User Manual
QME-2200 Series

Ver. 1.0
Jan.2008

Regional EMC Compliance Information

FCC Verification Notice (USA only)

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

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Class A

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

INDUSTRY CANADA (Canada only)

This Class B (or Class A, if so indicated on the registration label) digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe B (ou Classe A, si ainsi indiqué sur l'étiquette d'enregistration) respecte toutes les exigences du Reglement sur le Materiel Brouilleur du Canada.

CE Declaration of Conformity (EUROPE only)

This product has been tested in accordance to, and complies with the European Low Voltage Directive (73/23/EEC) and European EMC Directive (89/336/EEC).

The product has been marked with the CE Mark to illustrate its compliance.

CCC (China only)

The following CCC EMC Warning is marked on the product: EMC Warning are required for Class A products.

此为A级产品，在生活环境中，该产品可能会造成无线电干扰，在这种情况下，可能需要用户对其干扰采取可行的措施

China RoHS Declaration Table

部件名称 (Component Name)	有毒有害物质或元素 (Hazardous Substance)					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Chromium VI Compounds (Cr6+)	多溴联苯 Polybrominated Biphenyls (PBB)	多溴二苯醚 Polybrominated Diphenyl Ethers (PBDE)
机箱子组件 Chassis Subassembly	○	○	○	○	○	○
电源 Power Supply	○	○	○	○	○	○
印刷版组件 Printed Board Assemblies (PBA)	○	○	○	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。

○：Indicates that this hazardous substance contained in all homogeneous materials of this part is below the limit requirement in SJ/T 11363-2006.

BSMI (Tawain only)

The following BSMI EMC Warning is marked on the product: BSMI ID No and EMC Warning are required for Class A products.

這是甲類的資訊產品,在居住的環境中使用時,可能會造成射頻干擾,在這種情況下,使用者會被要求採取某些適當對策。

Copyright

Version 1.0, April, 2008

Disclaimer

Safety Information

READ THIS IMPORTANT SAFETY INFORMATION SECTION. RETAIN THIS MANUAL FOR REFERENCE. READ THIS SECTION BEFORE SERVICING.

CAUTION!
TO REDUCE THE RISK OF ELECTRIC SHOCK, THIS SERVER BOARD SHOULD ONLY BE SERVICED BY QUALIFIED SERVICE PERSONNEL.

RTC Battery

CAUTION!
DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

Power Supply

CAUTION!
THE POWER SUPPLIES IN YOUR SYSTEM MAY PRODUCE HIGH VOLTAGES AND ENERGY HAZARDS, WHICH CAN CAUSE BODILY HARM. UNLESS YOU ARE INSTRUCTED OTHERWISE, ONLY TRAINED SERVICE TECHNICIANS ARE AUTHORIZED TO REMOVE THE COVERS AND ACCESS ANY OF THE COMPONENTS INSIDE THE SYSTEM.

Power Supply Cord

CAUTION!
THIS SYSTEM MAY HAVE MORE THAN ONE POWER SUPPLY CABLE. TO REDUCE THE RISK OF ELECTRICAL SHOCK, A TRAINED SERVICE TECHNICIAN MAY NEED TO DISCONNECT ALL POWER SUPPLY CABLES BEFORE SERVICING THE SYSTEM.

Ambient Operation

This equipment cannot be operated above an ambient operation temperature of 40 degrees centigrade.

Typographic Conventions

Several different typographic conventions are used throughout this manual. Refer to the following examples for common usage.

Bold type face denotes menu items, buttons and application names.

Italic type face denotes references to other sections.

Note:
Highlights general or useful information and tips.

WARNING!
Warning information appears before the text it references and should not be ignored as the content may prevent damage to the device.

CAUTION!
CAUTIONS APPEAR BEFORE THE TEXT IT REFERENCES, SIMILAR TO NOTES AND WARNINGS. CAUTIONS, HOWEVER, APPEAR IN CAPITAL LETTERS AND CONTAIN VITAL HEALTH AND SAFETY INFORMATION.

The QME-2200 is an extended ATX server board that measures 13 x 12 inches (333 mm x 305 mm). The QME-2200 features dual J-Type 771-pin sockets that accommodate single or dual
Intel® Xeon Dempsey/Woodcrest/Wolfdale/Clovertown/Harpertown (5000/5100/5200/5300/5400) and
Seaburg1600 Northbridge/ESB2-E Southbridge chipsets.

Eight FBDIMM DDR2 533/667/800 slots enable you to add memory up to 32 GB. ECC support provides extra security against system failure. The two available SKUs support eight Serial Attached SCSI (SAS) ports, up to six 3.0 Gb/s SATA ports providing maximum flexibility for installing hard drives.

The QME-2200 has a full range of I/O ports, including two USB ports, two Gigabit Ethernet LAN ports from ESB2-E, one 10/100M LAN port from AST2000, one PS2 mouse port, one PS2 keyboard port, one 9-pin serial port, and one 15-pin VGA port.

IPMB (Intelligent Platform Management Bus) headers provide administrator access in case of server board failure. The IPMB connects externally through the (ICMB) Intelligent Chassis Management Bus. The ICMB is used to connect the QME-2200 to the outside world, providing data such as temperature, voltage, or chassis intrusion to the system administrator. ASPEED 2000 server management firmware enables the administrator to monitor the QME-2200 status through a typical web browser.

Checklist

The QME-2200 server board package ships with the following components:

- Serverboard
- One IDE ribbon cable (Ultra DMA 100)
- One installation manual (included in the software drivers CD)
- Serial ATA cable * 2
- I/O shield

If some items are missing or appear damaged, contact your vendor immediately.

Features

- Processors–Intel Xeon LGA771 CPU
- Seaburg1600 North Bridge / Memory Controller
- Intel ESB2-E South Bridge / IO Bridge
- Flash ROM for System BIOS–SILICON SST49LF008A-33-4C-NHE
- Super IO–Winbond 87427
- VGA–AST2000/SMI712 (option)
- NIC–82563
- BMC–AST2000
- SAS Controller–LSI1068E (option)
- Clock generator/ Buffer– ICS932S421BGLFT/ICS9DB803DFLFT/ICS9FG1201CGLF-T

Serverboard Components

SATA SKU

Item	Label	Component
1	I/O ports	See *Input/Output Ports* on page 4
2	MAIN_PWR	Serverboard main power connector
3	IPMB connector	Reserve power supply connector
4	12V connector	Supports 12V power connection
5	DDR2 DIMM array	4 DDR2 DIMM slots – channels 2 and 3
6	CPU_1 socket	771-pin CPU_1 socket for processor
7	CPU_2 socket	771-pin CPU_2 socket for processor
8	USB connector	Front USB connector
9	CPU_PWR1	CPU_1 power connector
10	CPU_PWR2	CPU_2 power connector
11	PRIMARY IDE	Primary IDE connector
12	SATA Connectors	6 x SATA connectors
13	FRONT_PANEL	Front panel connector
14	PCI Slot 1	PCI slot supporting PCI-X 64/100
15	PCI Slot 2	PCI slot supporting PCI-X 64/133
16	PCI-E Slot 3	PCI-E slot supporting PCI-E x 4
17	PCI-E Slot 4	PCI-E slot supporting PCI-E x 4
18	PCI-E Slot 5	PCI-E slot supporting PCI-E x 16
19	DDR2 DIMM array	4 DDR2 DIMM slots – channels 0 and 1

SAS SKU

Item	Label	Component
1	I/O ports	See *Input/Output Ports* on page 4
2	MAIN_PWR	Serverboard main power connector
3	IPMB connector	Reserve power supply connector
4	12V connector	Supports 12V power connection
5	DDR2 DIMM array	4 DDR2 DIMM slots – channels 2 and 3
6	CPU_1 socket	771-pin CPU_1 socket for processor
7	CPU_2 socket	771-pin CPU_2 socket for processor
8	USB connector	Front USB connector
9	CPU_PWR1	CPU_1 power connector
10	CPU_PWR2	CPU_2 power connector
11	PRIMARY IDE	Primary IDE connector
12	SAS Connectors	8 x SAS connectors
13	FRONT_PANEL	Front panel connector
14	PCI Slot 1	PCI slot supporting PCI-X 64/100
15	PCI Slot 2	PCI slot supporting PCI-X 64/133
16	PCI-E Slot 3	PCI-E slot supporting PCI-E x 4
17	PCI-E Slot 4	PCI-E slot supporting PCI-E x 4
18	PCI-E Slot 5	PCI-E slot supporting PCI-E x 16
19	DDR2 DIMM array	4 DDR2 DIMM slots – channels 0 and 1

Input/Output Ports

The QME-2200 Hybrid board is installed with the following I/O ports. Refer to the illustration below:

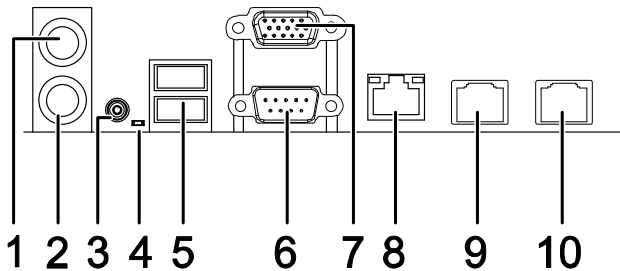| Item	Port		Description	
1	PS/2 Mouse		Connect a PS/2 pointing device to this port	
2	PS/2 Keyboard		Connect a PS/2 keyboard to this port	
3	ID button/ rear ID LED		Press to light front and rear ID LEDs (see table below for behavior)	
4	Status LED		Behavior is controlled by BMC (see below for behavior)	
	LED Name	**Color**	**Condition**	**Occurrence**
	ID LED	Blue	Off	OK
			Blinking	ID button pressed on chassis
	Status LED	Amber	Solid	Critical failure such as critical fan, voltage, or temperature state
			Blinking	Non-critical failure such as non-critical fan, volt-age, temperature state, or CPU thermal trip
		Green	Solid	OK
5	USB Ports		Use the USB ports to connect USB devices	
6	VGA Port		Use the VGA port to connect an external monitor	
7	Serial Port		Use the serial port COM1 to connect serial devices such as mice or fax/modems	
8	KVM over IP		Connect a RJ-45 jack to this port to link to a 10/100M LAN from AST2000	
9	NIC1 Port		10/100/1000 Mbps RJ-45 LAN port (for onboard LAN chipset)	
10	NIC2 Port		10/100/1000 Mbps RJ-45 LAN port (for onboard LAN chipset)	

I/O Port Color Coding

The industry has adopted a standard color code to identify many of the I/O ports used in today's systems.

Connector	Color
Analog VGA	Blue
PS/2 compatible keyboard	Purple
PS/2 compatible mouse	Green
Serial	Teal or Turquoise
USB	Black
LAN	Black

Block Diagram
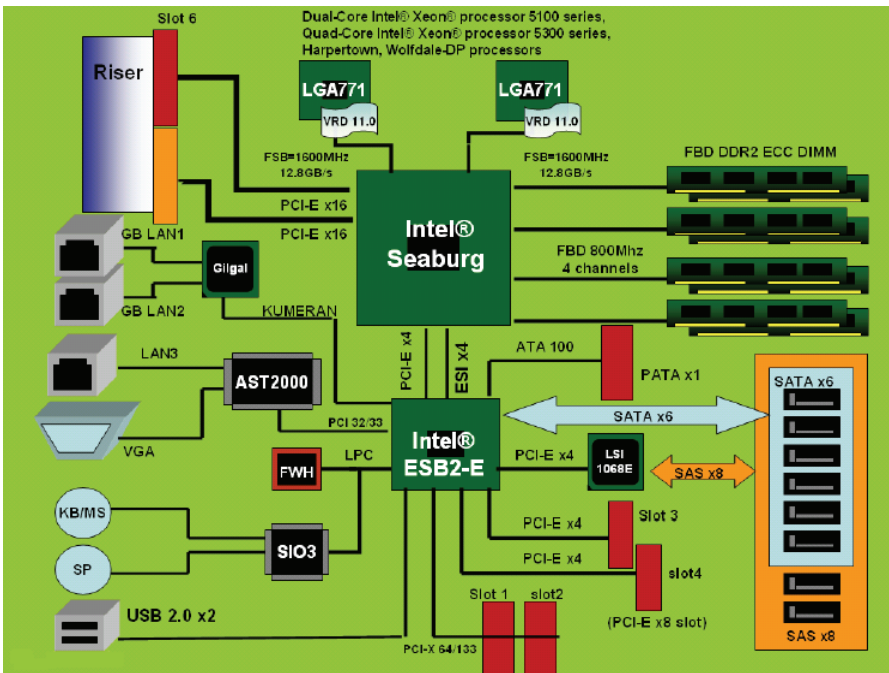
This concludes the first chapter. The next chapter explains how to install components.

