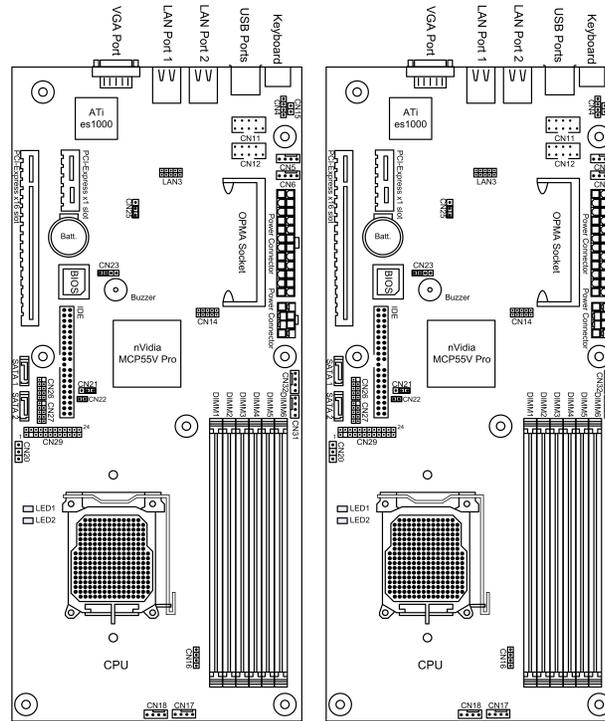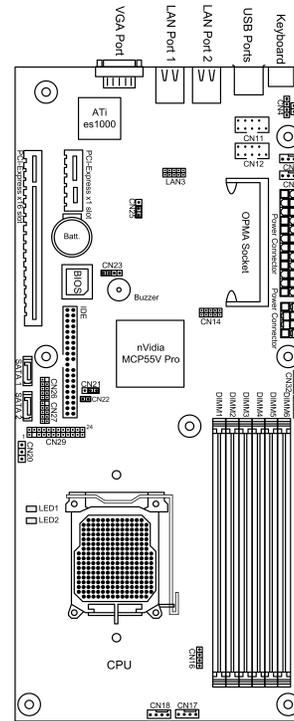
FAN

1	MB 1 CPU FAN1	5	Power FAN 1
2	MB 1 CPU FAN2	6	MB 2 CPU FAN1
3	MB 1 Memory FAN	7	MB 2 CPU FAN2
4	Power FAN 1	8	MB 2 Memory FAN

1	NIC for OPMA	5	NIC 1
2	Keyboard	6	NIC 2
3	USB Port 1	7	VGA
4	USB Port 2	8	Power

1. To get MB jumper setting , please review NM12X MB Quick Installation Guide
2. The Latest BIOS, Manual, Memory AVL, Drivers and Utility can be downloaded from
http://www.arima.com.tw/server

RS173041NS13GN

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1.3 System Specification

SYSTEM DETAILS:
- ✓ Dimension: 665 x 432 x 43.5 mm
- ✓ Two 10/100M RJ45 Connector on rear for OPMA
- ✓ Eight System Fan with PWM
- ✓ Two PCI-E x16 Riser Card
- ✓ Four Ports GbE
- ✓ SATA Backplane supports up to Four 3.5" Hot-Swap HDD
- ✓ 400W PSU with 80+% efficiency
- ✓ 24" Slide Rail
- ✓ Indicator: (each Node) Power, HDD, Fan fault, System fault, LAN1, LAN2
- ✓ SW/Connector: (each Node) Power, Reset, USB x2 Fault status Clear

SYSTEM MANAGEMENT:
- ✓ ADM1026 Hardware Monitor onboard
- ✓ OPMA connector supports Arima Scorpio II card (IPMI 2.0) and Arima Aquarius card (IPMI + iKVM) server management daughter card (optional)

1.4 Serverboard Specification

Processors
- ✓ AMD Dual-Core Opteron 2000 series 90nm processors
  - 2x1MB L2 cache
  - Socket F LGA 1207-pin
  - Support 16 Rank,
  - Selectable TDP 120W or 95W or 68W
- ✓ Supports up to 2000MT/s Hyper Transport
- ✓ Supports AMD technologies: AMD64 technology, PowerNow Technology with OPM, AMD Virtualization, Enhance Virus Protection & OPMA

Chipsets
- ✓ nVidia nForce MCP55V Pro chipset
- ✓ Winbond Super I/O W83627EHG chip
- ✓ Analog Devices ADM1026 Hardware Monitor chip

Memory
- ✓ Opteron 2000 socket F
- ✓ 6 Registered ECC DDR2 DIMM slots and a maximum 24GB of memory
- ✓ Supports 512MB / 1GB / 2GB / 4GB @ 533 / 667 MHz modules, single or double-rank DIMMs

Expansion Slots
- ✓ One PCI-Express x16 slot
- ✓ One PCI-Express x1 slot (This slot had to use a FPC/Cable to add on card, can not plug card in directly.)
- ✓ One IPMI 2.0 connector

Integrated Graphics
- ✓ ATI ES1000 with 32MB DDR/DDR2 memory (Dual Lay)

Gigabit Ethernet
- ✓ Marvell Alaska 88E1116 Dual Port PHY with MCP55V Pro integrated MAC with TOE function – Dual port 10/100/1000BASE-T PHY
- ✓ Two single RJ-45 connector with LEDs

MCP55V Pro Integrated Serial ATA II Controller
- ✓ 2 ports connector, data transfers up to 3.0Gb/s (300MB/s)
- ✓ Integrated nVidia MediaShield™ RAID to support RAID 0,1,10, 5, JBOD

MCP55V Pro Integrated ATA Controller
- ✓ One PCI bus master channels for up to two enhanced IDE devices (40-pin)
- ✓ Support for Ultra DMA 133/100/66/33 IDE drives and ATAPI compliant devices
- ✓ Tri-state modes to enable swap bay

MCP55V Pro Integrated USB 2.0
- ✓ Ten USB 2.0 ports (4 internal pin headers, and 2 front panel ports with Type A connector)

Super I/O
- ✓ Winbond Super I/O W83627EHG chip
- ✓ PS/2 mouse (internal pin-header) and PS/2 keyboard front panel connectors
- ✓ Two 9-pin serial port (internal pin header)

Front Panel I/O
- ✓ PS/2 keyboard connector

- ✓ One stacked connector contains two USB-2.0 ports
- ✓ Two RJ-45 ports (one for GbE, one for GbE and IPMI shared)
- ✓ DB15 Video connector

BIOS
- ✓ 4Mb Phoenix BIOS
- ✓ Legacy USB support, all ports
- ✓ SMBIOS 2.3.3 and DMI 2.0 compliant
- ✓ Plug and Play (PnP)
- ✓ APM (Advanced Power Management) 1.2
- ✓ DMI (Desktop Management Interface) 2.1
- ✓ ACPI (Advanced Configuration and Power Interface) 2.0
- ✓ Fan Speed Control
- ✓ PXE (Pre-Boot Execution)
- ✓ Soft Power-down
- ✓ Multiple boot support (with BIOS Boot Specification v3.1 (BBS) support) must be ready console re-direct
- ✓ After power failure (always on and last status, always off*)

System Management
- ✓ IPMI 2.0 compliance (daughter card through 200 pin connector)
- ✓ General management features required:
    - CPU and Chassis environment temperature monitoring
    - Fan speed control and Fan status monitoring
    - Motherboard voltage monitoring

Fan header
- ✓ Six 4 pins FAN headers with PWM control (Pin define: GND, FAN, 12V, PWM)

Form Factor
- ✓ Half of SSI MEB form factor with size: 5.9" X 13"

Power
- ✓ 8-pin (+12V) and 24-pin power connector

1.5 Serverboard Layout [Major Components]

The following diagram indicates all the major components of the serverboard.
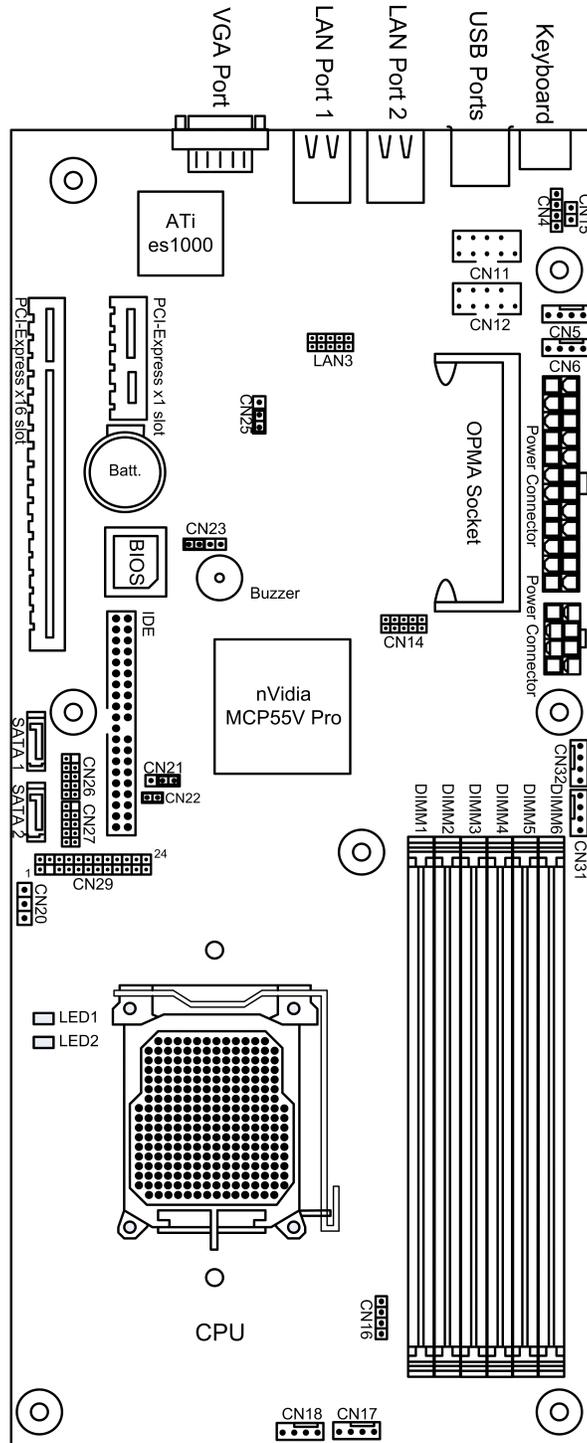
Chapter 2. Hardware Installation

2.1 System Installation

Step 1 Open The Case
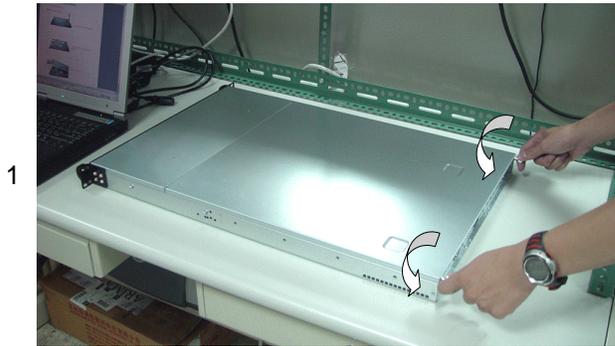
1   Loose the screw on the edge of the top cover by manual.
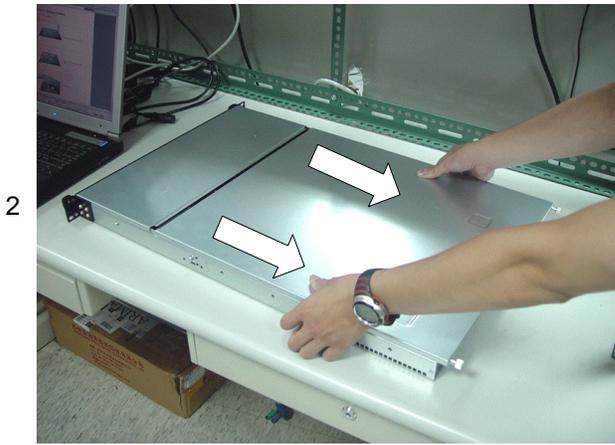
2   Press at the two sides of the top cover and slide the cover backward
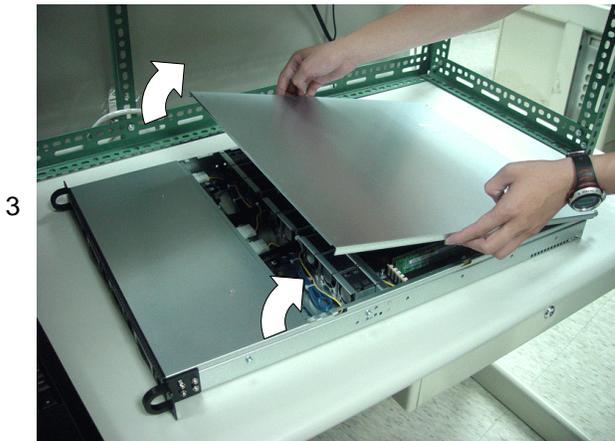
3   Pull out the top cover

Step 2 Install CPU and CPU Heatsink
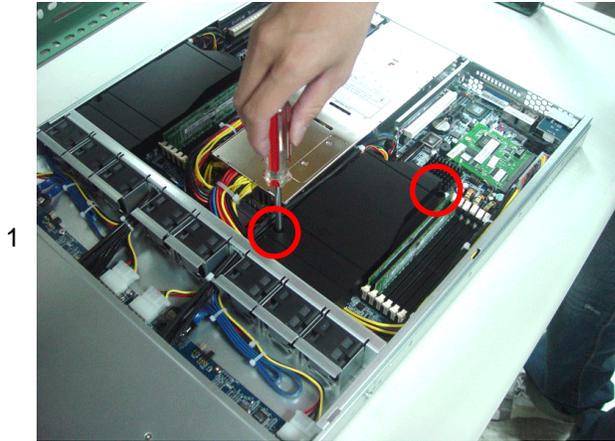
1   Loose the screws and lift up the Air duct

2   Locate the processor socket on the serverboard and carefully remove the protective cover.
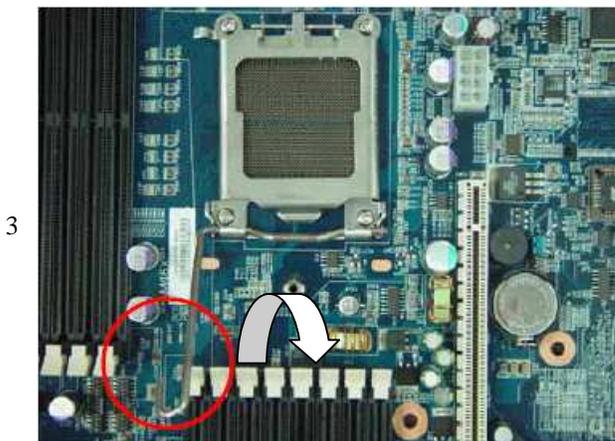
3   Pull the lever out of its locked position and let it spring into its open position.
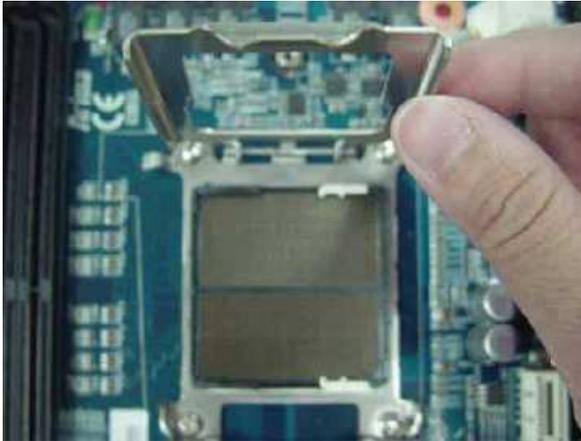
4   Now that the lever is in its unlocked position, lift up the metal cover to reveal the CPU socket.

5   Place the CPU into the socket with the arrows pointing to the bottom right of the socket as shown (there are two gaps on both sides of the CPU, make sure they fit perfectly into the socket. If it is placed correctly, the CPU pins should be able to fit into the socket perfectly).

6   Close the metal cover and return the lever into its original locked position.

7		Now, rest the serverboard into the chassis, align the two holes of the backplate with the two bolts of the chassis.
8		Place the heatsink with the correct orientation and secure heatsink with screws. Repeat this installation procedure, when you are installing the other CPU.
9		Install the Air Duct
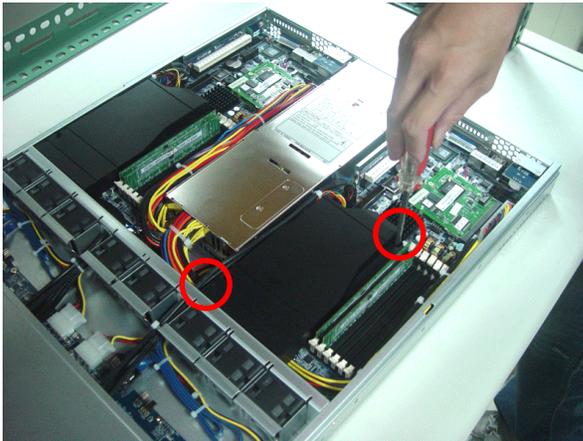
Step 3 Install Low Profile Registered DDR DRAM
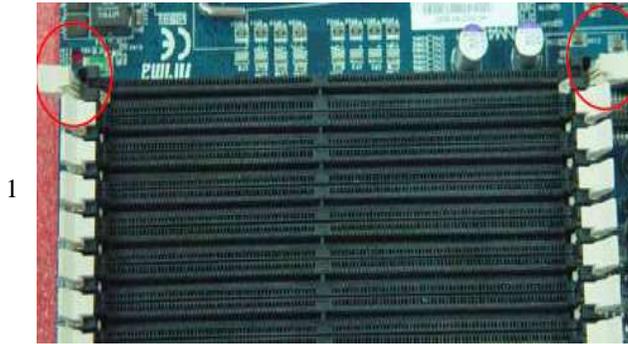
1   Open up the brackets
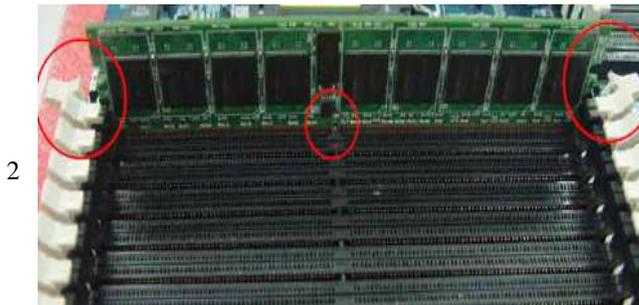
2   Line up the memory with socket. Make sure the gap fits into the socket. Push in the memory module until bracket can be closed securely onto the module.
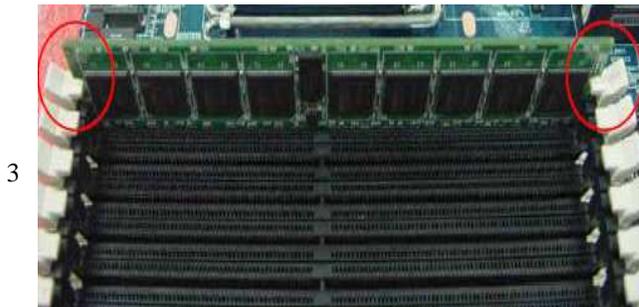
3   Make sure the brackets hold onto the memory module. Repeat this installation procedure, when you are installing the other memory module.

The number of memory chips and how they are stacked on a memory module do not indicate the rank of that memory module. The only way to determine the rank of a memory module is to contact the memory manufacturer for its specification.

The diagram below shows the 6 DIMM slots from 1 to 6 for the CPU.
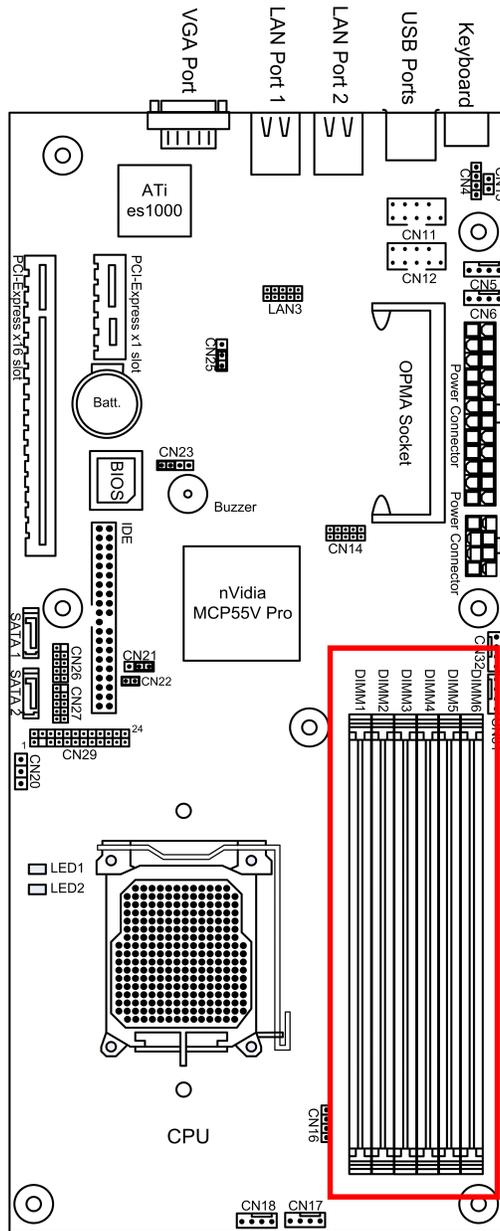
Types of memory supported:
There are 6 DIMM sockets for 240-pin 1.8-Volt DDR2 DIMMs (WILL ONLY SUPPORT Registered ECC type memory module). Please note the diagrams below to identify if your DIMM memories are ECC or non-ECC.
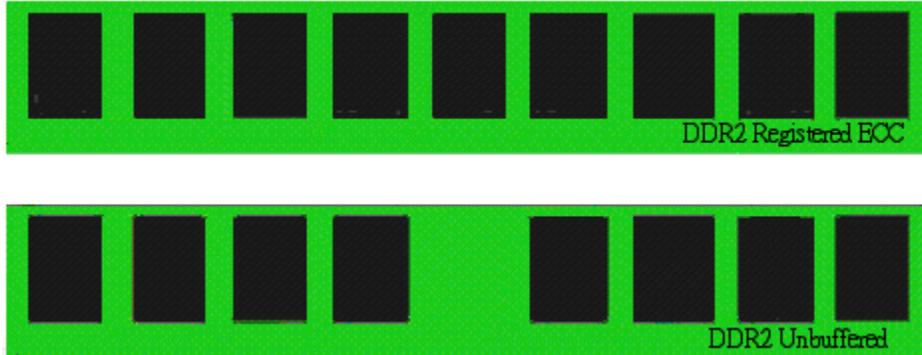
Before installing your memory sticks, please make sure that the memory sticks are compatible with the NK12X 1U. The NK12X 1U will only support DDR2-667/533 modules. Please study the table below for memory module specification of the NK12X 1U.

Key Notes:
- ✓ DDR2 Memory Modules Supported: 512MB – 4GB (Registered ECC Only)
- ✓ Installed memory will all be automatically detected (No jumpers or settings are needed)
- ✓ NK12X supports up to 24GB in total
- ✓ Unbuffered memory is NOT supported

1 DIMM	Slot 5
2 DIMMs	Slot 5, 6
4 DIMMs	Slot 3, 4, 5, 6
6 DIMMs	Slot 1, 2, 3, 4, 5, 6

Any configuration other than the recommended is not guaranteed to work. Please refrain from using those configurations as we cannot provide technical support on them.

Step 4 Install HDDs

1
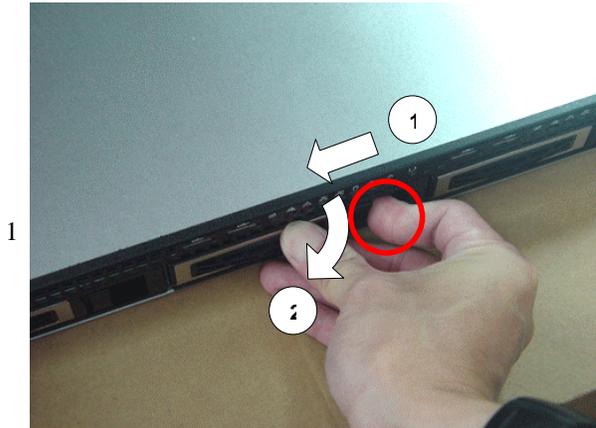
Press the thumb pad to the left and pull out the HDD Tray

2
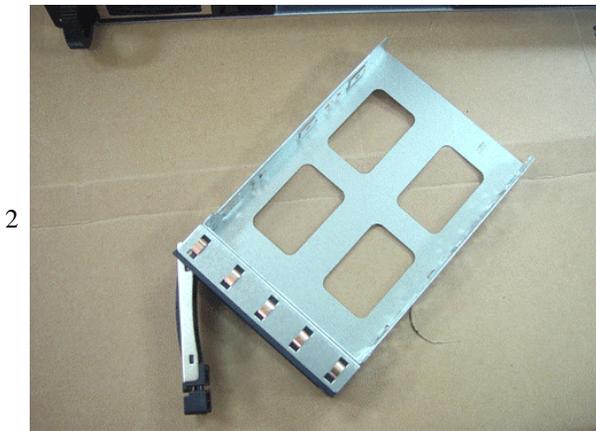
It is noted that there is no dummy case in the HDD Tray.

3

Put the HDD bay on the flat table and slide the hard disk into the tray with care.

4 Secure the hard disk to the tray with four screws.

4 Insert the hard disk and push the tray handle back in place.
It is noted to press the thumb pad to the left and push it into place until locked.