— Notes —

Safety Measures

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous. Follow the simple guidelines below to avoid damage to your computer or yourself.

- Always disconnect the computer from the power outlet whenever you are working inside the computer case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the computer case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging until you are ready to use the component for the installation.

Serverboard Jumper Settings

Refer to this section when setting the jumpers on the server board.

Setting a Jumper

The server board jumpers are to set system configuration options. When setting jumpers, ensure the shunts (jumper caps) are placed on the correct pins.

This 2-pin jumper is ON/SHORT.
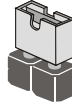
This 2-pin jumper is OFF/OPEN.

Pins 1 and 2 are ON/SHORT on this 3-pin jumper.
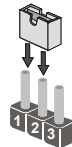
Jumper Locations and Functions

Refer to the following table for jumper names and functions.

Item	Name	Function	Setting
1	J5A1/J6A1	10/100/1000 LAN connector (Gilgal)	Link LED:10/None, 100/green, 1G/Orange
			Link: Green, Active LED: Blinking Green
2	J7A1	10/100 LAN connector (AST2000)	Link LED: Green
			Active LED: Blinking Green
3	J1B2	Intrusion connector	Pin1: FP_CHASSIS_INTRU
			Pin2: GND
4	J1K4	IPMB 5V connectors	Pin1: SMB_IPMB_5V_DAT
			Pin2: GND
			Pin3: SMB_IPMB_5V_CLK
			Pin4: Pull down
5	J1K1	IPMB 5V connectors	Pin1: SMB_IPMB_5V_DAT
			Pin2: GND
			Pin3: SMB_IPMB_5V_CLK
			Pin4: Pull high
6	J2H4	SGPIO header	Pin1: SGPIO_CLOCK
			Pin2: SGPIO_LOAD
			Pin3: SGPIO_DATAOUT0
			Pin4: SGPIO_DATAOUT1
7	J2K1	IPMB 5VSTB connector	Pin1: SMB_IPMB_5VSB_DAT
			Pin2: GND
			Pin3: SMB_IPMB_5VSB_CLK
			Pin4: P5V_STBY
8	J1C1	Clear CMOS header	1-2, Normal operation (default)
			2-3, COMS clear
9	J1D1	Clear Password header	1-2, Password protect (default)
			2-3, Password Clear
10	J9D1	IPMB connector for power supply (reserve)	Pin1: 3V3SB_PWR_CLK
			Pin2: 3V3SB_PWR_DAT
			Pin3: SMB_ALERT
			Pin4: GND
			Pin5: P3V3
11	J1C2	BMC recovery Function	Short J1C2 during BMC recovery function
12	J2A1	BMC recovery Function	Short J2A1 during BMC recovery function

Installing the CPUs

⚠️ **WARNING!**
In a single CPU configuration, the single processor must be installed in the CPU_1 socket (see *Serverboard Components* on page 2 for location).

Refer to the following instructions to install CPUs:

1. Remove the CPU dust cover by lifting the tab marked **Remove**.
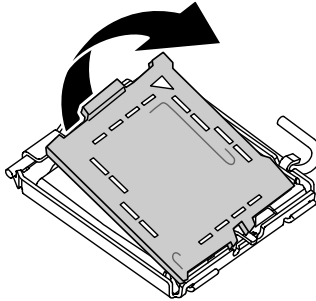
2. Pull the locking lever of the CPU socket out and up as shown.
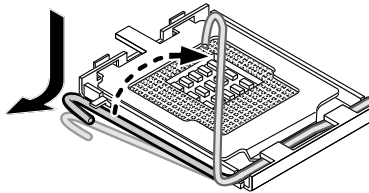
3. Push down as demonstrated to lift the CPU bracket.
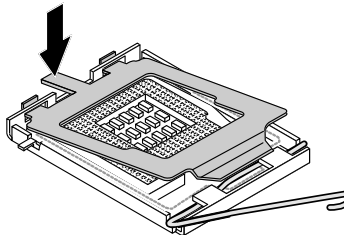
4. Locate the notches on the CPU and the socket.

WARNING!
The QME-2200 uses LGA 771 sockets (Zero Insertion Force socket), which are designed for trouble free insertion of CPUs. After placing a CPU into the socket, press the lever down and lock in place. If you notice any resistance when inserting the CPU, ensure that it is aligned correctly.

5. Align the notches and drop the processor into the socket.

Notch

Notch

Notch

Notch
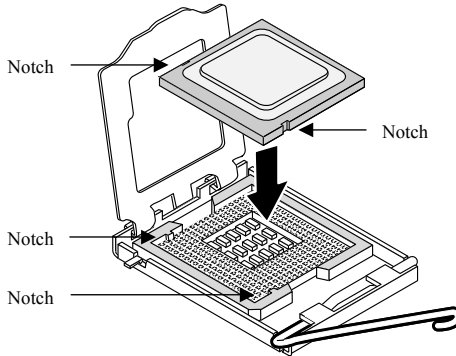
6. Replace the CPU bracket and locking lever to lock the processor in place.
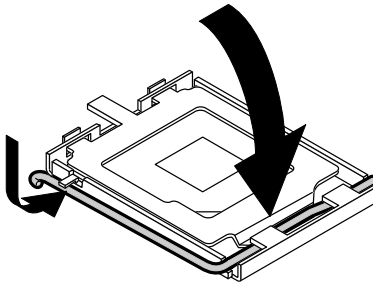
7. Repeat steps 1 through 6 for the second CPU.

Installing the Heatsinks

Refer to the following instructions to install heatsinks:

1. Apply thermal compound evenly on the top of the CPU.

2. Remove the protective cover from the underside of the heatsink.
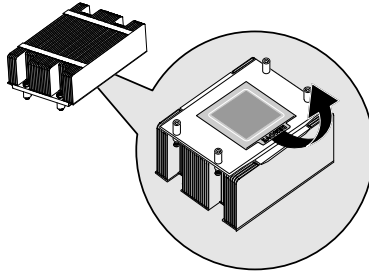
3. Place the heatsink on top of the CPU as shown.
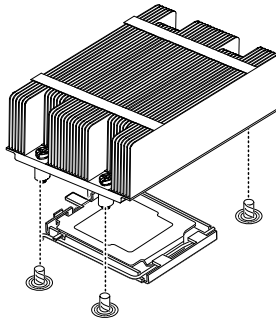
4. Tighten the four retaining screws clockwise, in the order shown, to secure the heatsink.
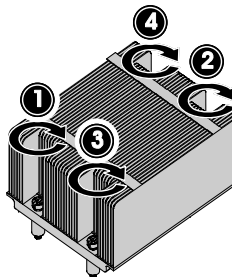
5. Repeat steps 1 through 4 for the second heatsink.

WARNING!
If the server board is to be operated with only a single processor, both heatsinks must be installed to insure proper cooling.

Installing Memory

The server board has eight FBD DDR2-DIMM slots for the installation of up to eight memory DIMMS @ DDR2-533/667/800 memory chips. See *Serverboard Components* on page 2 and 3 for the location of the memory modules.

Refer to the following instructions to install memory modules:

1. Pull the locking latches of the DIMM slot outwards.

2. Align the memory module correctly. Note the notch and obstruction in the following illustration.
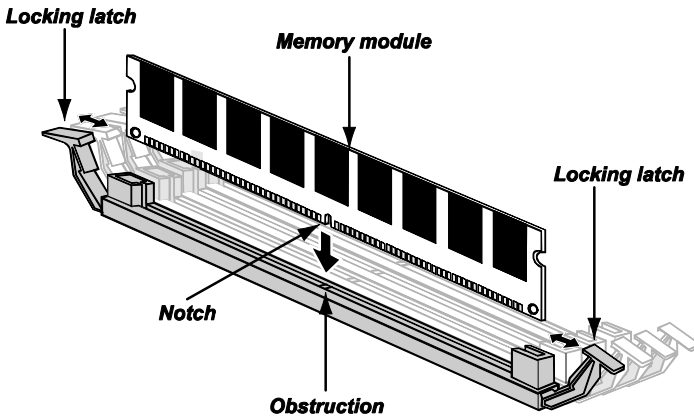
3. Press the edge connector of the memory module into the slot. Press down firmly so that the locking latches of the DIMM slot are levered upwards to secure the memory module in place.

Supported DIMM Configuration

The following DIMM configurations are supported by the QME-2200 server board. DIMM slots are numbered 0 to 1 and designated by two branches each containing two channels. Populate DIMM slots starting with slot 0: channel 0: branch 0 (DIMM A1). See the following for possible memory configurations.
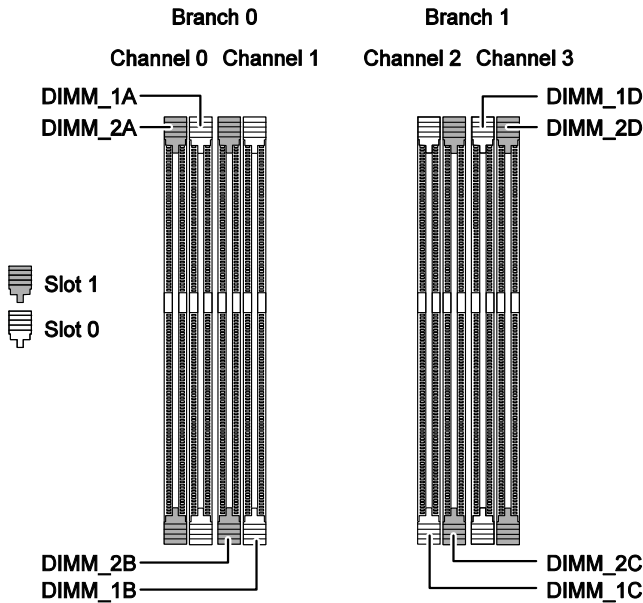
Branch	Channel	Slot	
Branch 0	Channel 0	Slot 1 [DIMM_2A]	Slot 0 [DIMM_1A]
	Channel 1	Slot 1 [DIMM_2B]	Slot 0 [DIMM_1B]
Branch 1	Channel 2	Slot 0 [DIMM_1C]	Slot 1 [DIMM_2C]
	Channel 3	Slot 0 [DIMM_1D]	Slot 1 [DIMM_2D]

Supported Modes

The QME-2200 supports the following modes:

- Non-Mirrored Mode
- Single Channel Mode

Non-Mirrored Mode:

Memory mirroring requires the corresponding slot positions in a channel pairs must hold the same DIMM type (manufacturing, speed, timing, organization and density). See the example that follows. Memory mirroring effectively reduces available memory by half.

Non-Mirrored Configuration	
Number of DIMMs	
2	Slot 0 (CH 0 : BR 0); Slot 0 (CH 1 : BR 0)
4	Slot 0 (CH 0 : BR 0); Slot 0 (CH 1 : BR 0); Slot 0 (CH 2 : BR 1); Slot 0 (CH 3 : BR 1)
6	Slot 0 (CH 0 : BR 0), Slot 1 (CH 0, BR 0); Slot 0 (CH 1 : BR 0), Slot 1 (CH 1 : BR 0); Slot 0 (CH 2 : BR 1), Slot 0 (CH 3 : BR 1)
8	Slot 0 (CH 0 : BR 0), Slot 1 (CH 0, BR 0); Slot 0 (CH 1 : BR 0), Slot 1 (CH 1 : BR 0); Slot 0 (CH 2 : BR 1), Slot 1 (CH 2: BR 1); Slot 0 (CH 3 : BR 1), Slot 1 (CH 3 BR 1)

Note:
CH designates channel; BR designates branch.

In non-mirrored mode, the memory upgrade granularity for each pair of locked-step channels is two identical DIMMS (one pair of corresponding slots on a selected branch).

Single Channel Mode

Populate DIMM slots in the following order:

Branch 0, CH 0, Slot 0

Branch 0, CH 1, Slot 0

Note:
All channels must hold the same DIMM type as defined in the previous instructions.

Any subsequent memory upgrades should follow the rules listed above for Non-Mirrored Mode and Mirrored Mode.

The memory upgrade granularity is one DIMM.

Installing a PCI Card

See *Serverboard Components* on page 2 for the location of the PCI slots.

CAUTION!
VOLTAGES CAN BE PRESENT WITHIN THE SERVER WHENEVER AN AC POWER SOURCE IS CONNECTED. THIS VOLTAGE IS PRESENT EVEN WHEN THE MAIN POWER SWITCH IS IN THE OFF POSITION. ENSURE THAT THE SYSTEM IS POWERED-DOWN AND ALL POWER SOURCES HAVE BEEN DIS-CONNECTED FROM THE SERVER PRIOR TO INSTALLING A PCI CARD.

FAILURE TO OBSERVE THIS WARNING COULD RESULT IN PERSONAL IN-JURY OR DAMAGE TO EQUIPMENT.

Follow these instructions to install a PCI card:

1. Remove a blanking plate from the system case.

2. Install the PCI card into the expansion slot.
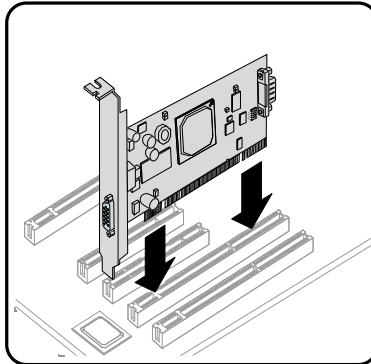
3. Secure the metal bracket of the PCI card to the system case with a screw.

Setup Menu

The computer employs the latest AMI BIOS, which is stored in a CMOS chip. This CMOS chip contains the ROM Setup instructions for configuring the mainboard's BIOS. The BIOS (Basic Input and Output System) Setup utility is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. BIOS is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters. These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

Configure such items as:

- Hard drives, diskette drives, and peripherals
- Password protection from unauthorized use
- Power Management features

This Setup utility should be executed under the following conditions:

- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the Setup utility
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Note:
Only items in brackets [ ] can be modified. Items that are not in brackets are display only.

BIOS Setup Options at Boot

The user will be able to initiate SETUP by pressing the respective keys.

<**DEL**>   **Enter the BIOS Setup**

Main Menu

The main menu displays information about the server board and BIOS.

BIOS SETUP UTILITY	
Main Advanced Boot Server Security Exit	
System Overview	USE [ENTER], [TAB] Or [SHIFT-TAB] to Select a field.
AMIBIOS	Use [+] or [-] to Configure system Time.
Version : S87MB 1A11.011	
BIOS Build Date : 01/21/08	
Product Name:	
QR2-2700/QSSC-680/QME-2200/QSSC-680MB	
Product Board ID: SATA SKU with PCIE/X slot	
Board Serial Number: QTFMOV74600018	←→ Select Screen
BMC Firmware Version: 00 00.23	↑ ↓ Select Item
Processor	+ - Change Option
Intel(R) Xeon(R) CPU X5482 @ 3.20 GHz	Tab Select Field
Speed: 3200 MHz	F1 General Help
Count: 2	F10 Save and Exit
	ESC Exit
System Memory	
Size: 512 MB	
System Time [17:40:55]	
System Date [Mon 01/21/2008	
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AMIBIOS

Version: displays the BIOS version. Check this version number when updating BIOS from the manufacturer.

Build Date: displays the date the BIOS was created.

Product Name: displays the product name.

Product Board ID: displays the SKU type.

Board Serial Number: displays the mainboard serial number.

Processor

Type: displays the type of CPU installed on the mainboard.

Speed: displays the maximum speed of the CPU.

Counter: displays the number of installed processors.

System Memory

Size: displays how much memory (DRAM) is installed on the mainboard.

System Time: scroll to this item to adjust the time.

System Date: scroll to this item to adjust the date.

Advanced Menu

This option displays a table of items that define advanced information about your system.

WARNING!
Making incorrect settings to items on these pages may cause the system to malfunction. Unless you have experience adjusting these items, we recommend that you leave these settings at the default values. If making settings to items on these pages causes your system to malfunction or prevents the system from booting, open BIOS and choose **Load Optimal Defaults** in the **Exit** menu to boot up normally.

BIOS SETUP UTILITY
Main **Advanced** Boot Server Security Exit

Advanced Settings ――――――――――――――――――― **Warning: Setting wrong values in below sections may cause system to malfunction.** ► **CPU Configuration** ► **ACPI Configuration** ► **IDE Configuration** ► **Super IO Configuration** ► **USB Configuration** ► **PCI Configuration** ► **MPS Configuration** **Branch 0 Specific Sparing** [Disabled] **Branch 1 Specific Sparing** [Disabled]	**Configure the CPU.** ←→ **Select Screen** ↑ ↓ **Select Item** Enter **Go to Sub Screen** F1 **General Help** F10 **Save and Exit** ESC **Exit**
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The mark '►' denotes a sub menu. Scroll to the item and press ENTER to access the respective sub menu.

CPU Configuration

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY

Advanced

Configure advanced CPU settings
_____

Intel(R) Xeon(R) CPU X5482 @ 3.20 GHz
Frequency: 3.20 GHz
FSB Speed: 1600 MHz

CPU1
CPUID: 10676
Cache L1:   128 KB
Cache L2:   12288 KB

CPU2
CPUID: 10676
Cache L1:   128 KB
Cache L2:   12288 KB

Ratio Status: Unlocked (Min:06, Max:08)
Ratio Active Value: 7

Hardware Prefetcher:	[Enabled]
Adjacent Cache Line Prefetch:	[Enabled]
Max CPUID Value Limit	[Disabled]
Intel(R) Virtualization Tech:	[Enabled]
Execute Disable Bit Capability:	[Enabled]
PECI:	[Enabled]
Core Multi-Processing:	[Enabled]
Intel(R) Speedstep(tm) tech.	[Enabled]

This should be enabled in order to enable or disable the Hardware Prefetcher Disable Feature.

←→   Select Screen
↑ ↓   Select Item
+ -   Change Option
F1   General Help
F10   Save and Exit
ESC   Exit

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Manufacturer: displays the CPU manufacturer.

Frequency: shows the rated processing speed of the CPU.

FSB Speed: displays the data transfer speed of the front side bus.

CPU 1/CPU2:

   CPUID: displays the CPU ID

   Cache L1: speed rating of the internal (L1) cache.

   Cache L2: speed rating of the external (L2) cache.

Ratio status: displays the running ratio of the CPU for higher FSB turning. Always **Locked**.

Ratio Active Value: core frequency to the FSB multiplier. Always **Maximum**.

ACPI Configuration

Scroll to this item and press **Enter** to view the following screen:

BIOS SETUP UTILITY	
Advanced	
Advanced ACPI Configuration	Enable RSDP pointers to 64 bit Fixed System Description Tables. Different ACPI version has some additions.
ACPI Version Features [ACPI v2.0]	
	←→ Select Screen ↑ ↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
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IDE Configuration

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Advanced	
IDE Configuration	**Options**
	Disabled
ATA/IDE Configuration [Enhanced]	Compatible
Configure SATA as [IDE]	Enhanced
► **Primary IDE Master** [Not Detected]	
► **Primary IDE Slave** [Not Detected]	
► **Secondary IDE Master** [Not Detected]	
► **Secondary IDE Slave** [Not Detected]	
► **Third IDE Master** [Hard Disk]	
► **Third IDE Slave** [Not Detected]	←→ **Select Screen**
	↑ ↓ **Select Item**
Hard Disk Write Protect [Disabled]	+ - **Change Option**
IDE Detect Time Out (Sec) [35]	F1 **General Help**
ATA (PI) 80 Pin Cable Detection [Host & Device]	F10 **Save and Exit**
	ESC **Exit**
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IDE Configuration: enables you to configure IDE devices such as hard disk or CD-ROM drives.

Note:

- **Primary/Secondary IDE Master/Slave:** There are two IDE channels (Primary and Secondary) and each channel can be installed with one or two devices (Master and Slave). Use these items to configure each device on the IDE channel.
- **Hard Disk Write Protect:** when enabled, writes to the HDD are not permitted.
- **IDE Detect Time Out (Sec):** maximum time spent auto detecting connected IDE peripherals

Select Primary, Secondary or Third to configure each device on the IDE channel. The following example shows Third IDE channel configuration.

Third IDE Master

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Advanced	

Third IDE Master			Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already Formatted with LBA Mode disabled.
Device	:	Hard Disk	
Vendor	:	ST320410A	
Size	:	20.0 GB	
LBA Mode	:	Supported	
Block Mode	:	16Sectors	
PIO Mode	:	4	
Async Mode	:	MultiWord DMA2	
Ultra DMA	:	Ultra DMA2	
S.M.A.R.T.		Supported	

		←→ Select Screen
Type	[Auto]	↑↓ Select Item
LBA/Large Mode	[Auto]	+ - Change Option
Block (Multi-Sector Transfer)	[Auto]	F1 General Help
PIO Mode	[Auto]	F10 Save and Exit
DMA Mode	[Auto]	ESC Exit
S.M.A.R.T.	[Auto]	
32Bit Data Transfer	[Enabled]	

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Third IDE Master: displays information about the hard disk that is installed as a primary IDE device on the system. The following information is displayed:

- **Device:** type of IDE device installed
- **Vendor:** manufacturer of IDE device
- **Size:** capacity of IDE device
- **LBA Mode:** displays whether LBA mode is supported or not (set below)
- **Block Mode:** displays the number of sectors in a block (set below)
- **PIO Mode:** displays the PIO mode setting (set below)
- **Async Mode:** displays the asynchronous mode settings for the DMA channel.
- **Ultra DMA:** displays the Ultra DMA mode setting (set below)
- **S.M.A.R.T.:** displays whether S.M.A.R.T mode is supported or not (set below)

LBA/Large Mode: enables you to set the Logical Block Addressing mode. Select Auto to let BIOS automatically detect the LBA mode. LBA mode is used to support IDE devices with capacities greater than 504 MB.

Block (Multi-Sector Transfer): enable this field if your IDE hard drive supports block mode. Block mode enables BIOS to automatically detect the optimal number of block read and writes per sector that the drive can support and improves the access speed to IDE devices.

PIO Mode: each IDE channel supports a master device and a slave device. This item lets you assign the kind of PIO (Programmed Input/Output) used by the IDE device. Choose Auto to let the system auto detect which PIO mode is best, or select a PIO mode from 0-4.

DMA Mode: each IDE channel supports a master device and a slave device. This mainboard supports UltraDMA technology, which provides faster access to IDE devices. If you install a device that supports UltraDMA, change the appropriate item on this list to Auto.

S.M.A.R.T: the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) system is a diagnostics technology that monitors and predicts device performance. S.M.A.R.T. software resides on both the disk drive and the host computer.

The disk drive software monitors the internal performance of the motors, media, heads, and electronics of the drive. The host software monitors the overall reliability status of the drive. If a device failure is predicted, the host software, through the Client WORKS S.M.A.R.T applet, warns the user of the impending condition and advises appropriate action to protect the data.

32-Bit Data Transfer: enables and disables 32-bit data transfer. Enable this only if your IDE documentation says that the device supports 32-bit data transfer.

Third IDE Slave

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Advanced	
Third IDE Slave ──────────────────────────────── Device : Not Detected **LBA/Large Mode** [Auto] **Block (Multi-Sector Transfer)** [Auto] **PIO Mode** [Auto] **DMA Mode** [Auto] **S.M.A.R.T.** [Auto] **32Bit Data Transfer** [Disabled]	**Disabled: Disables LBA Mode.** **Auto: Enables LBA Mode if the device supports it and the device is not already Formatted with LBA Mode disabled.** ←→ Select Screen ↑ ↓ Select Item + - Change Option F1 General Help F10 Save and Exit ESC Exit
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Device: displays the type of device assigned to this channel.

LBA/Large Mode: enables LBA access mode.

- Disabled: LBA access mode is disabled
- Auto: LBA is set to optimal or default mode if the device supports it and is not formatted with LBA mode disabled.

Block (Multi-Sector Transfer): enables multi-sector transfer block mode.

- Disabled: data transfer from and to the device occurs one sector at a time
- Auto: data transfer from and to the device occurs multiple sectors at a time if supported by the device

PIO Mode: select the device PIO (Programmed Input/Output) mode, which determines the data transfer mode used by IDE drives. PIO mode uses the CPU's registers for data transfer.