2.2 Block Diagram

24GB DDR2-667 (6 DIMMs)
2way interleaved
[ECC, Registered]

1-way Opteron 2000 (Socket F)

DDR2-667

HT x16

2000 MT/S

HT x16

PCI-E x16 — PCI-E x16

PCI-E x1 — PCI-E x1

nVidia
MCP55V Pro

PHY — GbE RJ-45

PHY — GbE RJ-45

SATA2 x2
USB2.0 x4 (2R, 4I)
ATA-133 x1

ATI ES1000
32 MB — PCI 33MHz

IPMI
(200 pins) — LPC — Super I/O

RS232 x2 (2I)
PS / 2 Mouse (internal)
PS / 2 KB
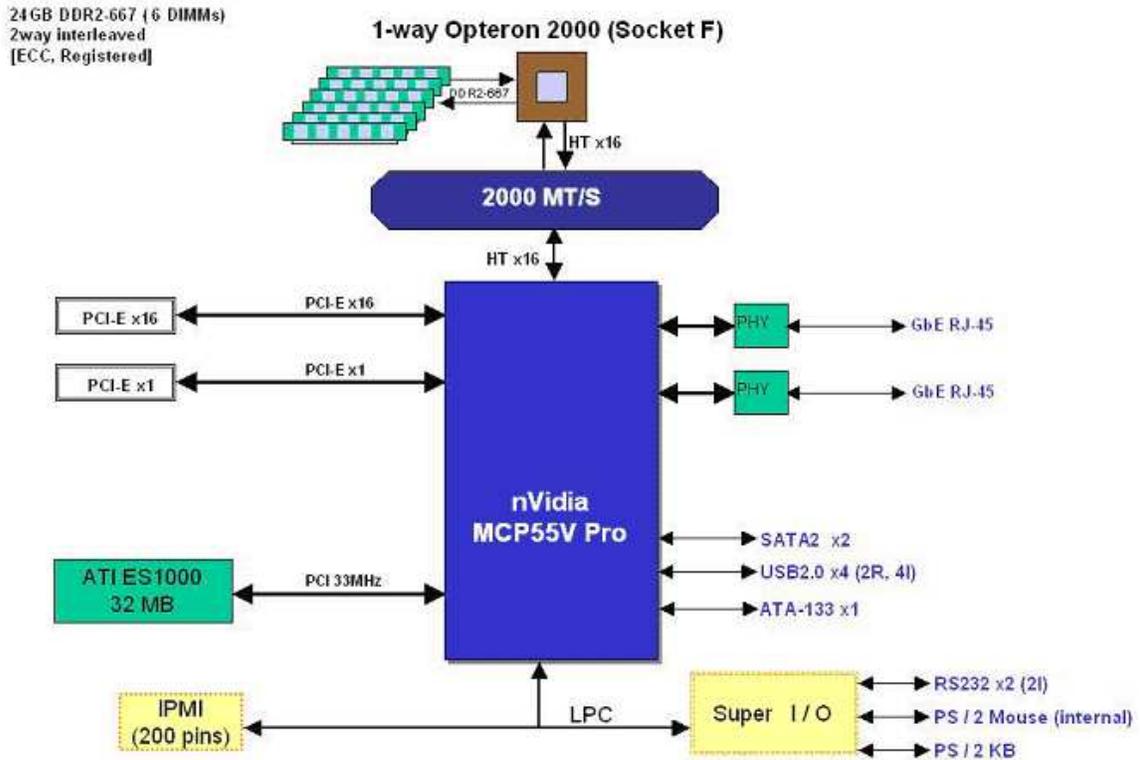
2.3 Jumper Configuration

2.3.1 Clear CMOS header

Header CN21 controls CMOS setting. Position your motherboard as it appears in the following diagram.
To clear CMOS:
1. Turn off the system, and make sure the standby power on the power supply has been turned off too.
2. Short pin 1 and pin 2 using a jumper for a few seconds, and switch back to pin 2 and pin 3 (as default).
3. Turn on the system and reconfigure the BIOS.
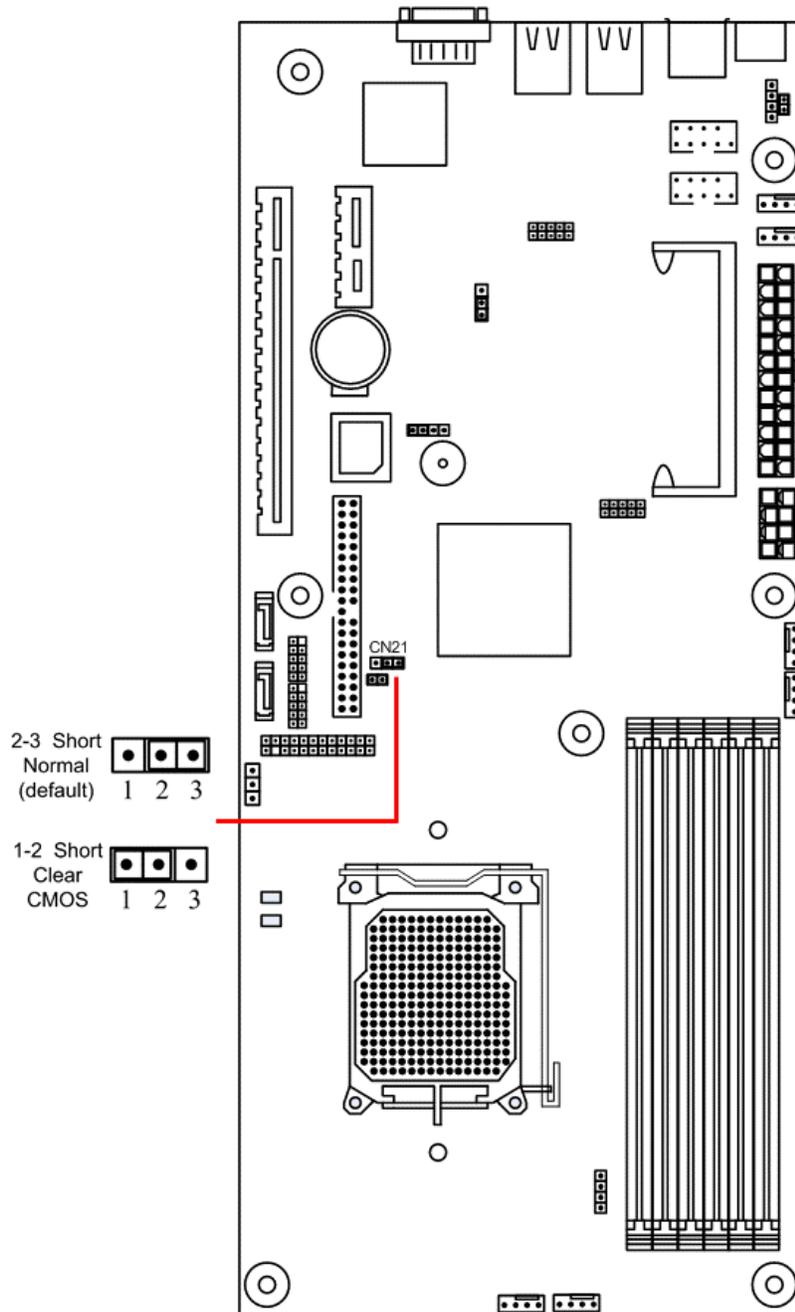
2.3.2 Enable onboard VGA header

Header CN25 controls the onboard VGA setting.
CN25 has the default set as enabled where pin 1 and pin 2 are short, and switch the jumper to pin 2 and pin 3 will disable onboard VGA. Refer to the following diagram for CN25 location:
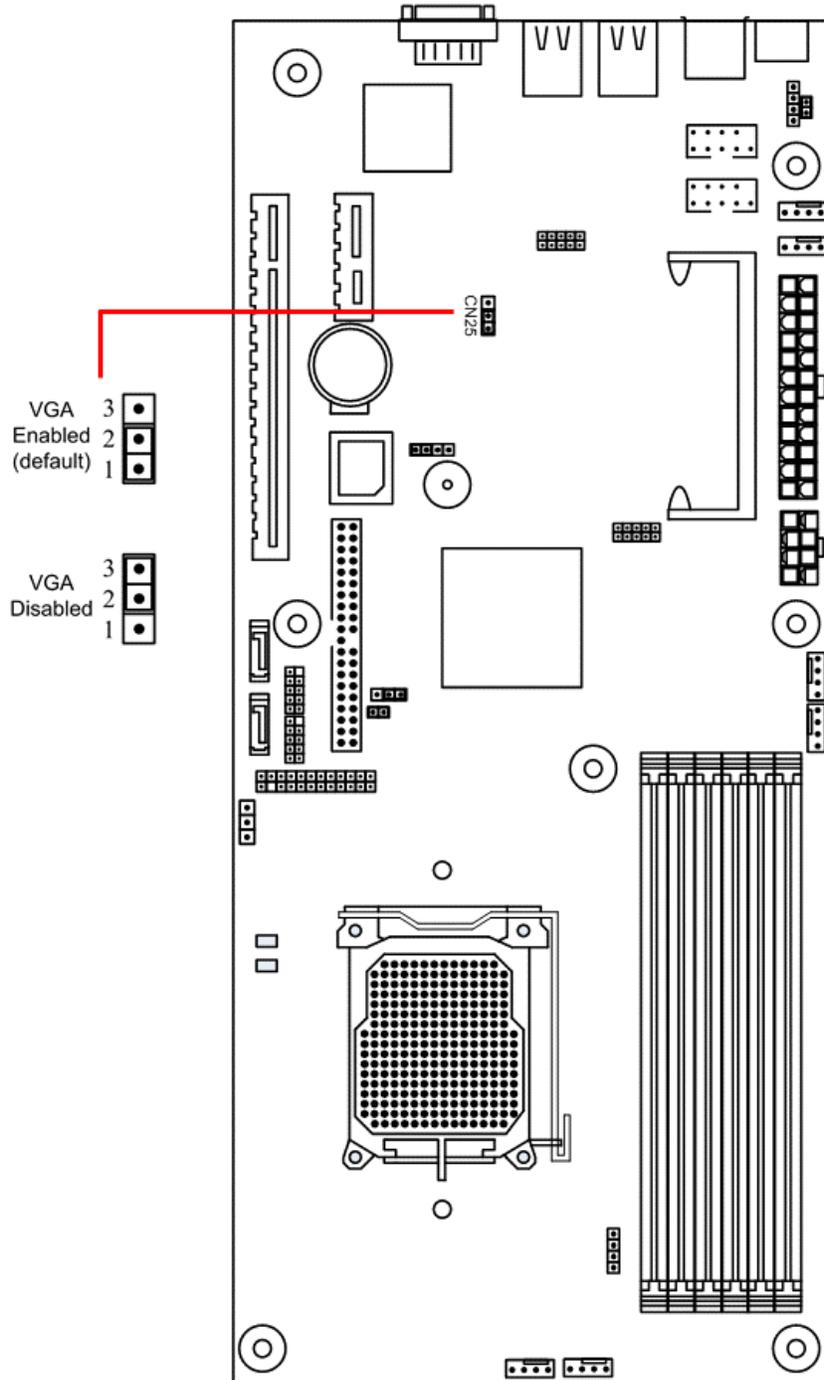
2.3.3 Onboard Buzzer

Header CN23 setting controls the on and off state of the onboard buzzer. Set jumper on 1-2 to enable the buzzer.
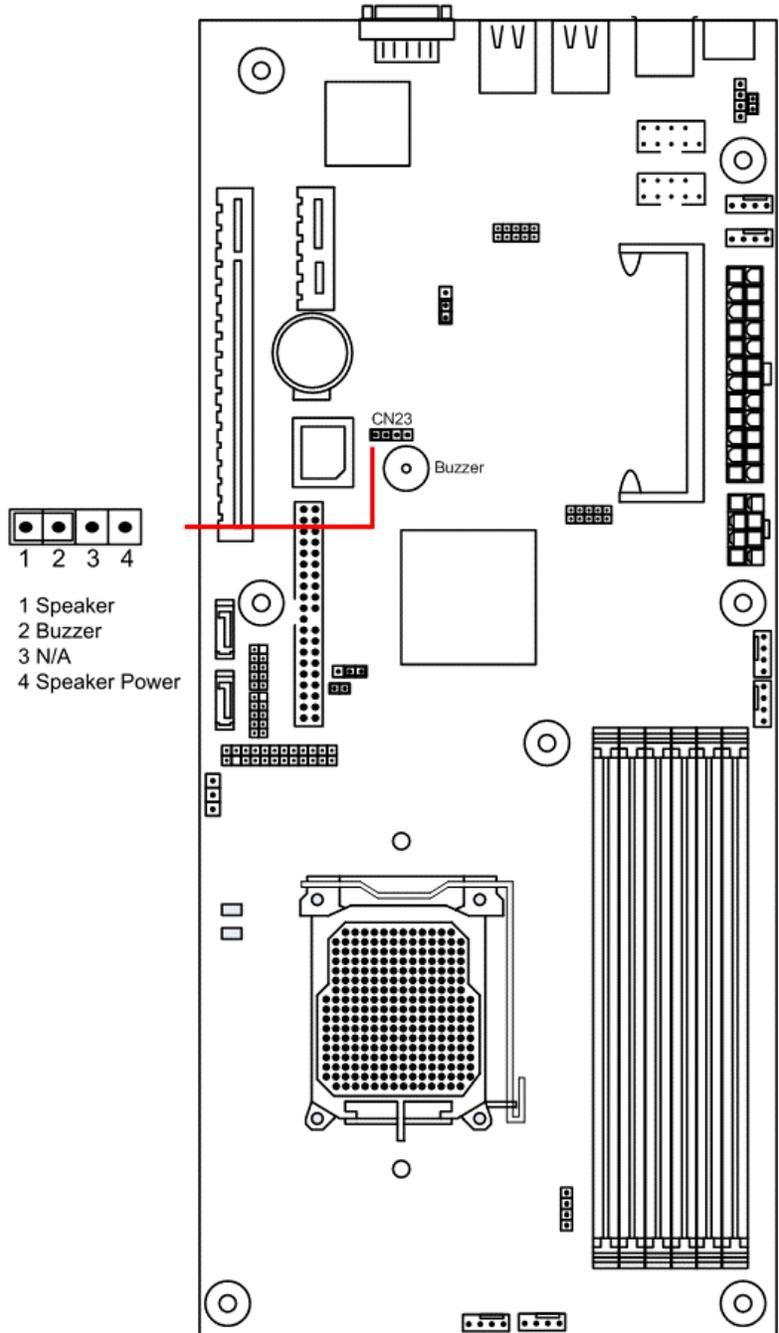
2.3.4 Mouse Header