- Auto: automatically detects optimal or default PIO mode
- 0 ~ 4: select PIO mode 0 to 4

DMA Mode: select the devices DMA (Direct Memory Access) mode which transfers data from channel to channel without using the CPU, resulting in faster data transfer then when the CPU is used for every byte of transfer.

- Auto: automatically detects optimal or default DMA mode
- SWDMA0 ~ SWDMA2: select SingleWord DMA 0 to 2
- MWDMA0 ~ MWDMA2: select MultiWord DMA 0 to 2
- UDMA 0 ~ UDMA5: select Ultra DMA 0 to 5

S.M.A.R.T.: (Self Monitoring Analysis and Reporting Technology) reports drive degradation to the operating system to warn you of potential failure.

- Auto: automatically sets optimal or default S.M.A.R.T. mode

- Disabled: disables S.M.A.R.T.
- Enabled: enables S.M.A.R.T.

32Bit Data Transfer: enables 32-bit data transfer for improved performance.

Super IO Configuration

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Advanced	
Configure Nat42x Super IO Chipset _____ **Serial Port1 Address** [3F8/IRQ4] **Serial Port2 Address** [2F8/IRQ3]	**Allows BIOS to Select Serial Port1 Base Addresses** ⟷ Select Screen ↑ ↓ Select Item + - Change Option F1 General Help F10 Save and Exit ESC Exit
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Super I/O Configuration: enables you to configure the onboard serial ports.

Serial Port 1 Address: This option is used to assign or disable the I/O address and IRQ for the onboard Serial Port 1.
Default is 3F8/IRQ4

Serial Port 2 Address: This option is used to assign or disable the I/O address and IRQ for the onboard Serial Port 2.
Default is 2F8/IRQ3.

USB Configuration

Scroll to this item and press <Enter> to view the following screen:

```
                          BIOS SETUP UTILITY
   Advanced

   USB Configuration                              Enables support for
   _____   legacy USB. AUTO
                                                  option disables
   Module Version – 2.24.3-13.4                   legacy support if
                                                  no USB devices are
   USB Devices Enabled:                           connected.
      1 Keyboard, 1 Mouse

   Legacy USB Support              [Enabled]
   Port 64/60 Emulation            [Disabled]
   USB Functions                   [8 USB Ports]
   USB 2.0 Controller              [Enabled]

                                                 ←→    Select Screen
                                                 ↑ ↓   Select Item
                                                 + -   Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit


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```

USB Devices Enabled: displays USB devices currently detected.

Legacy USB Support: enables support for legacy USB devices. Select Auto to disable legacy support if no USB devices are connected.

Port 64/60 Emulation: Enable and disable USB keyboard legacy support for non-USB aware operating systems.

USB Functions: enables and disables USB host controllers.

USB 2.0 Controller Mode: configures the USB 2.0 controller in HiSpeed (480Mbps) or FullSpeed (12Mbps).

PCI Configuration

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Advanced	
PCI Configuration	**Enable or Disable LAN Controller 0.**
────────────────────────────────────	
LAN Controller 0 [Enabled]	
LAN0 OptionROM [Enabled]	
LAN Controller 1 [Enabled]	
LAN1 OptionROM [Enabled]	
LSI SAS 1068E [Enabled]	←→ Select Screen ↑ ↓ Select Item + - Change Option F1 General Help F10 Save and Exit ESC Exit
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Note:
Default values shown.

Standard PCI Option ROM space is only 128KB. BIOS displays the following warn-ing message: **Not enough Space to copy PCI Option ROM during POST** if the system total option size is over the 128K limitation.

Initial requirements for certain add-on cards and onboard devices that call option ROM, such as NIC Option ROM, may need to have the function disabled to allocate sufficient space.

LAN Controller 0

Select LAN0 mode from Enabled or Disabled.

LAN Controller 1

Select LAN1 mode from Enabled or Disabled.

LSI-SAS

Select LSI-SAS mode from Enabled or Disabled. This item is only displayed on SAS SKUs.

MPS Configuration

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Advanced	
MPS Configuration	**Select MPS Revision**
MPS Revision **[1.4]**	
	←→ **Select Screen**
	↑ ↓ **Select Item**
	+ - **Change Option**
	F1 **General Help**
	F10 **Save and Exit**
	ESC **Exit**
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Boot Menu

This page enables you to configure power management. Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY					
Main	Advanced	**Boot**	Server	Security	Exit

Boot Settings
_____

► **Boot Setting Configuration**

► **Boot Device Priority**
► **Hard Disk Drives**
► **Network Drives**

Configure Settings
during System Boot.

←→ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit

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Boot Settings Configuration

Select this item and press Enter to view the following submenu items:

BIOS SETUP UTILITY	
Boot	
Boot Settings Configuration _____	Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
Quick Boot [Enabled] Quiet Boot [Disabled] Addon ROM Display Mode [Force BIOS] Bootup Num-Lock [On] Wait For 'F1' If Error [Enabled] Hit 'DEL' Message Display [Enabled] Interrupt 19 Capture [Enabled]	←→ Select Screen ↑↓ Select Item + - Change Option F1 General Help F10 Save and Exit ESC Exit
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Select the priority and order of the devices that your system searches for an operating system at start-up time.

- **Quick Boot**: If enabled (default), this item skips some POST routines to speed up boot time.

- **Quiet Boot**: If disabled (default), the results of the POST are displayed (enabled causes a logo screen to appear instead).

- **AddOn ROM Display Mode:** Display mode controlled by BIOS or addon ROM.

- **Boot Up Num lock**: If on (default), the Num Lock key is activated at start up.

- **Wait For 'F1' If Error**: Wait for the user to press the F1 key if an error occurs during POST. Default is Enabled.

- **Hit 'DEL' Message Display**: Enable this item to have the system prompt you to press 'DEL' to enter the BIOS Setup Utility.

- **Interrupt 19 Capture**: If enabled (default) the system allows ROM to trap interrupt 19 events.

Boot device Priority

Press <Enter> and select the order in which the various bootable devices load. The system will prioritize the devices it looks for during boot up.

BIOS SETUP UTILITY	
Boot	
Boot Device Priority	Specifies the boot sequence from the available devices.
1st Boot Device [HDD:3M-ST320410A] **2nd Boot Device** [Network:IBA GB Slo]	A device enclosed in parenthesis has been disabled in the corresponding type menu.
	←→ Select Screen ↑↓ Select Item + - Change Option F1 General Help F10 Save and Exit ESC Exit
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Network Drives

BIOS SETUP UTILITY	
Boot	
Network Drives	Specifies the boot sequence from the available devices.
1st Drive [Network:IBA GE Slo] **2nd Drive** [Network:IBA GB Slo]	←→ Select Screen ↑↓ Select Item + - Change Option F1 General Help F10 Save and Exit ESC Exit
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Server Menu

This page enables you to configure Server parameters. Scroll to this item and press **Enter** to view the following screen:

BIOS SETUP UTILITY					
Main	Advanced	Boot	Server	Security	Exit

Server Configuration ‾‾‾	Enable or Disable ECC Event Logging
Status of BMC: Working IPMI Specification Version: 2.0 BMC Firmware Version: 00 00.23	
NIC1 MAC Address [00-1B-24-BD-F8-31] NIC2 MAC Address [00-1C-34-DF-F9-56]	
►Set AST2000 LAN Configuration ►Remote Access Configuration	
Restore on AC Power Loss [Last State]	
Event Control Interface -- View BMC System Event Log Clear BMC System Event Log	←→ Select Screen ↑ ↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
BIOS Event Logging [Enabled] ECC Event Logging [Enabled] PCI Error Logging [Enabled] NB FSB Error Logging [Enabled] NB Internal Error Logging [Enabled] NMI on Error [Fatal]	

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Set AST2000 LAN Configuration

These pages enable you to configure AST2000 LAN parameters. Scroll to this item and press **Enter** to view the following screen:

BIOS SETUP UTILITY

Main Advanced Boot Server Security Exit	
LAN Configuration ────────────────────────────────	**Enter for IP Address Configuration.**
Channel Number [01] **Channel Number Status:** Channel number is OK ▶ **IP Address** ▶ **MAC Address** ▶ **Subnet Mask** ▶ **Gateway Address**	←→ **Select Screen** ↑↓ **Select Item** **Enter Go to Sub Screen** **F1 General Help** **F10 Save and Exit** **ESC Exit**
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Set IP Address

Scroll to this item and press **Enter** to view the following screen:

```
┌──────────────────────────────────────────────────────────────────────────┐
│                          BIOS SETUP UTILITY                                │
├──────────────────────────────────────────────────────────────────────────┤
│     Main   Advanced   Boot   Server   Security   Exit                      │
├────────────────────────────────────────────┬─────────────────────────────┤
│                                             │ Select IP Mode on BMC.      │
│  IP Address Configuration                   │ Save and exit to work       │
│  ─────────────────────────────────────────  │ at the next boot.           │
│                                             │                             │
│  Parameter Selector           [03]          │                             │
│  IP Address Mode              [Static]      │                             │
│  IP Address                   [192.168.077.087]                           │
│  Current IP address in BMC    192.168.077.087                             │
│                                             │                             │
│                                             │                             │
│                                             │ ←——→   Select Screen        │
│                                             │ ↑ ↓    Select Item          │
│                                             │ + -    Change Option        │
│                                             │ F1     General Help         │
│                                             │ F10    Save and Exit        │
│                                             │ ESC    Exit                 │
│                                             │                             │
├─────────────────────────────────────────────────────────────────────────┤
│        V02.61 © Copyright 1985-2006, American Megatrends Inc.             │
└──────────────────────────────────────────────────────────────────────────┘
```
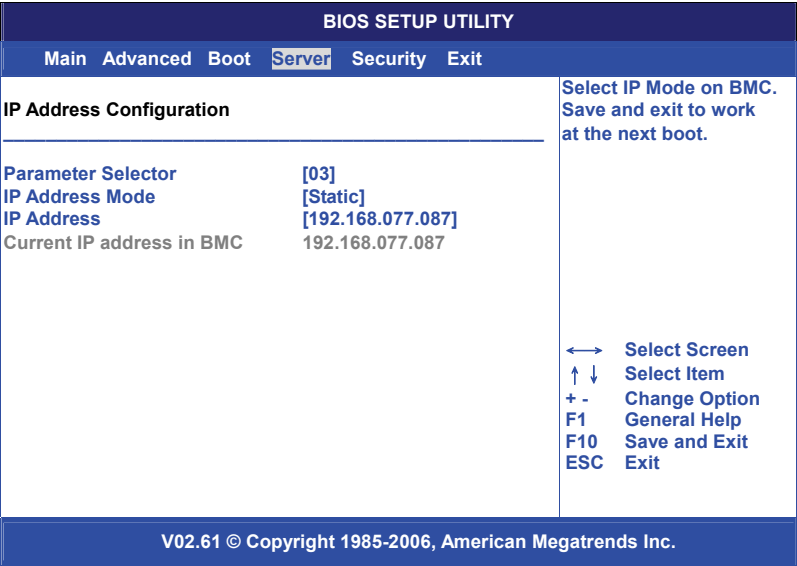
IP Address Mode

Select server IP Address Mode: Static IP Address or Dynamic Host Configuration Protocol (DHCP).

> **Note:**
> Current IP address in BMC is dynamic and may change with configuration changes.

Set MAC Address

Scroll to this item and press **Enter** to view the following screen:

BIOS SETUP UTILITY	
Main Advanced Boot Server Security Exit	
MAC Address Configuration ─────────────────────────────── **Parameter Selector** [05] **Current MAC address in BMC:** xx-xx-xx-xx-xx-xx	←→ **Select Screen** ↑ ↓ **Select Item** F1 **General Help** F10 **Save and Exit** ESC **Exit**
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Note:
Current MAC address in BMC is dynamic and may change with configuration changes.

Set Subnet Mask

Scroll to this item and press **Enter** to view the following screen:

```
                    BIOS SETUP UTILITY
     Main   Advanced   Boot   Server   Security   Exit
                                             Enter Subnet Mask in
 Subnet Mask Configuration                   decimal in the form of
 _____   XXX.XXX.XXX.XXX
                                             (XXX less than 256
 Parameter Selector          [06]            and decimal only)
 Subnet Mask                 [255.255.255.000]
 Current Subnet Mask in BMC: 255.255.255.000


                                             ←——→   Select Screen
                                             ↑ ↓    Select Item
                                             F1     General Help
                                             F10    Save and Exit
                                             ESC    Exit



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```

Note:
Current Subnet Mask in BMC is dynamic and may change with configuration changes.

Set Gateway Configuration

Scroll to this item and press **Enter** to view the following screen:

```
                        BIOS SETUP UTILITY
     Main   Advanced   Boot   Server   Security   Exit

                                              Enter Gateway Address
  GateWay Configuration                       in decimal in the form
  _____        of XXX.XXX.XXX.XXX
                                              (XXX less than 256
  Parameter Selector        [0C]              and decimal only)
  GateWay Address           [192.168.077.001]
  Current Gateway in BMC:   192.168.077.001


                                              ←→    Select Screen
                                              ↑ ↓   Select Item
                                              F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit



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```

Note:
Current Gateway address in BMC is dynamic and may change with configuration changes.

Remote Access Configuration

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Server	
Configure Remote Access type and parameters	**Select Remote Access type.**
Remote Access [Enabled]	
Serial port number [COM1]	
Base Address, IRQ [3F8h,4]	
Serial Port Mode [115200 8,n,1]	
Flow Control [None]	⟷ **Select Screen**
Redirection After BIOS POST [Always]	↑ ↓ **Select Item**
Terminal Type [ANSI]	+ - **Change Option**
	F1 **General Help**
	F10 **Save and Exit**
	ESC **Exit**
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Remote Access: this item enables/disables serial port remote access.

Serial port number: select the serial port number.

Base Address IRQ: select base address IRQ.

Serial Port Mode: Select serial port settings.

Flow Control: options are None (default), Hardware, or Software.

Redirection After BIOS POST: options are Always (default), Boot Loader, or Always.

Terminal Type: options are ANSI (default), VT100, or VT-UFT8.

Security Menu

This page enables you to set the security parameters. Scroll to this item and press <Enter> to view the following screen:

```
                        BIOS SETUP UTILITY
    Main   Advanced   Boot   Server   Security   Exit

  Security Settings                                  Install or Change the
  _____       password.

    Supervisor Password :        Not Installed
    User Password        :        Not Installed

    Change Supervisor Password
    Change User Password

    Boot Sector Virus Protection      [Disabled]     ←→    Select Screen
                                                     ↑ ↓   Select Item
                                                     Enter  Change
                                                     F1     General Help
                                                     F10    Save and Exit
                                                     ESC    Exit



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```

Supervisor Password: displays whether the supervisor password is installed or not.

User Password: displays whether the user password is installed or not.

Change Supervisor/User Password: you can install a Supervisor password, and if you install a supervisor password, you can then install a user password. A user password does not provide access to many of the features in the Setup utility.

If you highlight these items and press **Enter**, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press **Enter** after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press **Enter** after you have retyped it correctly. The password is required at boot time, or when the user enters the Setup utility.

Boot Sector Virus Protection: Enable and disable Boot sector protection

Exit Menu

Scroll to this item and press <Enter> to view the following screen:

BIOS SETUP UTILITY	
Main Advanced Boot Server Security Exit	
Exit Options	**Exit system setup After saving the changes.**
Save Changes and Exit	**F10 key can be used for this operation.**
Discard Changes and Exit	
Discard Changes	
Load Optimal Defaults	
Load Failsafe Defaults	
	⟷ **Select Screen**
	↑↓ **Select Item**
	Enter Go to Sub Screen
	F1 General Help
	F10 Save and Exit
	ESC Exit
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Save Changes and Exit: Highlight this item and press Enter to save any changes that you have made in the Setup utility and exit the Setup utility. When the Save Settings and Exit dialog box appears, press Y to save the changes and exit, or press N to return to the setup main menu.

Discard Changes and Exit: Highlight this item and press **Enter** to discard any changes that you have made in the Setup utility and exit the Setup utility. When the Exit Without Saving dialog box appears, press **Y** to discard changes and exit, or press **N** to return to the setup main menu.

Discard Changes: select this item and press <Enter> to discard any changes you have made without leaving the setup utility.

Load Optimal Defaults: if you highlight this item and press **Enter**, a dialog box asks if you want to install optimal settings for all the items in the Setup utility. Press the **Y** key to indicate Yes, and then press **Enter** to install the optimal settings.

The optimal settings default values are quite demanding and your system might not function properly if you are using slower memory chips or other kinds of low-performance components.

Load Failsafe Defaults: If you highlight this item and press **Enter**, a dialog box asks if you want to install fail-safe settings for all the items in the Setup utility. Press the **Y** key to indicate Yes, and then press **Enter** to install the fail-safe settings.

The fail-safe settings default values are not demanding so a system should be able to operate with the fails safe settings even if it is installed with slower memory chips or other kinds of low-performance components.

BIOS Check Point and Beep Code List

Definition of Beep Codes

Beep codes are used by the BIOS to indicate a serious or fatal error to the end user. Beep codes are used when an error occurs before the system video has been initialized. Beep Codes are generated by the system board speaker, commonly referred to as the PC speaker.

Beeps	Error message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	Parity error in the first 64 KB of memory.
3	Base 64 KB Memory Failure	Memory failure in first 64 KB.
4	Timer Not Operational	Memory failure in the first 64 KB of memory or Timer 1 on the M/B is not functioning.
5	Processor error	The CPU (Central Processing unit) on the M/B generated an error.
6	8042-Gate A20 Failure	The keyboard controller (8042) may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in the BIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.
11	Cache Error/External Cache Bad	The external cache is faulty.

Troubleshooting BIOS Beep Codes

Number of Beeps	Troubleshooting Action
1, 2 or 3	Reseat the memory, or replace with known good modules.
4-7, 9-11	Fatal error indicating a serious problem with the system.
	Before replacing the motherboard, eliminate the possibility of interference by a malfunctioning add-in card. Remove all expansion cards.
	If the beep codes are generated even when all other expansion cards are absent, the motherboard has a serious problem.
	If the beep codes are not generated when all other expansion cards are absent, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem happens again. This procedure will reveal the malfunctioning add-in card.
8	If the system video adapter is an integrated part of the system board like S52D, the board may be faulty.

Checkpoints and Beep Codes

A checkpoint is either a byte or word value output to I/O port 80h. The BIOS outputs checkpoints throughout bootblock and Power-On Self Test (POST) to indicate the task the system is currently executing. Checkpoints are very useful in aiding software developers or technicians in debugging problems that occur during the pre-boot process.

Beep codes are used by the BIOS to indicate a serious or fatal error to the end user. Beep codes are used when an error occurs before the system video has been initialized. Beep codes are generated by the system board speaker, commonly referred to as the PC speaker.

Bootblock Initialization Code Checkpoints

The Bootblock initialization code sets up the chipset, memory and other components before system memory is available. The following table describes the type of checkpoints that may occur during the bootblock initialization portion of the BIOS:

Checkpoint	Description
Before D1	Early chipset initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled.
D0	Perform keyboard controller BAT test. Confirm waking up from power management suspend state. Save power-on CPUID value in scratch CMOS. Enable I/O devices
D1	Go to flat mode with 4GB limit and GA20 enabled. Verify the bootblock checksum. Initial CPU at power on
D2	Disable CACHE before memory detection. Execute full memory sizing module. Verify that flat mode is enabled. Verify the bootblock checksum.
D3	If the memory-sizing module did not execute, start memory refresh and do memory sizing in Bootblock code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled. Disable cache prior to memory detection, and then do memory sizing.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0. See the Bootblock Recovery Code Checkpoints section of this documentation for more information.
D7	Restore CPUID value in register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determines whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copy Main BIOS into memory. Leaves all RAM below 1MB Read-Write (including E000 and F000 shadow areas) but closing SMRAM.
DA	Restore CPUID value in register. Give control to BIOS POST (ExecutePOSTKernel). See the POST Code Checkpoints section of this document for more information.

Bootblock Recovery Code Checkpoints

The Bootblock recovery code gets control when the BIOS determines that a BIOS recovery needs to occur because the user has forced the update or the BIOS checksum is corrupt. The following table describes the type of checkpoints that may occur during the Bootblock recovery portion of the BIOS:

Checkpoint	Description
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. The 8259 interrupt controller is initialized. L1 cache is enabled.
E9	Set up floppy controller and data. Attempt to read from floppy.
EA	Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
E9 or EA	Determine information about root directory of recovery media.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.

Checkpoint	Description
FB	Make flash write enabled as specified by the chipset and OEM. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Run-time data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start -- Disable Cache - Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.

Checkpoint	Description
38	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect if different devices (parallel ports, serial ports, CPU coprocessor, etc.) has successfully installed on the system and update the BDA, EBDA, etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested.
8C	Late POST initialization of chipset registers.
8D	Build APM tables (if APM is supported)
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at 'config' display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. De-initializes the ADM module.
AB	Prepare BBS for Int.19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for APM.
00	Passes control to OS Loader (typically INT19h).

DIM Code Checkpoints

The Device Initialization Manager module gets control at various times during BIOS POST to initialize different BUSes. The following table describes the main checkpoints where the DIM module is accessed:

Checkpoint	Description
2A	Initialize different buses and perform the following functions: Reset, Detect, and Disable (function 0); Static Device Initialization (function 1); Boot Output Device Initialization (function 2). Function 0 disables all device nodes, PCI devices, and PnP ISA cards. It also assigns PCI bus numbers. Function 1 initializes all static devices that include manual configured onboard peripherals; memory and I/O decode windows in PCI-PCI bridges, and noncompliant PCI devices. Static resources are also reserved. Function 2 searches for and initializes any PnP, PCI, or AGP video devices.
38	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 configures all onboard peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.

While control is in the different functions, additional checkpoints are output to port 80h as a word value to identify the routines under execution. The low byte value indicates the main POST Code Checkpoint. The high byte is divided into two nibbles and contains two fields. The details of the high byte of these checkpoints are as follows:

HIGH BYTE XY

The upper nibble 'X' indicates the function number that is being executed. 'X' can be from 0 to 7.

0 = func#0, disable all devices on the BUS concerned.

1 = func#1, static devices initialization on the BUS concerned.

2 = func#2, output device initialization on the BUS concerned.

3 = func#3, input device initialization on the BUS concerned.

4 = func#4, IPL device initialization on the BUS concerned.

5 = func#5, general device initialization on the BUS concerned.

6 = func#6, error reporting for the BUS concerned.

7 = func#7, add-on ROM initialization for all BUSes.

8 = func#8, BBS ROM initialization for all BUSes.

The lower nibble 'Y' indicates the BUS on which the different routines are being executed. 'Y' can be from 0 to 5.

0 = Generic DIM (Device Initialization Manager).

1 = On-board System devices.

2 = ISA devices.

3 = EISA devices.

4 = ISA PnP devices.

5 = PCI devices.

APM Runtime Checkpoints

APM checkpoints are displayed when an APM capable operating system either enters or leaves a sleep state. The following table describes the type of checkpoints that may occur during APM sleep or wake events:

Checkpoint	Description
AC	First ASL check point. Indicates the system is running in PIC mode.
AA	System is running in APIC mode.
01, 02, 03, 04, 05	Entering sleep state S1, S2, S3, S4, or S5.
10, 20, 30, 40, 50	Waking from sleep state S1, S2, S3, S4, or S5.

Beep Codes

The following table describes the beep codes that are used by AMIBIOS:

Number of Beeps	Description
1	Memory refresh timer error.
2	Parity error
3	Main memory read / write test error.
4	Motherboard timer not operational
5	Processor error
6	Keyboard controller BAT test error.
7	General exception error.
8	Display memory error.
9	ROM checksum error
10	CMOS shutdown register read/write error
11	Cache memory bad

Troubleshooting BIOS Beep Codes

The following table describes the beep codes used for troubleshooting:

Number of Beeps	Troubleshooting Action
1, 2 or 3	Reseat the memory, or replace with known good modules.
4-7, 9-11	Fatal error indicating a serious problem with the system. Consult your system manufacturer.
	Before declaring the motherboard beyond all hope, eliminate the possibility of interference by a malfunctioning add-in card. Remove all expansion cards except the video adapter.
	If the beep codes are generated even when all other expansion cards are absent, the motherboard has a serious problem. Consult your system manufacturer.
	If the beep codes are not generated when all other expansion cards are absent, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem happens again. This will reveal the malfunctioning add-in card.
8	If the system video adapter is an add-in card, replace or reseat the video adapter. If the video adapter is an integrated part of the system board, the board may be faulty.