CN4 is the pin header for mouse.
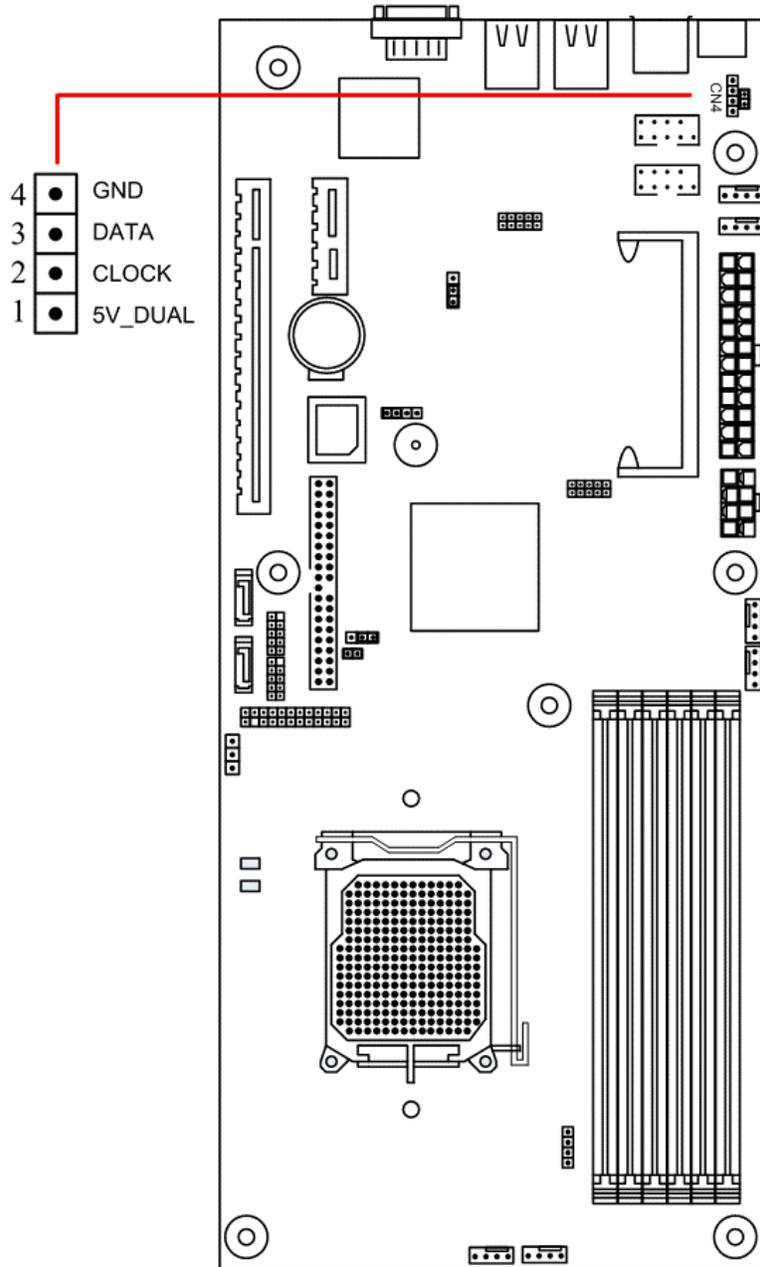
2.3.5 Intrusion Function Pin Header

Header CN15 controls the functionality of the onboard intrusion. Refer to the diagram below for the locations of the headers.

1 Intruder
2 GND
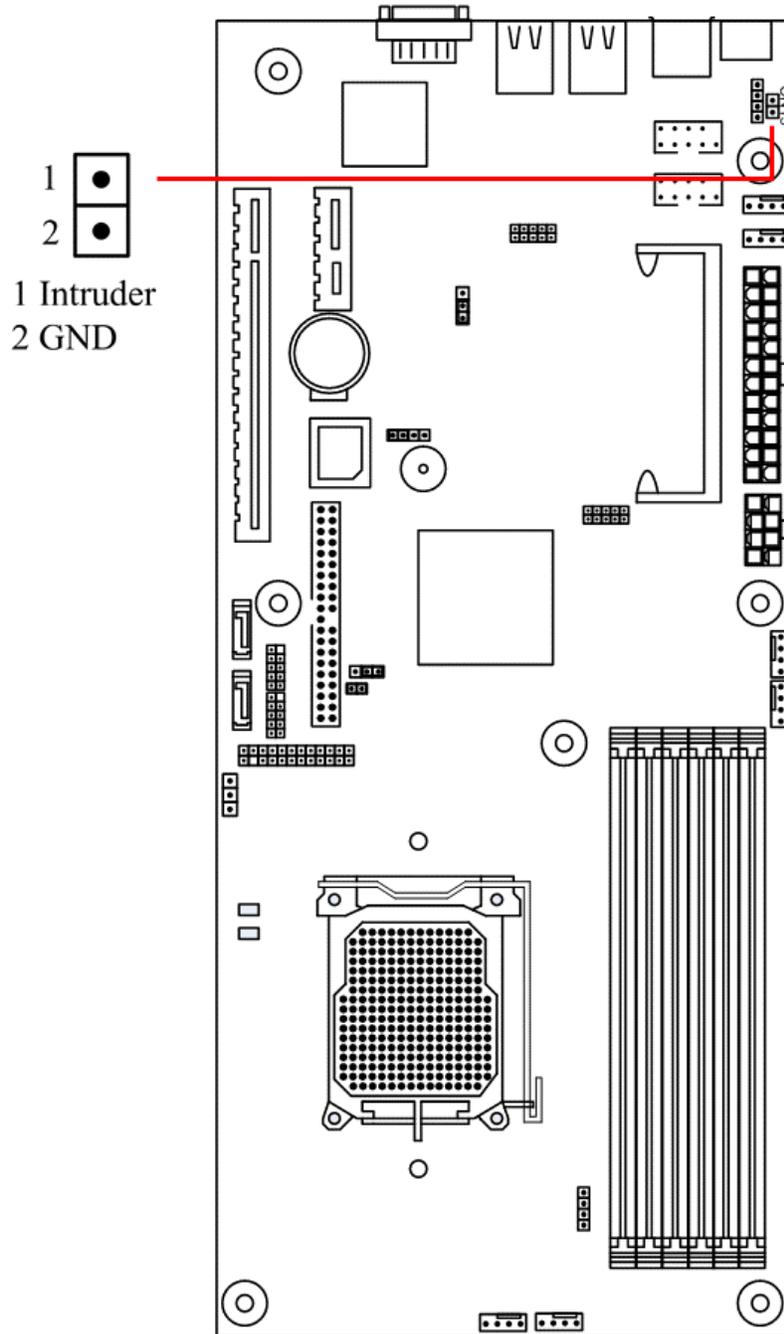
2.3.6 Flash Recovery Pin Header

Header CN22 is the pin header for flash recovery function.

1 VCC3
2 Flash_Recovery_N
(GND)
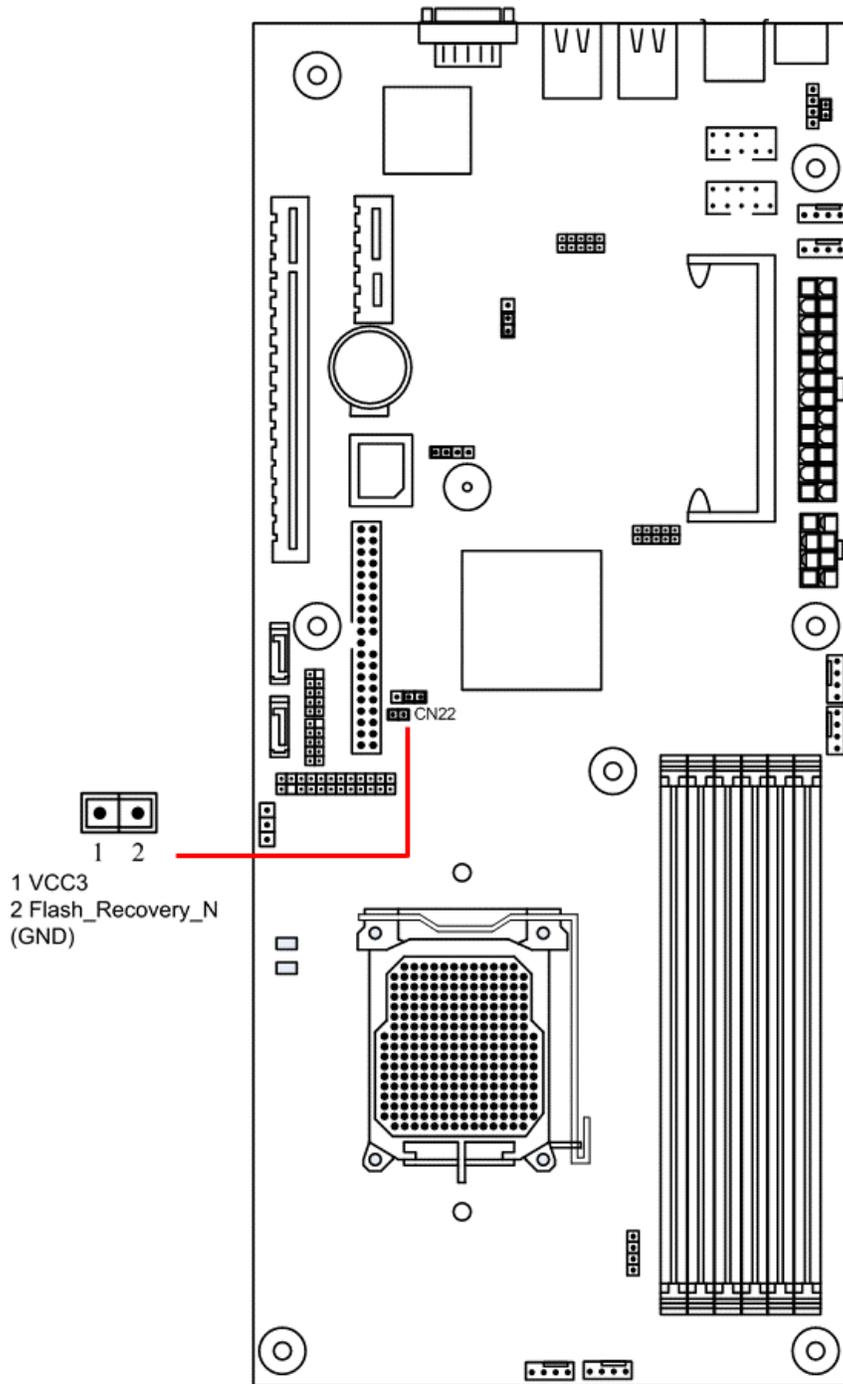
2.3.7 IPMI Header

Header CN20 is the pin header for IPMI.