Error Message Descriptions

Memory

Message Displayed	Description
Gate20 Error	The BIOS is unable to properly control the motherboard's Gate A20 function, which controls access of memory over 1 MB. This may indicate a problem with the mother-board.
Multi-Bit ECC Error	This message will only occur on systems using ECC enabled memory modules. ECC memory has the ability to correct single-bit errors that may occur from faulty memory modules. A multiple bit corruption of memory has occurred, and the ECC memory algorithm cannot correct it. This may indicate a defective memory module.
Parity Error	Fatal Memory Parity Error. System halts after displaying this message.

Boot

Message Displayed	Description
Boot Failure ...	This is a generic message indicating the BIOS could not boot from a particular device. This message is usually followed by other information concerning the device.
Invalid Boot Diskette	A diskette was found in the drive, but it is not configured as a bootable diskette.
Drive Not Ready	The BIOS was unable to access the drive because it indicated it was not ready for data transfer. This is often reported by drives when no media is present.
A: Drive Error	The BIOS attempted to configure the A: drive during POST, but was unable to properly configure the device. This may be due to a bad cable or faulty diskette drive.
Insert BOOT diskette in A:	The BIOS attempted to boot from the A: drive, but could not find a proper boot diskette.
Reboot and Select proper Boot device or Insert Boot Media in selected Boot device	BIOS could not find a bootable device in the system and/or removable media drive does not contain media.
NO ROM BASIC	This message occurs on some systems when no bootable device can be detected.

Storage Device

Message Displayed	Description
Primary Master Hard Disk Error	The IDE/ATAPI device configured as Primary Master could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
Primary Slave Hard Disk Error	The IDE/ATAPI device configured as Primary Slave could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
Secondary Master Hard Disk Error	The IDE/ATAPI device configured as Secondary Master could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
Secondary Slave Hard Disk Error	The IDE/ATAPI device configured as Secondary Slave could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
Primary Master Drive ATAPI Incompatible	The IDE/ATAPI device configured as Primary Master failed an ATAPI compatibility test. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
Primary Slave Drive ATAPI Incompatible	The IDE/ATAPI device configured as Primary Slave failed an ATAPI compatibility test. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
Secondary Master Drive ATAPI Incompatible	The IDE/ATAPI device configured as Secondary Master failed an ATAPI compatibility test. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
Secondary Slave Drive ATAPI Incompatible	The IDE/ATAPI device configured as Secondary Slave failed an ATAPI compatibility test. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
S.M.A.R.T. Capable but Command Failed	The BIOS tried to send a S.M.A.R.T. message to a hard disk, but the command transaction failed. This message can be reported by an ATAPI device using the S.M.A.R.T. error reporting standard. S.M.A.R.T. failure messages may indicate the need to replace the hard disk.
S.M.A.R.T. Command Failed	The BIOS tried to send a S.M.A.R.T. message to a hard disk, but the command transaction failed. This message can be reported by an ATAPI device using the S.M.A.R.T. error reporting standard. S.M.A.R.T. failure messages may indicate the need to replace the hard disk.
S.M.A.R.T. Status BAD, Backup and Replace	A S.M.A.R.T. capable hard disk sends this message when it detects an imminent failure. This message can be reported by an ATAPI device using the S.M.A.R.T. error reporting standard. S.M.A.R.T. failure messages may indicate the need to replace the hard disk.
S.M.A.R.T. Capable and Status BAD	A S.M.A.R.T. capable hard disk sends this message when it detects an imminent failure. This message can be reported by an ATAPI device using the S.M.A.R.T. error reporting standard. S.M.A.R.T. failure messages may indicate the need to replace the hard disk.

Virus Related

Message Displayed	Description
Boot Sector Write!!	The BIOS has detected software attempting to write to a drive's boot sector. This is flagged as possible virus activity. This message will only be displayed if Virus Detection is enabled in AMIBIOS setup.
VIRUS: Continue (Y/N)?	If the BIOS detects possible virus activity, it will prompt the user. This message will only be displayed if Virus Detection is enabled in AMIBIOS setup.

System Configuration

Message Displayed	Description
DMA-2 Error	Error initializing secondary DMA controller. This is a fatal error, often indication a problem with system hardware.
DMA Controller Error	POST error while trying to initialize the DMA controller. This is a fatal error, often indication a problem with system hardware.
Checking NVRAM…Update Failed	BIOS could not write to the NVRAM block. This message appears when the FLASH part is write-protected or if there is no FLASH part (System uses a PROM or EPROM).
Microcode Error	BIOS could not find or load the CPU microcode Update to the CPU. This message only applies to INTEL CPUs. The message is most likely to appear when a brand new CPU is installed in a motherboard with an outdated BIOS. In this case, the BIOS must be updated to include the microcode Update for the new CPU.
NVRAM Checksum Bad, NVRAM Cleared	There was an error in while validating the NVRAM data. This causes POST to clear the NVRAM data.
Resource Conflict	More than one system device is trying to use the same non-shareable resources (Memory or I/O).
NVRAM Ignored	The NVRAM data used to store plug and play (PnP) data was not used for system configuration in POST.
NVRAM Bad	The NVRAM data used to store plug and play (PnP) data was not used for system configuration in POST due to a data error.
Static Resource Conflict	Two or more Static Devices are trying to use the same resource space (usually Memory or I/O).
PCI I/O conflict	A PCI adapter generated an I/O resource conflict when configured by BIOS POST.
PCI ROM conflict	A PCI adapter generated an I/O resource conflict when configured by BIOS POST.
PCI IRQ conflict	A PCI adapter generated an I/O resource conflict when configured by BIOS POST.
PCI IRQ routing table error	BIOS POST (DIM code) found a PCI device in the system but was unable to figure out how to route an IRQ to the device. Usually this error is causing by an incomplete description of the PCI Interrupt Routing of the system.
Timer Error	Indicates an error while programming the count register of channel 2 of the 8254 timer. This may indicate a problem with system hardware.
Interrupt Controller-1 error	BIOS POST could not initialize the Master Interrupt Controller. This may indicate a problem with system hardware.
Interrupt Controller-2 error	BIOS POST could not initialize the Slave Interrupt Controller. This may indicate a problem with system hardware.

CMOS

Message Displayed	Description
CMOS Date/Time Not Set	The CMOS Date and/or Time are invalid. This error can be re-solved by readjusting the system time in AMIBIOS Setup.
CMOS Settings Wrong	CMOS settings are invalid. This error can be resolved by using AMIBIOS Setup.
CMOS Checksum Bad	CMOS contents failed the Checksum check. Indicates that the CMOS data has been changed by a program other than the BIOS or that the CMOS is not retaining its data due to malfunction. This error can typically be resolved by using AMIBIOS Setup.

Miscellaneous

Message Displayed	Description
Keyboard Error	Keyboard is not present or the hardware is not responding when the keyboard controller is initialized.
Keyboard/Interface Error	Keyboard Controller failure. This may indicate a problem with system hardware.
System Halted	The system has been halted. A reset or power cycle is required to reboot the machine. This message appears after a fatal error has been detected.

This concludes the BIOS chapter. The following chapter explains Using the Web UI.

<div align="right">

Chapter 4
Using the Web UI

</div>

The AST2000 firmware features an embedded web server, enabling users to connect to the AST2000 using an Internet browser (Microsoft Internet Explorer) without needing to install KVM and Virtual Storage software on the remote console side PC.

The following web browsers are supported:

- Internet Explorer 6 and 7
- Mozilla 1.7.13 or later
- Firefox 1.5 or later

Note:
If BMC F/W recovery is required, short jumpers J1C2 and J2A1 enabling the MB to boot directly.

Setting the KVM TCP Port on Network

The AST2000 web user interface requires access to the system's TCP ports. Before using the web user interface, ensure that the firewall settings are configured to allow access to the following ports: 8890 (KVM), 9000 (Storage), 9001, 9002, and 9003.

Note:
For information on configuring firewall settings to allow TCP port access, refer to your firewall software user's guide.

Logging into the Web User Interface

Users must enter the AST2000 embedded server IP address or URL into the address bar of the web browser or connect using OEM customer's Embedded Server Management (ESM). The default IP address is https://192.168.1.87

When connecting to the AST2000 using a web browser, SSL is automatically activated and the display user login form is displayed prompting for the username and password. This authentication with SSL protection prevents unauthorized intruders such as hackers from gaining access to the AST2000 web server. If authentication is passed, the user can manage the server by privilege. At the same time, the PHP (PHP Hypertext Preprocessor) records all user information, including user ID and privilege.

The following figure displays the user authentication web page.
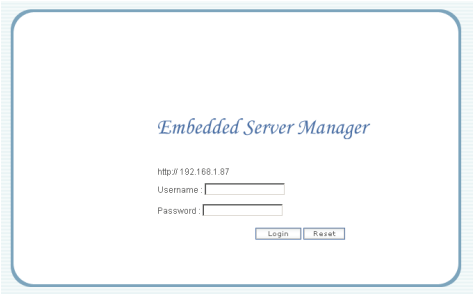
The default username is **root**. The default password is **changeme**.

After passing authentication, the following web page appears.

System Information

The System Information tab enables you to view the Version Information, enable session time-out and interval, and view Components options. Click the **System Information** tab to view the following web page.

Version

Click the **BMC version** tab to view BMC information including: the device ID, Device Revision, Firmware Revision, and IPMI Revision numbers.

Click the **Server Board version** tab to view Server Board information including: manufacturer, date, product name, P/N, and S/N.

Session Time-Out

1. Click the **Session Time-Out** tab.
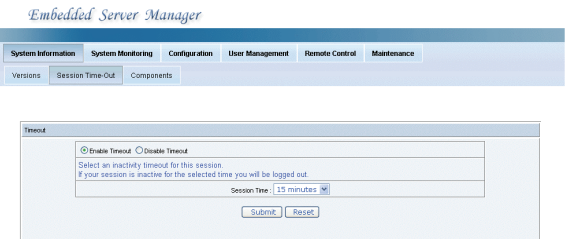
2. Click **Enable Timeout** and select a timeout value from the drop-down list, as seen in following image.

3. Click **Disable Timeout** to prevent the embedded web server from logging off.

4. Click **Submit** to save the changes
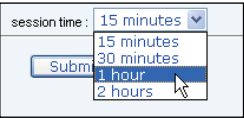
Components

Click the **Components** tab to view CPU and memory information.

CPU

Click the **CPU** tab to view the CPU model, speed, and number.

Memory

Click the **Memory** tab to view memory model, size, DIMM slot status, and slot location.

System Monitoring

The System Monitoring tab enables the administrator to view data about the system, including LED, system, fan, temperature and voltage status, and event logs. You can also enable server LED blinking on the Locator Indicator page to identify a particular server.

Click the **System Monitoring** tab to view the following web page.

Sensor Reading

The **Sensor Reading** tab provides information about system hardware such as the fan speed, internal temperature, and voltage.

Summary

Click the **Summary** tab to display a brief overview of system hardware status.

— Update

- **Fault LED Status:** indicates whether the fault LED on the server is on or off.

- **Power Status:** indicates whether the server system is powered on or off.

- **Fan Status:** indicates the health status of the CPU fans and SYS fans for CPUs and SYS that are installed.

- **Temperature Status:** indicates the status for such items as the baseboard and processor temperature, and thermal control.

- **Voltage Status:** indicates the voltage status for components such as the baseboard, processor Vcc, and CPUs installed.

Click **Update** to refresh the status information.

Chassis Intrusion

Displays Chassis open/close status.

Description	Chassis Intrusion
Status	closed

Fan

Click the **Fan** tab to view CPU and SYS fan information.

Temperature

Click the **Temperature** tab to view system component temperature information.

Note:
Click the hyperlinks as the top of the screen to view associated information.

<u>Voltage</u>

Click the **Voltage** tab to view system component voltage information.

Note:
Click the hyperlinks as the top of the screen to view associated information.

Event Logs

Click the **Event Logs** tab to view reports about system events.

<u>View Event Logs</u>

Click **View Event Logs** to view specific event information.

- **Severity:** indicates the nature of the event (unspecified, information, critical, etc.)
- **TimeStamp backward:** indicates the time and date the event occurred.
- **Description:** describes the event in more detail.

Save Event Logs

1. Click the **Save Event Logs** tab to view the following screen.
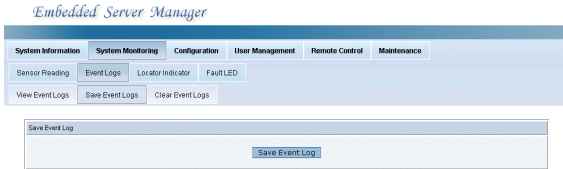
2. Click **Save Event Logs** to save the log to disk. You are prompted to save the event log text file to disk.
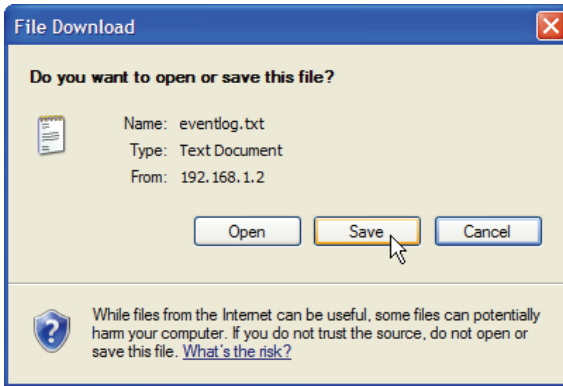
3. Click **Save** to save the log file to your hard drive.

Clear Event Logs

1. Click the **Clear Event Logs** tab to view the following screen.
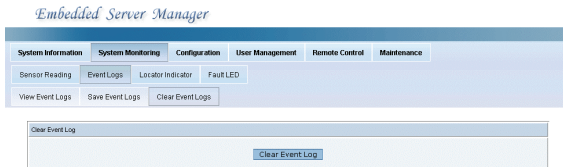
2. Click **Clear Event Log** to clear the current log. The following screen displays when the logs have been cleared.
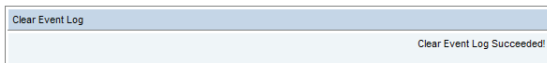
Locator Indicator

1. Click the **Locator Indicator** tab to view the following screen.

2. Click on the desired setting.
- **Turn system indicator LED on:** set the system indicator LED on the remote server to blink.
- **Turn system indicator LED off:** set the system indicator LED on the remote server to off.
- **System Indicator LED blink:** set the blinking interval on the system indicator LED.

Fault LED

1. Click the Fault LED tab to view the following screen.

2. Click on the desired setting.
- **Turn fault LED on:** set the fault LED on the server to blink.
- **Turn fault LED off:** set the fault LED on the server to off.

Configuration

The **Configuration** tab enables you to set network parameters, e-mail notification, Platform Event Filter, load and enable an SSL certificate, and to set Time options.

Front Panel Lockout

The administrator can control the front panel lockout here including Locking out the Reset button, and Locking out the power button for power off only.

Network

1. Click the **Network** tab to set network parameters.

- **Enable DHCP:** check this box to enable the DHCP server. When checked, an IP address is automatically assigned.
- **IP:** enter a specific IP address to be assigned.
- **Net Mask:** enter the Net Mask of the LAN.
- **Gateway:** enter the Gateway of the LAN.
- **Mac Address:** this field displays the Mac address.
- **DNS server:** enter the DNS server address of the LAN, if required.

2. Click **Submit** to save the changes.

E-mail Notification

The **E-mail Notification** tab enables you to configure e-mail SMTP server sender and receiver details for system events notification.

Click the **E-mail Notification** tab to display the following web page.

Enter server, sender, and receiver details and click **Submit**.

Platform Event Filter

The Platform Event Filter tab allows you to modify the Trap Receiver Destination Address.

Click the **Platform Event Filter** tab to display the following web page.

Clock Settings

The Clock Settings page enables the Administrator to set the time for the server.

1. Click the **Clock Settings** tab to view the following web page.

2. Manually enter the year, month, day, and time (hours:minutes:seconds).
3. Click **Submit** to save the changes.

System Management Access

The System Management Access page enables the Administrator to generate SSL certificates and configure SNMP.

SSL Certificate

The SSL Certificate page enables the Administrator to generate a new CSR (Certificate Signing Request) key automatically or upload the key.

Click the **SSL Certificate** tab to view the following web page.

Generating a CSR

Before you can create the SSL Certificate, you must first generate a CSR (Certificate Signing Request) on your server. A CSR is a body of text that contains encoded information specific to your company and domain name. You can generate a CSR or upload a manually created CSR.

Follow these instructions to generate and upload a CSR:

1. Fill in the information in the fields provided.
- **Common Name (CN):** the domain name for which you are requesting the SSL certificate.
- **Organization Unit (OU):** whichever branch of your company is ordering the certificate.
- **Organization (O):** legal Company or Personal Name, as legally registered in your locality.
- **Country Code (C):** the two-digit code for a country. Select the country from the drop-down list.
- **Locality (L):** city or location (for example, "Los Angeles").
- **State (S):** state (for example, "California").
- **E-mail Address (E):** your email address.
2. Click **Generate**.
3. A CSR key is generated and uploaded automatically.

Uploading a Manually Created CSR

1. Click the **Browse** button next to Certificate Upload, and browse to the location of the saved key, for example **Savekey.pem**.

2. Click **Upload** to upload the key.

3. Once the upload is completed, close the browser.

4. Open a new browser and log in. The certificate file is the CSR previously uploaded.

5. After you have generated or uploaded the CSR, click **Submit** to save the changes.

SNMP

The SNMP page enables the Administrator to configure SNMP settings for communities and users.

User Management

The User Management web page enables the administrator to change the administrative account password, and to add, modify, and delete users and set user privileges.

Click the **User Management** tab to view the following web page.

Changing the Administrative Password

Follow these instructions to change the administrative password.

1. Under the username **root**, click **Change Password**. The following screen appears.

2. Type the current password in the Old Password text box.

3. Type the new password.

4. Type the password again for confirmation.

5. Click **Submit** to save the new password.

Managing Users

This section describes how to add a new user, and set user privileges.

Adding a User

1. Click **Add User**. The following screen appears.

2. Type the Username in the text box.

3. Type the Password in the text box and type it again for confirmation.

4. Select the privilege to assign to this user.

- Administrator

- Operator

- User

- Call Back

5. Click **Submit** to save the user.

Editing User Information

After a User is added, the administrator can change the user's password, prevent user access, change user privileges, or delete the user.

- **Disable:** Click to prevent the user access to the server.

- **Change Password:** Click to change the user's password.

- **Change Privilege:** Click to change the user's privileges.

- **Delete:** Click to remove the user from the system.

ADS Configuration

The ADS Configuration web page enables the administrator to configure an Active Directory Server (ADS).

ADS Configuration requires a Domain Name Server (DNS), an Active Directory Server (ADS), a Certificate Authority Server (CAS), and an AD certificate.

1. In the ADS Configuration page, enter the file path of the CA certificate or browse to the location.

2. Click **Upload** to upload the Certificate exported from the AD server.

3. Enter Primary DNS (Domain Name Server IP) and root_domain (AD server Domain).

4. In the Clock Settings page, ensure BMC shows the same time as the AD Server.

5. Click **Submit**.

6. Log off, and log in to the Web GUI with the username and password you set in AD server.
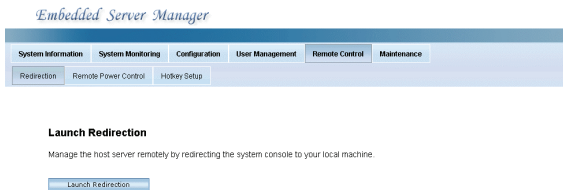
Remote Control

By using the included Java client, users have access to robust remote control features.

Note:
- Refer to the next chapter for more information on remote control features.
- Ensure that you have the java runtime machine (JVM) version 1.5 or higher installed before using the remote control.

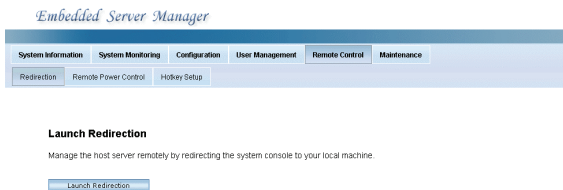Click the **Remote Control** tab to view the following web page.
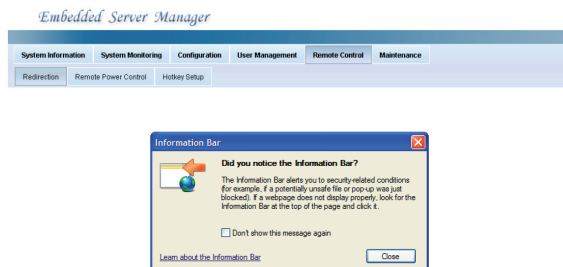
Redirection

Launch Redirection enables you to control the server through your local PC.
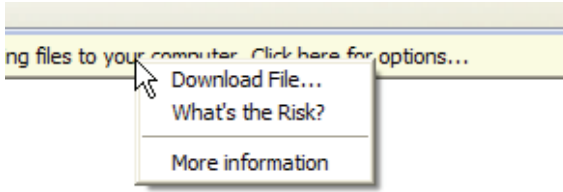
Follow these instructions to use Launch Redirection.

1. Click the **Redirect** tab.

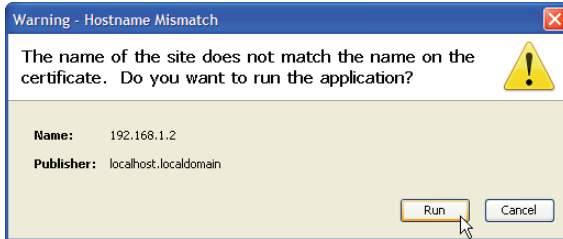2. Click the **Launch Redirection** button.

The following warning screen appears.

3. Click **Close** and then right-click the Information Bar to open the following screen.

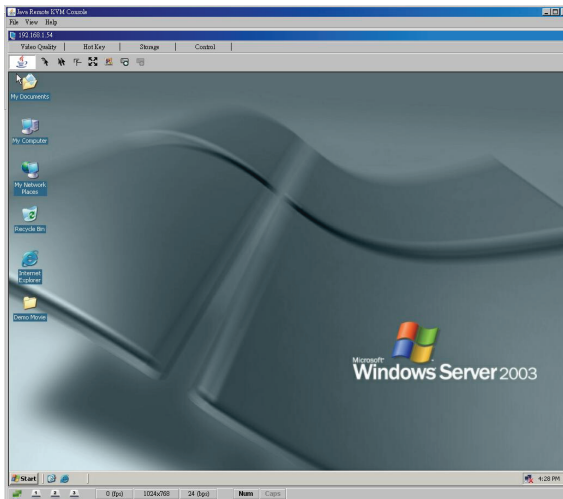4. Click **Download File**. The following screen appears.

5. Click **Run**.

Note:
You may see several security screens during installation of the remote application. On each screen, click **Yes** to continue.

The Java Remote KVM application appears.

6. Click **OK**. The remote window opens. From here, you can control the remote client.

Using the Java Remote KVM

The Java Remote KVM interface has several buttons that provide different functionality.

- **Video Quality:** Enables you to select the video quality: low, medium, or high.
  - **High:** Fewest video loss and biggest size image transmitted.
  - **Normal:** Few video loss and big size image transmitted.
  - **Low:** Some video loss and small size image transmitted.
- **Hot Key:** Displays hot key function. Refer to *Hotkey Setup* on page 72.
- **Storage:** Enables you to mount a virtual storage device.
- **Scale Fit:** Reduces magnification of the current screen until it fits in the window.
- **Scroll Mode:** Zoom is disabled, use scroll bar to view screen.
- **Full Screen:** Get the current KVM screen to zoom into the client monitor
- **Local Cursor:** Enable and disable the client cursor in KVM.
- **Hardware Cursor:** Enable and disable the hardware cursor. Hardware provides the cursor position and cursor shape to draw the cursor in the client KVM.

Note:
For more information on using the Java remote KVM, refer to the next chapter.

Remote Power Control

This feature enables the administrator to power on or power down the system remotely.

Note:
The IPMI connector must be connected to enable this function.

Click the **Remote Power Control** tab to view the following web page.

- In the Power Control frame, select **Power Off** (On) from the drop down menu, then click **Save** to turn off (on) the remote server.