3 ● FP_ALERT
2 ● ALERT_CLEAR
1 ● FP_ID_LED
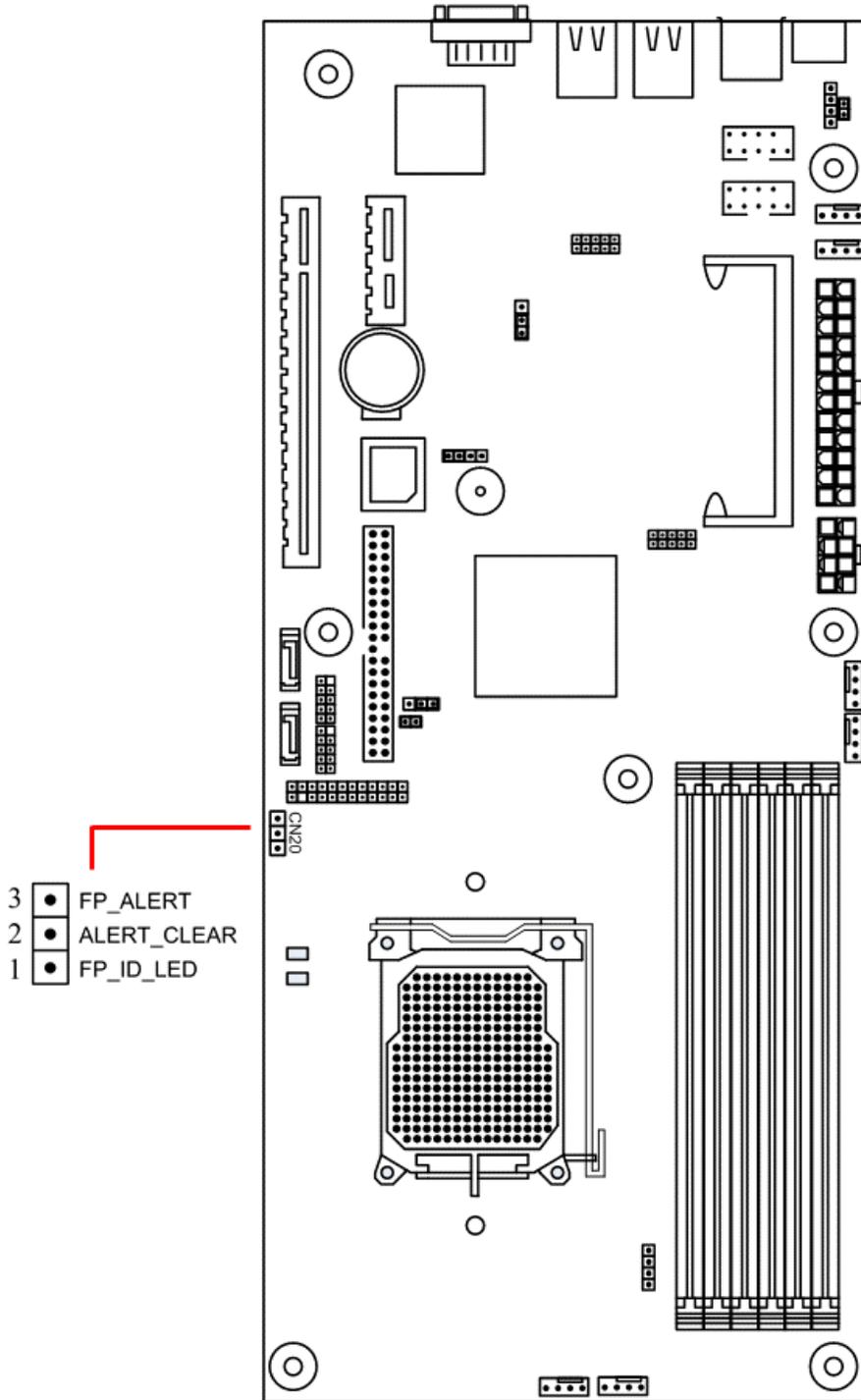
2.3.8 LPC Connector Header

Header CN14 is the pin header for LPC connector.

Pin	Description	Pin	Description
1	LPC_AD0	2	VCC3
3	LPC_AD1	4	GND
5	LPC_AD2	6	LPC_FRAME_N
7	LPC_AD3	8	GND
9	PCIRST_P80_N	10	LPC80PCLK
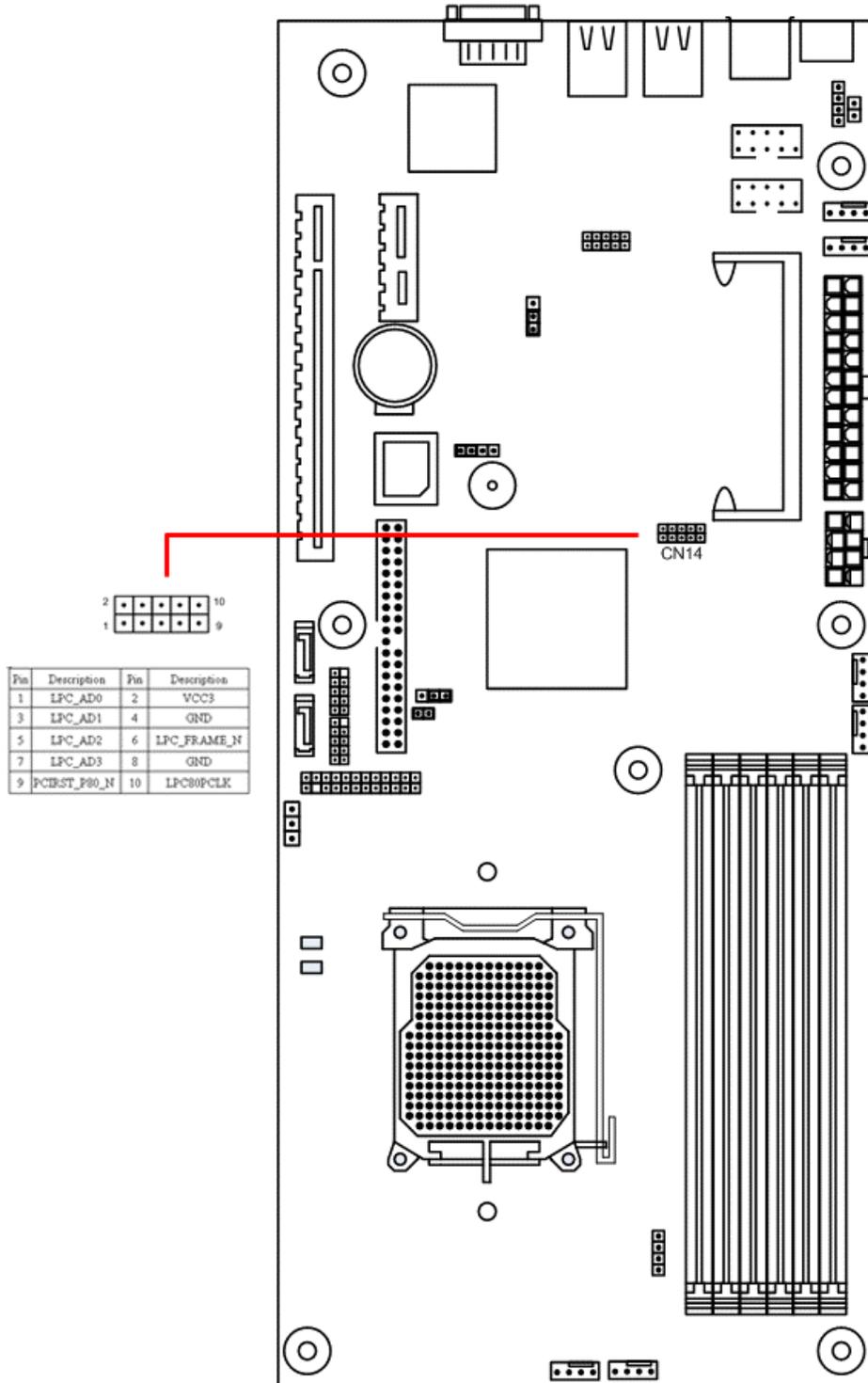
2.4 Power Supply

2.4.1 ATX 24-pin power connector and CPU 8/4-pin connector

There is one 24-pin power input connection and a 8/4-pin power input connection on the motherboard. The 24-pin power connection is used to connect to the power supply, while the 8/4-pin power connection is used to power up the CPU. BOTH must be connected in order for the system to boot up. Make sure the plugs are inserted into the connectors properly, to prevent any damage.

Please make sure your power supply can support at least 2 amps standby power for the Advanced Configuration and Power Interface (ACPI) functions.

Make sure the AC adapter is not plugged into the wall outlet during installation. The electric current could damage the motherboard.

Refer to the following diagram below for the connector locations.

+3.3V — COM
+12V — +5V
+12V — +5V
5VSB — +5V
PWR_OK — Reserved
COM — COM
+5V — COM
COM — COM
+5V — PS_ON
COM — COM
+3.3V — -12V
+3.3V — +3.3V

GND — +12V
GND — +12V
GND — +12V
GND — +12V

Power Connector
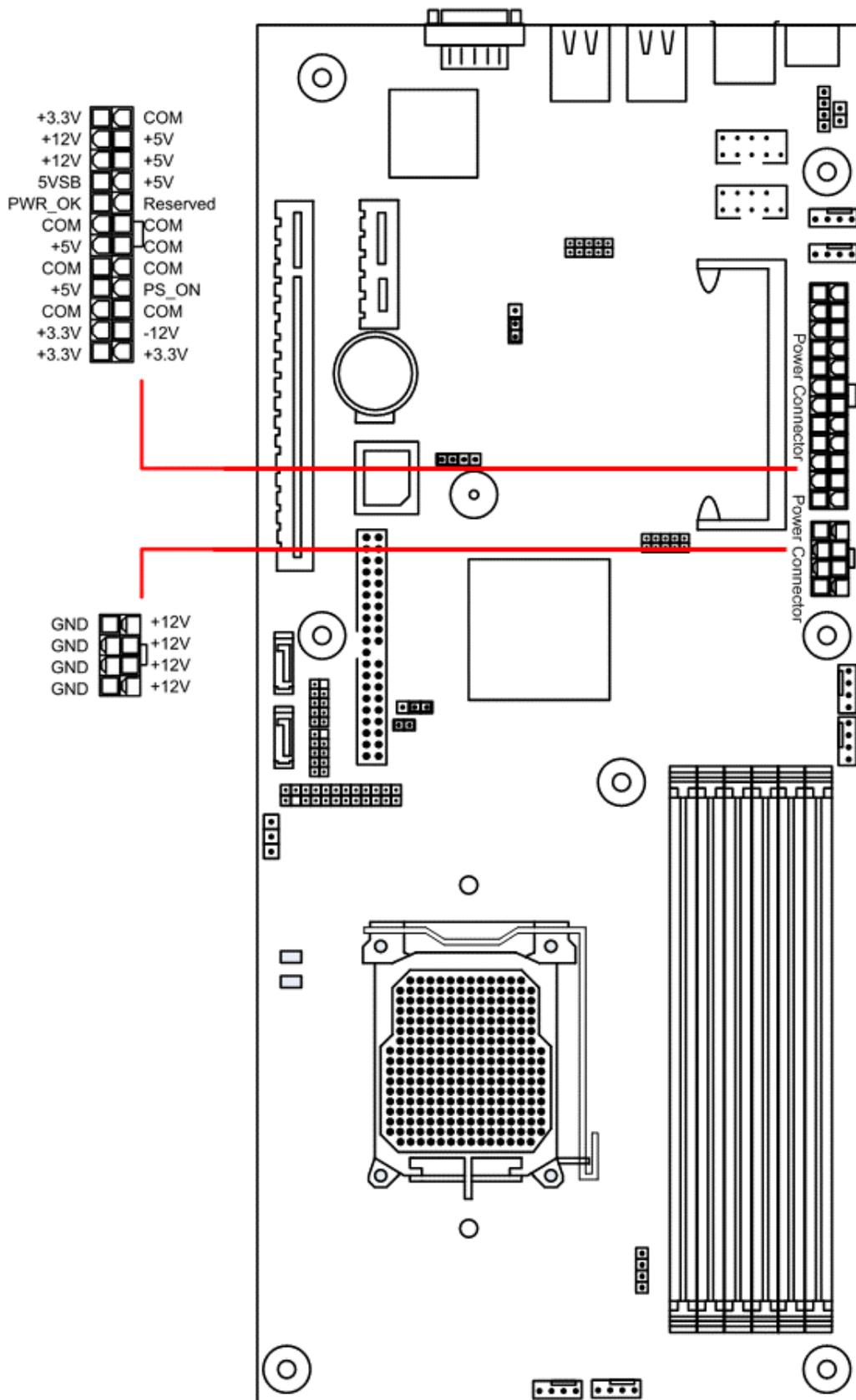
Power Connector

2.5 Cables & Connectors

2.5.1 Front Panel Connectors

Power LED: This 3-pin connector attaches to the power LED.

HDD Activity LED: This 2-pin connector attaches to the LED of the hard disk. The LED lights up when HDD is active.

Power Switch: This 2-pin connector attaches to the power button of the system.

Reset Switch: This 2-pin connector attaches to the case-mounted reset switch for rebooting your computer without turning on/off your power switch.

ACPI Sleep Switch: This 2-pin connector connects to the switch that can take the system into standby mode when pressed.

NMI to CPU Switch: This 1-pin connector connects to the switch that sends Non-Maskable Interrupt to the CPU. User can customize the button to perform a particular function.

5 VSB: This connector provides the user with power to any extra devices that uses 5 volt power.

Cooling Fault LED: This connector connects to the LED that lights up when a problem arises with cooling system.

System Fault LED: This connector connects to the LED that lights up when a problem arises with the system.

NIC#1 Activity LED: This connector connects to the LED that lights up when there is activity on Gbe 1.

SMBus SDA: A private bus to BMC chip for serial data, for use with BMC only.

SMBus SCL: A private bus to BMC chip for serial clock, for use with BMC only.

Chassis Intrusion: This connects to the mechanical switch that indicates whether the chassis had been opened. User can activate it if desired.

NIC#2 Activity LED: This connector connects to the LED that lights up when there is activity on Gbe 2.

CN29

5VSB
Cooling Fault LED
System Fault LED
LAN1 LED
SMBus SDA
SMBus SCL
Chassis Intrusion
LAN2 LED

Power LED
HDD LED
Power Button
Reset Button
ACPI Sleep Switch
NMI to CPU Switch

1   2
23   24
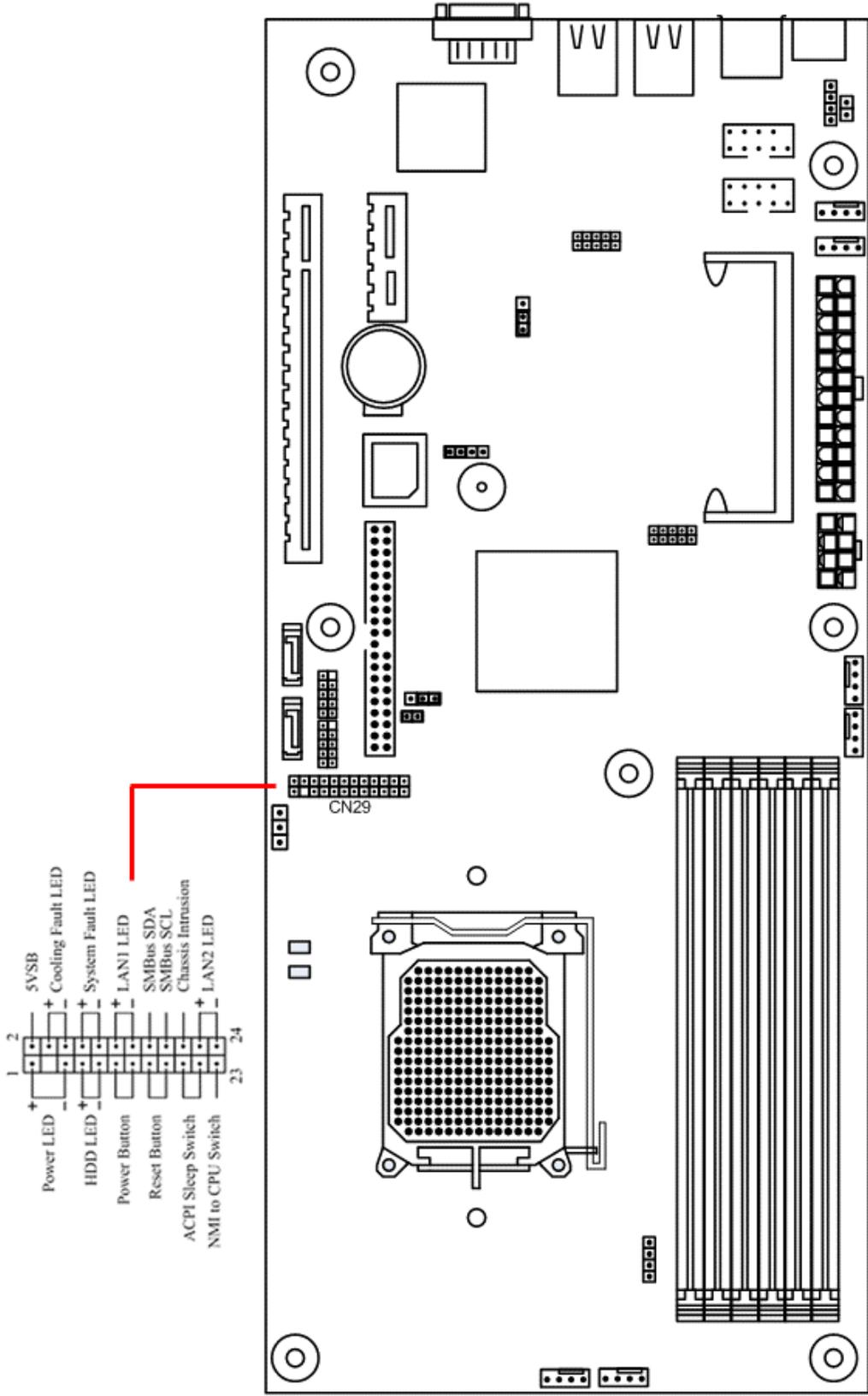
2.5.2 IDE connectors

The following diagram indicates the location of the IDE connector:
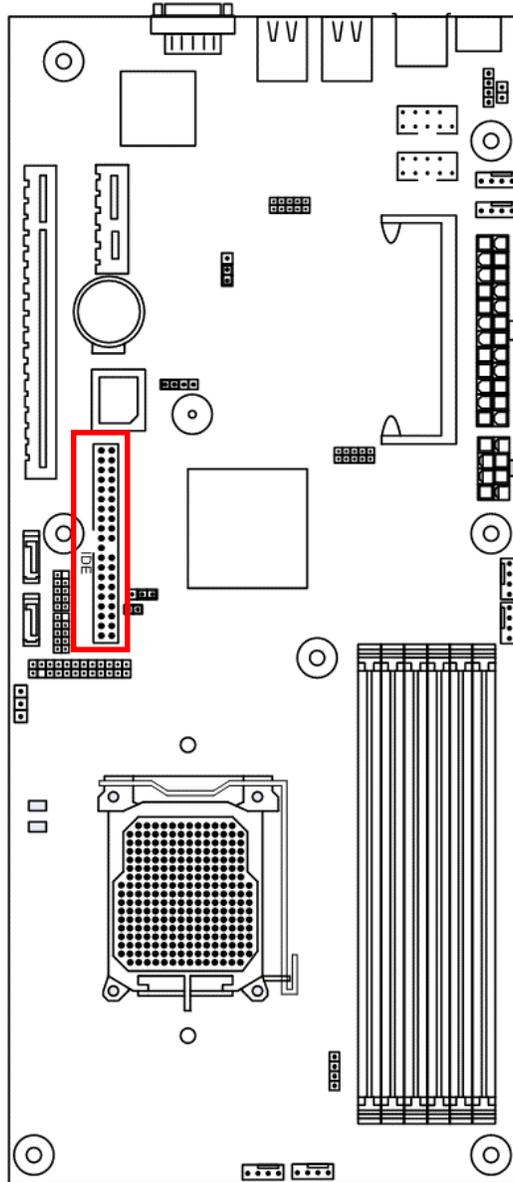
Read the instructions that come with the IDE drive and then consult the instructions here.
For Parallel ATA, installing IDE drives has become simpler over the years. The cables are now "keyed" to guide the user to the correct installation configuration. Each IDE connector can support two IDE drives.

Remember to set BIOS to match the configuration that you implement here. Go to Advanced Menu section of BIOS for detail.

2.5.3 Rear Panel I/O ports

The following illustration displays the motherboard I/O port array.
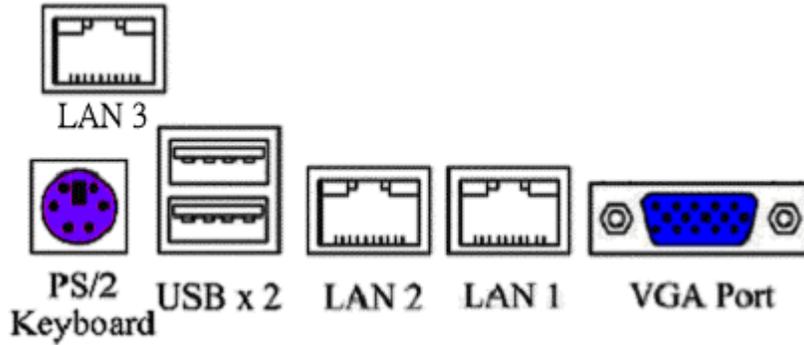
Type of Port	Function
PS/2 Keyboard connector	This connection is for a standard keyboard using a PS/2 plug (mini DIN). This connector will not allow standard AT size (large DIN) keyboard plugs. You may use a DIN to mini DIN adapter on standard AT keyboards.
USB Ports	Two external USB 2.0 ports that allow simultaneous connections of 2 USB devices.
Gigabit Ethernet Port 1 & 2	These ports are RJ-45. The motherboard uses the Marvell Alaska 88E1116 Dual Port PHY with MCP55V Pro MAC with TOE function.
Ethernet Port 3 (OPMA)	This port is RJ-45. This port is ONLY for OPMA, not for regular network.
VGA connector (15-pin female)	The VGA port connects display devices such as a monitor. See the BIOS setup.

When Scorpio2 server management card* is implemented, plug LAN cable into LAN1 for its function.

* Scorpio2 server management card is used for monitoring and recording of system component values such as system voltages, fan speed, and CPU/system temperature.

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2.5.4 Back Panel LAN LED

Back Panel LAN LED:
The table below will allow the user to monitor LAN activities from the back of the system.

RJ-45 connectors LEDs

	State of Link	Speed LED (Green/Orange)	Link/Activity LED (Green)
	No link	OFF	OFF
	Link @ 10Mbps	OFF	On
	Link @ 100Mbps	ON (Green)	On
	Link @ 1000Mbps	ON (Orange)	On
	Activity	ON	BLINK

Speed LEDs — Link/Activity LEDs

2.5.5 Front USB Connector

Header CN26 and CN27 control two front USB connections. To activate the front USBs, connect the USB wires to CN26 or CN27. Refer to the following diagram for the location of CN26 and CN27.
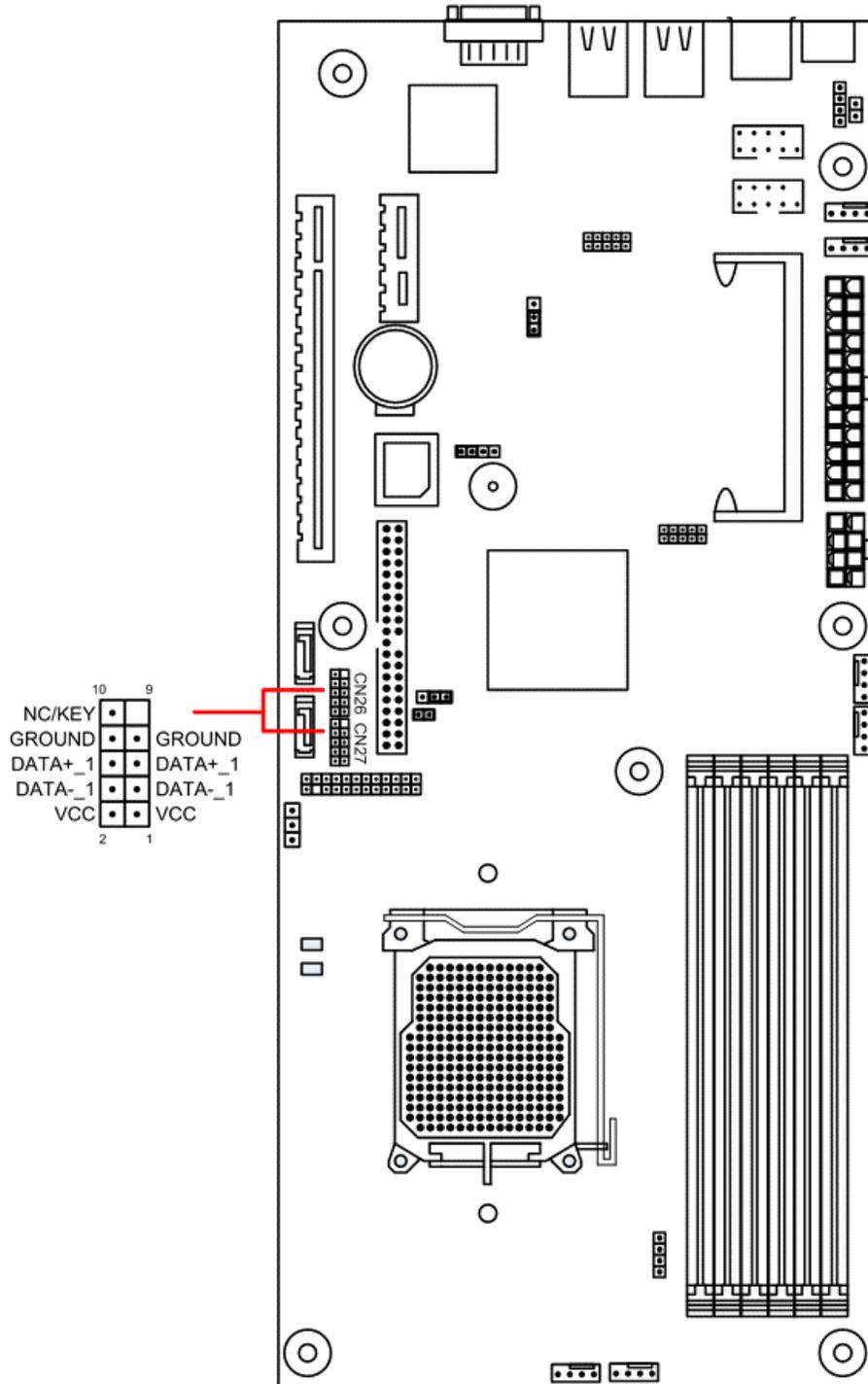
2.5.6 Front Panel Serial Port Connector

Header CN11 (COM1) and CN12 (COM2) control the activation of front panel serial port. Refer to the following diagram for location and orientation of CN11 and CN12.

1	DCD	2	DSR
3	Serial In	4	RTS
5	Serial Out	6	CTS
7	DTR	8	RI
9	GND	10	N/A
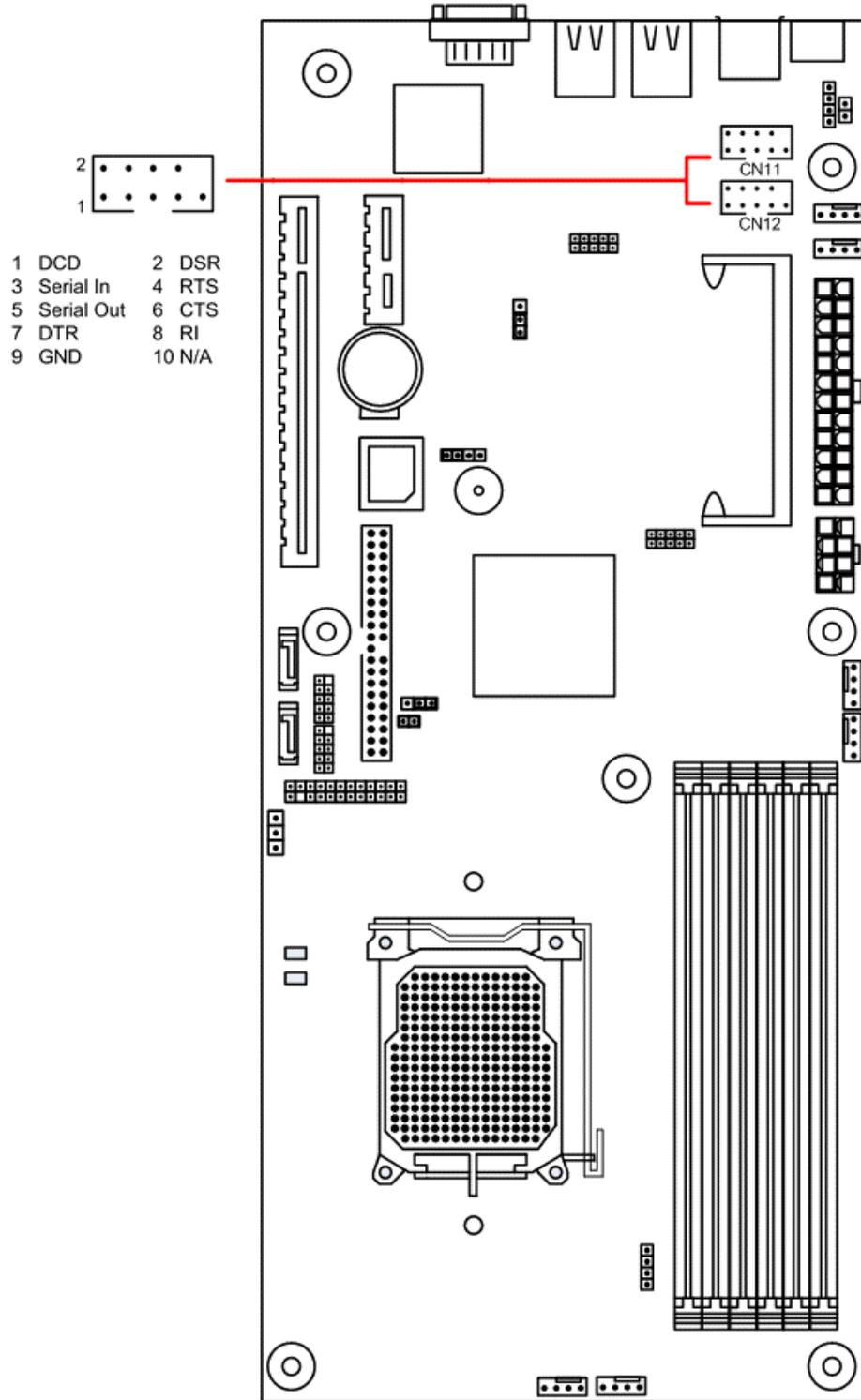
Chapter 3. BIOS Setup

This chapter discusses the PhoenixBIOS setup program built into the ROM BIOS.
BIOS is the basic input/output system, the firmware on the motherboard that enables the hardware to interact with the software. The setup program allows the users to modify the basic system configurations according to their needs. The configuration is then stored in a battery-backed NVRAM so that it retains the configuration even when the power is turned off. The PhoenixBIOS installed in the motherboard's ROM is a custom version of an industry standard BIOS.
The rest of the chapter will list all the menus and sub-menus in the BIOS. Along with them, you can also find the list of varieties for any configurable item in the BIOS.

3.1 Entering BIOS Setup

The PhoenixBIOS is activated when the system powers on. The BIOS reads the system information contained in the CMOS and begins the process of checking the system and configuring it. After finishing configuring the whole system, BIOS will seek an OS on disk and turn over control of the system to the OS found.
While BIOS is in control, the Setup menu can be accessed by pressing the <F2> key when the following message appears briefly at the bottom of the screen during Power On Self Test: "Press <F2> to enter SETUP."

3.2 Using Setup

The following table provides details about how to navigate the Setup program using keyboard.

KEY	FUNCTION
Up Arrow ↑	Move to the previous item.
Down Arrow ↓	Move to the next item.
Left Arrow ←	Move to the previous menu.
Right Arrow →	Move to the next menu.
Esc	In the sub-menu: Exit the sub-menu. In the main menu: Exit without saving.
Enter	Select the item. A pop-up window will appear to allow setting of the item's value. If the item has a ▶ in front of it, it means that the item leads to a sub-menu. Pressing <Enter> will take you to the sub-menu.
+	Increase the numeric value or goes to the previous setting value.
-	Decrease the numeric value or goes to the next setting value.
F1	General help on setup navigation keys. Press <F1> key to pop up a small help window that describe the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <ESC> key or <F1> key again.
F9	Setup Defaults.
F10	Save and Exit.

3.3 Troubleshooting

In case the system cannot be booted after some changes in BIOS, use the clear CMOS jumper setting to reset the BIOS to default (See Page 22). To avoid such problem, configure only the items that you thoroughly understand and refrain from modifying the advanced settings.

3.4 Main Menu

```
                    Phoenix TrustedCore(tm) Setup Utility
   Main        Advanced      Security      Power     Boot      Server        Exit

                                                        Item Specific Help

   System Time:      [10:14:38]
   System Date:      [12/19/2006]                    <Tab>, <Shift Tab>, or
                                                     <Enter> selects field.
   BIOS Date         11/09/06
   BIOS Version:       NK12X V051 NFORCE

   System Memory:     633 KB
   Extended Memory:    2046 MB





   F1   Help      ↑↓ Select Item      -/+   Change Values      F9   Setup Defaults
   Esc  Exit       Select Menu       Enter  Select   ► Sub-Menu   F10  Save and Exit
```

The following table shows the items that you can customize on the Main menu page:

Item	Options	Description
System Time	No options.	Shows the time of the day in the format of Hour/Min/Sec.
System Date	No options.	Shows the date in the format of MM/DD/YYYY.
BIOS Date	No options.	Shows the release date of the BIOS.
BIOS Version	No options.	Version of the BIOS.
System Memory	No options.	This item is not configurable to user.
Extended Memory	No options.	This item is not configurable to user.

3.5 Advanced Menu

```
                    Phoenix TrustedCore(tm) Setup Utility
   Main       Advanced      Security      Power     Boot      Server        Exit

                                                    Item Specific Help

   MCFG Table:  [Disabled]
   Reset Configuration Data: [No]                   Enable/Disable MCFG Table
   QuickBoot Mode:        [Enabled]
   Summary screen:         [Disabled]

   ► Hammer Configuration
   ► Integrated Devices
   ► IDE Configuration              Disabled
   ► I/O Device Configuration       Enabled

   ► Console Redirection
   IOMMU:              [Disabled]
   DRAM Bank Interleave    [Auto]



   F1  Help      ↑↓ Select Item        -/+  Change Values       F9  Setup Defaults
   Esc Exit       Select Menu        Enter Select   ► Sub-Menu   F10 Save and Exit
```

The following table shows the items that you can customize on the Advanced menu page:

Item	Options	Description
MCFG Table	Disabled Enabled	Enable/Disable MCFG Table
Reset Configuration Data	No Yes	Select 'Yes' if you want to clear the Extended System Configuration Data (ESCD) area.
QuickBoot Mode	Disabled Enabled	Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
Summary screen	Disabled Enabled	Display system configuration on boot.
IOMMU	Disabled Enabled	Enable \ Disable IOMMU
DRAM Bank Interleave	Disabled Auto	Interleave memory blocks across the DRAM chip selects. Auto will set this enabled when possible.

3.5.1 Hammer Configuration Sub-Menu

The Hammer Configuration sub-menu is shown in following figure:

Phoenix TrustedCore(tm) Setup Utility	
Advanced	
Hammer Configuration	Item Specific Help
HT-LDT Frequency: [1000Mhz] 200Mhz 400Mhz 600Mhz 800Mhz 1000Mhz	Set frequency of HT links for coherent and non-coherent.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults Esc Exit Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

3.5.2 Integrated Devices Sub-Menu

The Integrated Devices sub-menu should look like following:

```
                    Phoenix TrustedCore(tm) Setup Utility
                 Advanced

   Integrated Devices                                      Item Specific Help

   USB Control            [USB1.1+USB2]            Enable/Disable USB
   USB BIOS Legacy Support:  [Enabled]            Controllers.
   MAC LAN:            [Enabled]
   MAC LAN Bridge:        [Enabled]
   MAC 1 LAN:            [E
   MAC 1 LAN Bridge:     [E  Disabled
   SATA1 Controller:      [E  USB1.1
                              USB1.1+USB2


   ► NV RAID Configuration


   F1   Help        ↑↓ Select Item       -/+   Change Values        F9   Setup Defaults
   Esc  Exit          Select Menu        Enter  Select   ► Sub-Menu  F10  Save and Exit
```

The following table shows the items that you can customize on the Integrated Devices sub-menu page:

Item	Options	Description
USB Control	Disabled USB1.1 USB1.1+USB2	Enable/Disable USB Controllers.
USB BIOS Legacy Support	Disabled Enabled	Enables or Disables support for USB Keyboards and Mice. (Enable for use with a non-USB aware Operating System such as DOS or UNIX)
MAC LAN	Enabled Disabled	Enabled/Disable MAC LAN Device
MAC LAN Bridge	Disabled Enabled	Enable MAC Lan Bridge
MAC 1 LAN	Enabled Disabled	Enabled/Disable MAC 1 LAN Device
MAC 1 LAN Bridge	Disabled Enabled	Enable MAC 1 Lan Bridge
SATA Controller	Enabled Disabled	Enable/Disable First Serial ATA Device NOTE: Mobile platform, Enable SATA, Save and Exit BIOS SETUP. Then must do a power cycle during next POST.

Following figure shows the NV RAID Configuration sub-menu:

Phoenix TrustedCore(tm) Setup Utility	
Advanced	
NV RAID Configuration	Item Specific Help
NV RAID Configuration: [Disabled] Disabled Enabled	Enabled/Disable Nvidia RAID control. SATA controller must be enabled for RAID feature to function. Enabling Master SATA0 Secondary requires enabling Secondary SATA Channel. Both options are listed in Integrated Devices.
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults Esc Exit Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

3.5.3 IDE Configuration Sub-Menu

The IDE Configuration sub-menu looks like the following:

```
                    Phoenix TrustedCore(tm) Setup Utility
              Advanced
─────────────────────────────────────────────────────────────────────
         IDE Configuration                    |    Item Specific Help
                                              |
  ► Primary Master  [None]                    |
  ► Primary Slave   [None]                     |
                                              |
                                              |
                                              |
                                              |
                                              |
─────────────────────────────────────────────────────────────────────
  F1  Help        ↑↓ Select Item      -/+   Change Values      F9   Setup Defaults
  Esc  Exit          Select Menu      Enter  Select   ► Sub-Menu   F10  Save and Exit
```

Primary Master/Primary Slave sub-menu:

```
                    Phoenix TrustedCore(tm) Setup Utility
              Advanced
─────────────────────────────────────────────────────────────────────
       Primary Master  [None]                 |    Item Specific Help
                                              |
   Type:              [Auto]                   |   User = you enter
                                              |   parameters of hard-disk
   Multi-Sector Transfers: [Disabled]          |   drive installed at this
   LBA Mode Control:      [Disabled]            |   connection.
   32 Bit I/O:        [Disabled]               |   Auto = autotypes
   Transfer Mode:       [Standard]             |   hard-disk drive
   Ultra DMA Mode:       [Disabled]            |   installed here.
                                              |   CD-ROM = a CD-ROM drive
                                              |   is installed here.
                                              |   ATAPI Removable =
                                              |   removable disk drive is
                                              |   installed here.
                                              |
                                              |
                                              |
                                              |
─────────────────────────────────────────────────────────────────────
  F1   Help       ↑↓ Select Item      -/+   Change Values      F9   Setup Defaults
  Esc  Exit          Select Menu      Enter  Select   ► Sub-Menu   F10  Save and Exit
```

The table below is a list of items that you can customize in the Primary Master/Primary Slave options under IDE Configuration sub-menu.

Item	Options	Description
Type	Auto None CD-ROM ATAPI Removable IDE Removable Other ATAPI User	User = you enter parameters of hard-disk drive installed at this connection. Auto = autotypes hard-disk drive installed here. CD-ROM = a CD-ROM drive is installed here. ATAPI Removable = removable disk drive is installed here.
Multi-Sector Transfers	Disabled 2 Sectors 4 Sectors 8 Sectors 16 Sectors	Specify the number of sectors per block for multiple sector transfers. 'MAX' refers to the size the disk returns when queried.
LBA Mode Control	Disabled Enabled	Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads & Sectors.
32 Bit I/O	Disabled Enabled	This setting enables or disables 32 bit IDE data transfers.
Transfer Mode	Standard Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4 FPIO 3/DMA 1 FPIO 4/DMA 2	Select the method for moving data to/from the drive. Autotype the drive to select the optimum transfer mode.
Ultra DMA Mode	Disabled Mode 0 Mode 1 Mode 2 Mode 3 Mode 4 Mode 5 Mode 6	Selects the Ultra DMA mode used for moving data to/from the drive. Autotype the drive to select the optimum transfer mode.

3.5.4 I/O Device Configuration Sub-Menu

The I/O Device Configuration sub-menu looks like the following:

Phoenix TrustedCore(tm) Setup Utility	
Advanced	
I/O Device Configuration	Item Specific Help

Serial port A: [Enabled]
  Base I/O address: [3F8]
  Interrupt: [IRQ 4]
Serial port B: [Disabled]
	Configure serial port A
	using options:
	
	[Disabled]
	   No configuration
	
	[Enabled]
	   User configuration
	
	[Auto]
	   BIOS or OS chooses
	   configuration
	
	(OS Controlled)
	   Displayed when
	   controlled by OS

F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults Esc Exit Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

The following table shows the items that you can customize on the I/O Device Configuration sub-menu page:

Item	Options	Description
Serial port A	Disabled Enabled Auto	Disabled - No configuration. Enabled - User configuration. Auto - BIOS or OS chooses configuration.
Base I/O address	3F8 2F8 3E8 2E8	Set the base I/O address for serial port A.
Interrupt	IRQ 3 IRQ 4	Set the interrupt for serial port A.
Serial port B	Disabled Enabled Auto	Disabled - No configuration. Enabled - User configuration. Auto - BIOS or OS chooses configuration.

3.5.5 Console Redirection Sub-Menu

The Console Redirection sub-menu looks like the following:

```
                    Phoenix TrustedCore(tm) Setup Utility
              Advanced

          Console Redirection                          Item Specific Help

    Com Port Address        [Disabled]              If enabled, it will
                                                    use a port on the
    Baud Rate            [19.2K]                    motherboard.
    Console Type            [PC ANSI]
    Flow Control            [CTS/RTS]
    Console connection:    [Direct]
    Continue C.R. after POST:  [Off]




    F1   Help       ↑↓ Select Item      -/+   Change Values       F9   Setup Defaults
    Esc  Exit       Select Menu          Enter  Select    ► Sub-Menu   F10  Save and Exit
```

The following table shows the items that you can customize on the Console Redirection sub-menu page:

Item	Options	Description
Com Port Address	Disabled On-board COM A On-board COM B	If enabled, it will use a port on the motherboard.
Baud Rate	300 1200 2400 9600 19.2K 38.4K 57.6K 115.2K	Enables the specified baud rate.
Console Type	VT100 VT100, 8BIT PC ANSI, 7BIT PC ANSI VT100+ VT UTF8 ASCII	Enables the specified console type.
Flow Control	None XON/XOFF CTS/RTS	Enables Flow Control
Console connection	Direct Via modem	Indicate whether the console is connected directly to the system or a modem is used to connect.
Continue C.R. after POST	Off On	Enables Console Redirection after OS has loaded.

3.6 Security Menu

The Security Menu is shown as the following figure:

```
                    Phoenix TrustedCore(tm) Setup Utility
        Main      Advanced    Security      Power        Boot   Server        Exit

                                                       Item Specific Help

    Supervisor Password Is:     Clear
    User Password Is:           Clear            Display the diagnostic
                                                 screen during boot
    Boot-time Diagnostic Screen:  [Enabled]
    Set Supervisor Password   [Enter]
    Set User Password       [Enter]




    F1  Help       ↑↓ Select Item        -/+  Change Values       F9  Setup Defaults
    Esc Exit       Select Menu          Enter Select    ► Sub-Menu   F10 Save and Exit
```

The following table shows the items that you can customize on the Security Menu page:

Item	Options	Description
Boot-time Diagnostic Screen	Disabled Enabled	Display the diagnostic screen during boot.
Set Supervisor Password	No options.	Enter New Password. Confirm New Password.
Set User Password	No options.	Enter New Password. Confirm New Password.

3.7 Power Menu

The Power Menu is shown as following figure:

Phoenix TrustedCore(tm) Setup Utility						
Main	Advanced	Security	**Power**	Boot	Server	Exit

	Item Specific Help
Spread Spectrum: [Disabled] Enable Multimedia Timer [Yes] WakeUp On LAN/PME: [Enabled] Time: [Off] Resume Time: [00:00:00] After Power Failure: [Disabled]	Disable (default) or Enable Spread Spectrum.

F1 Help	↑↓ Select Item	-/+ Change Values	F9 Setup Defaults
Esc Exit	Select Menu	Enter Select ► Sub-Menu	F10 Save and Exit

The following table shows the items that you can customize on the Power Menu:

Item	Options	Description
Spread Spectrum	No Yes	Disable (default) or Enable Spread Spectrum.
Enable Multimedia Timer	No Yes	Enable/Disable Multimedia Timer support.
WakeUp On LAN/PME	Disabled Enabled	Enables WakeUp on LAN/PME support.
Resume On Time	Off On	Enabled wakes the system up at a specific time.
Resume Time	No options.	Specify the time when the system is to wake up. <Tab>, <Shift-Tab>, or <Enter> selects field.
After Power Failure	Disabled Enabled	Disabled = when Power is applied, the system will boot to the G0 state. Enabled = when power is a applied, the system will boot to the G2:S5 state.

3.8 Boot Menu

All the possible devices that you can boot from are automatically detected and listed on the page. The first device listed is the first boot device. In the example shown below, Maxtor 6L100P0-(PM) hard drive is the first boot device.

```
+------------------------------------------------------------------------------+
|                    Phoenix TrustedCore(tm) Setup Utility                     |
|     Main    Advanced     Security      Power  Boot       Server      Exit    |
+----------------------------------------------+-------------------------------+
|                                              |       Item Specific Help      |
|   Boot priority order:                       |                               |
|    1:  IDE 0: Maxtor 6L100P0-(PM)            |   Keys used to view or        |
|    2:                                        |   configure devices:          |
|    3:                                        |   Up and Down arrows          |
|    4:                                        |   select a device.            |
|    5:                                        |   <+> and <-> moves           |
|    6:                                        |   the device up or down.      |
|    7:                                        |   <f> and <r> specifies       |
|    8:                                        |   the device fixed or         |
|   Excluded from boot order:                  |   removable.                  |
|     : PCI BEV: NVIDIA Boot Agent 232.0529    |   <x> exclude or include      |
|     : PCI BEV: 2-NVIDIA Boot Agent 232.05    |   the device to boot.         |
|     : Legacy Network Card                    |   <Shift + 1> enables or      |
|     : Bootable Add-in Cards                  |   disables a device.          |
|                                              |   <1 - 4> Loads default       |
|                                              |   boot sequence.              |
|                                              |                               |
|                                              |                               |
+----------------------------------------------+-------------------------------+
|  F1   Help      ↑↓ Select Item     -/+   Change Values    F9   Setup Defaults |
|  Esc  Exit         Select Menu     Enter  Select    ► Sub-Menu  F10  Save and Exit |
+------------------------------------------------------------------------------+
```

3.9 Server Menu

Phoenix TrustedCore(tm) Setup Utility						
Main	Advanced	Security	Power	Boot	**Server**	Exit

	Item Specific Help
Display without KB Err Msg [No] ► Hardware Monitor	Control the Post Error Message display or not when without KB.

F1 Help	↑↓ Select Item	-/+ Change Values	F9 Setup Defaults
Esc Exit	Select Menu	Enter Select ► Sub-Menu	F10 Save and Exit

Item	Options	Description
Display without KB Err Msg	Yes No	Control the Post Error Message display or not when without KB.
Hardware Monitor	No options.	Shows all the hardware monitor's current state.

3.10 Exit Menu

```
                        Phoenix TrustedCore(tm) Setup Utility
          Main    Advanced        Security        Power   Boot         Server       Exit

                                                            Item Specific Help

     Exit Saving Changes     [Enter]
     Exit Discarding Changes  [Enter]                 Exit System Setup and
     Load Setup Defaults     [Enter]                  save your changes to
     Discard Changes         [Enter]                  CMOS.
     Save Changes            [Enter]

     F1  Help        ↑↓ Select Item        -/+   Change Values          F9   Setup Defaults
     Esc  Exit         Select Menu       Enter  Select   ► Sub-Menu    F10  Save and Exit
```

Item	Options	Description
Exit Saving Changes	Enter	Exit System Setup and save your changes to CMOS.
Exit Discarding Changes	Enter	Exit utility without saving Setup data to CMOS.
Load Setup Defaults	Enter	Load default values for all SETUP items.
Discard Changes	Enter	Load previous values from CMOS for all SETUP items.
Save Changes	Enter	Save Setup Data to CMOS.

3.11 BIOS FLASH UPGRADE UTILITY

Phoenix Phlash gives you the ability to update your BIOS from a floppy disk without having to install a new ROM BIOS chip. Phoenix Phlash is a utility for "flashing" (copying) a BIOS to the Flash ROM installed on your server from a floppy disk. A Flash ROM is a Read-Only Memory chip that you can write to using a special method called "flashing."

Phoenix Phlash automatically updates or replaces the current BIOS with the one which your OEM or dealer supplies you (it's a .ROM file).

Command Example:
A:\> phlash16 nk12xv071.ROM /MODE=3 /BBL /C

Syntax:
phlash16	**Phlash command name**
nk12xv071.ROM	**Filename of new BIOS ROM supplied by dealer**
/BBL	**Flash the Boot Block**
/C	**Clear CMOS**
/MODE=3	**Update both BIOS and DMI information**

APPENDIX I: Glossary

ACPI (Advanced Configuration and Power Interface): a power management specification that allows the operating system to control the amount of power distributed to the server's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs only at 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

ATAPI (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

ATX: the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

Bandwidth: refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path can carry. Greater bandwidth results in greater speed.

BIOS (Basic Input/Output System): the program that resides in the ROM chip, which provides the basic instructions for controlling your server's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

Buffer: a portion of RAM which is used to temporarily store data; usually from an application though it is also used when printing and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it to a disk drive. While this improves system performance (reading to or writing from a disk drive a single time is much faster than doing so repeatedly) there is the possibility of losing your data should the system crash. Information in a buffer is temporarily stored, not permanently saved.

Bus: a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering: allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times since the information is stored in SRAM instead

of slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

Closed and open jumpers: jumpers and jumper pins are active when they are "on" or "closed", and inactive when they are "off" or "open".

CMOS (Complementary Metal-Oxide Semiconductors): chips that hold the basic startup information for the BIOS.

COM port: another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DDR (Double Data Rate): a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

DIMM (Dual In-line Memory Module): faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank: sometimes called DIMM socket because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA (Direct Memory Access): channels that are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.

DMI: A specification that establishes a standard framework for managing networked servers. DMI covers hardware and software, desktop systems and servers, and defines a model for filtering events and describing interfaces.

DRAM (Dynamic RAM): widely available, very affordable form of RAM which looses data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

ECC (Error Correction Code or Error Checking and Correcting): allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

EEPROM (Electrically Erasable Programmable ROM): also called Flash BIOS, it is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip.

ESCD (Extended System Configuration Data): a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Firmware: low-level software that controls the system hardware.

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Circuit Board (PCB) or serverboard. The standard form factors are the AT and ATX.

IDE (Integrated Device/Drive Electronics): a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

IDE INT (IDE Interrupt): a hardware interrupt signal that goes to the IDE.

I/O (Input/Output): the connection between your server and another piece of hardware (mouse, keyboard, etc.)

IRQ (Interrupt Request): an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ lines can lock up your system. Plug-n-Play operating systems can take care of these details for you.

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This occurs most commonly when the system sends data out to a peripheral device and has to wait for the peripheral to spread (peripherals tend to be slower than onboard system components).

NVRAM: ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

OPROM: Firmware on adapter cards that control bootable peripherals. The system BIOS interrogates the option ROMs to determine which devices can be booted.

Parallel port: transmits the bits of a byte on eight different wires at the same time.

PCI (Peripheral Component Interconnect): a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI bridge: allows you to connect multiple PCI devices onto one PCI slot.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

RAID (Redundant Array of Independent Disks): a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly and multiple hard drives will appear as a single drive to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is both striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

SDRAM (Synchronous Dynamic RAM): called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

Serial port: called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

Sleep/Suspend mode: in this mode, all devices except the CPU shut down.

SRAM (Static RAM): unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

SMBIOS: The system management specification addresses how serverboard and system vendors present management information about their products in a standard format by extending the BIOS interface on Intel architecture systems.

Standby mode: in this mode, the video and hard drives shut down; all other devices continue to operate normally.

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without a proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

USB (Universal Serial Bus): a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

ZCR (Zero Channel RAID): ZCR card provides RAID-5 solution by working with the onboard SCSI/SATA/SATA-II chip through special PCI-X slot with Intel RAIDIOS logic, thus lowering cost of RAID-5 solution