  OR

- Select **Reset** and then click **Save** to reset the remote server.

Hotkey Setup

This page enables the administrator to create user profiles that include control modes, KVM settings, hot key settings, and storage settings. These settings are loaded after the Java Remote KVM is launched.

Click the **Hotkey Setup** tab to view the following web page.

- **Username:** Displays the name of the user for this profile.
- **Control Mode:** Select a view mode from the drop-down list, and check the boxes that you wish applied to this profile.
- **KVM Setting:** Select the video quality and the encryption mode for this profile.
- **Hot Key Setting 1 ~ 16:** Select the Hot Key settings from the drop-down lists.

Maintenance

The Maintenance web page enables you to upgrade the firmware and reset the BMC.

Firmware Upgrade

Use the Firmware Update feature to upgrade to the latest firmware version. See BMC Firmware Update Utility on page 87 for more information on upgrading firmware.

Click the **Firmware Update** tab to view the following web page.

Reset BMC

Use the Reset BMC web page to reset the BMC to the factory default configuration.

1. Click the **Reset BMC** tab to view the following web page.

2. Click **Reset BMC** to restore the default values.

This concludes this chapter. The next chapter describes using the Client in more detail.

KVM stands for Keyboard, Video, and Mouse. KVM over IP redirects server video screen, keyboard, and mouse data to or from a remote console PC via a network, so that the administrator can monitor the server and control keyboard and mouse to operate the server remotely.

KVM Client HW platform requirement: RKVM application needs CPU resource to decode the video and draw the screen picture, so we suggest CPU Pentium4 1.8G and 512 dram to run, otherwise the Client Application will timeout and disconnect from BMC.

Video Screen Redirection

AST2000 captures video output, compresses, and sends it to a remote console PC with encryption. The Java remote KVM application on the console PC receives and displays the server's video screen. AST2000 can acquire video source either from PCI bus as VGA mode or from external source as Video mode. Please refer to hardware specification for more detail information about mode switching.

The redirection specifications are as follows:

- **Video Mode:** Support both Text mode and Graphic mode.
- **Frame Resolution:** Up to 1280x1024 @ 75Hz.
- **Frame Frequency:** Up to 85Hz for other resolutions.
- **Frame Transfer Rate:** More than 30 frames per second for generic operation.

Video Quality Configuration

In order to fit the network bandwidth and video quality requirement, the Java Remote KVM provides the following options that the user can select them.

Video Quality Option

1. Best: Fewest video loss and biggest size image transmitted.
2. Normal: Few video loss and big size image transmitted.
3. Low: Some video loss and small size image transmitted.

The following image displays the video quality options.
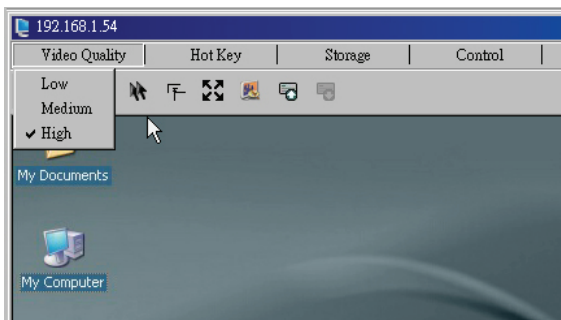
USB Keyboard and Mouse Emulation

Once the AST2000 KVM over IP function is launched, AST2000 emulates USB 1.1 keyboard and mouse devices. As a result, the managed server's BIOS or OS will detect the USB keyboard and mouse attached, and load their drivers to service them.

The following image shows the managed server's device manager window.
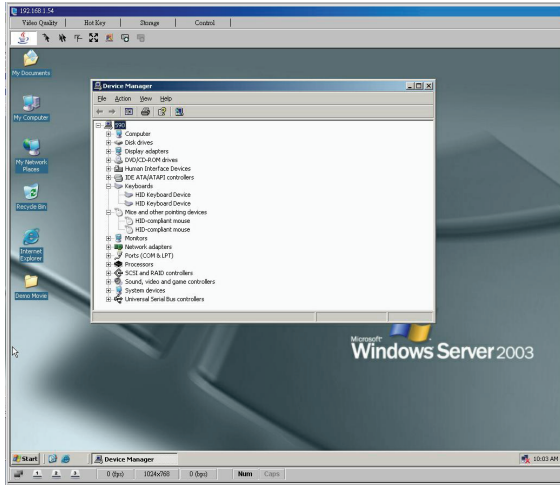
The remote console sends keyboard and mouse input to the AST2000, which then receives and packs them in USB HID format and transmits them to the managed server through the USB interface and protocol.
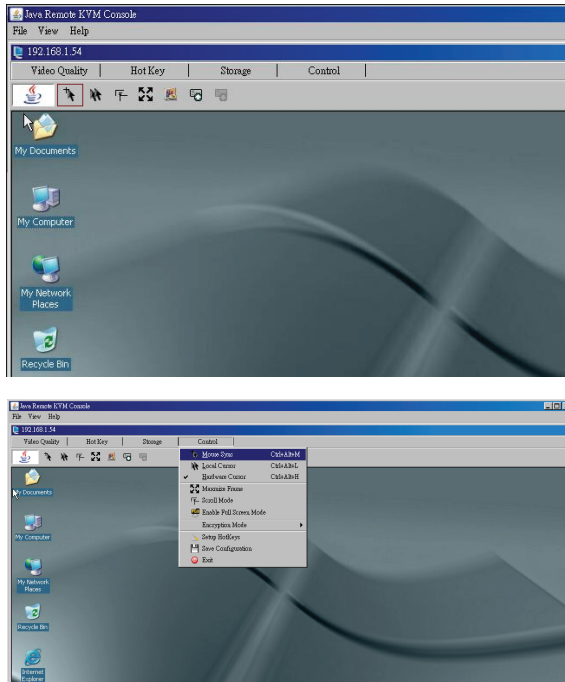
> **Note:**
> Mouse wheel operation only functions in the remote screen, not remote console screen

Mouse Synchronization at Console Side

When the Java remote KVM application is launched on the console PC, the mouse position of the remote server and the console are automatically synchronized. However, once the managed server's mouse is moved locally, the console PC mouse position will be different from the redirected managed server mouse.

In order to re-synchronize the mouse, click the **Mouse Synchronization** button on the toolbar (highlighted in red) or by clicking **Control** on the main menu and selecting **Mouse Sync**.

Note:
As the mouse is asynchronous after clicking mouse synchronization, ensure that mouse acceleration is turned off.

To turn off the mouse acceleration function:

- In Solaris, Linux: use # xset m 1 1 at the command line.
- In Windows XP and Windows 2003: Click **Control Panel** | **Mouse Pointer Options** and uncheck the enhance pointer precision option.
- In Windows 2000: Click **Control Panel** | **Mouse Motion Acceleration None**.

Hide Console Side Mouse

You can hide or show the console side (local) mouse by clicking the **Local Cursor** button on the toolbar or by clicking **Control** on the main menu and selecting **Local Cursor**.
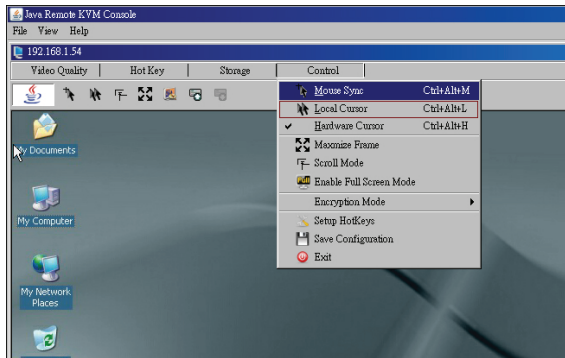

Hardware Cursor Mode

AST2000 provides the means to separate mouse data from video data and send the cursor position directly to the console side after positional updates or icon changes. In this mode, video image transmits become fewer and mouse movement becomes smoother. Click **Control** | **Hardware Cursor** on the menu to enable this mode.

## Keyboard LED and Status Synchronization

When NUM/CAPS lock keys are pressed on the managed server's local keyboard, the remote console side keyboard LEDs update automatically. Conversely, when you press these keys are pressed on the console side keyboard, the remote managed server's keyboard LEDs and status will change synchronously.
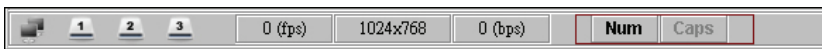
Hot-Key Simulation

Since Windows or other application programs have priority in using hot-keys before the remote server, (for example Ctrl-Alt-Del), the Java remote KVM ignores these keys and does not send them. However, you can assign hotkeys in the Java remote KVM application (see *Hotkey Setup* on page 72) and these hotkeys are available on the menu-bar where user can select hot keys to send to AST2000 and the managed server directly, instead of pressing keys.

You can also set up hotkeys by clicking **Control** | **Setup HotKeys**.
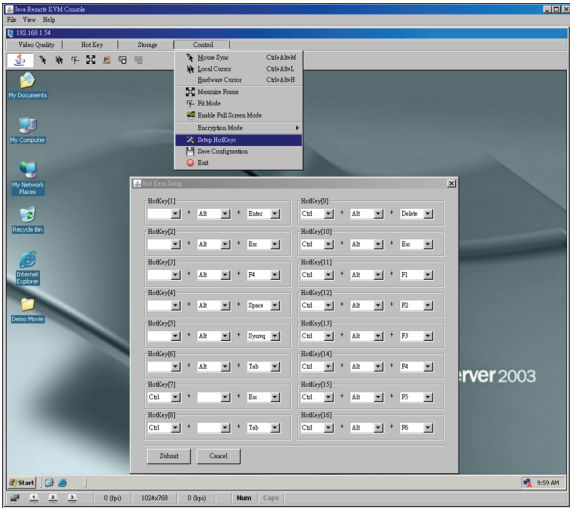
The following screen displays the hot-key menu.
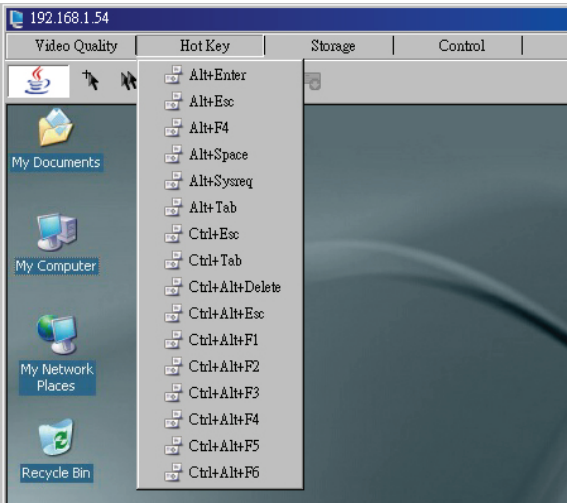
Full Screen Display on Console PC

The Java Remote KVM enables you to display the redirected video image in full screen as seen at the local side server in place of the window at the remote server side.

To display full screen:

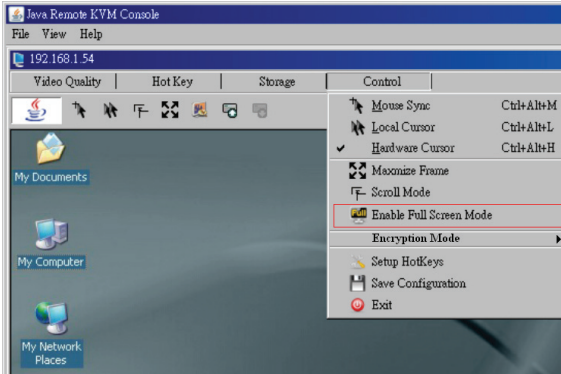1. Click **Control** on the main menu bar.
2. Select **Enable Full Screen Mode**.

To return to normal view:

1. Click **Control** on the main menu bar.

2. Select **Disable Full Screen Mode**.

Dynamic Scaling Video Resolution

From managed server power on to entering the Operating System, the video output resolution changes frequently. The AST2000 detects these changes and adjusts the display window automatically. In addition, user can adjust the display window to the size required by clicking and dragging the bottom right-hand corner of the inner window.

Before using dynamic scaling video resolution function, please make sure that the state of the video resolution mode is set to **Fit mode** and Not **Scroll Mode**.

Select the **Control** menu as shown in the following image. Ensure that the **Scroll Mode** option is visible. In this state, the video resolution state is currently in **Fit Mode**.
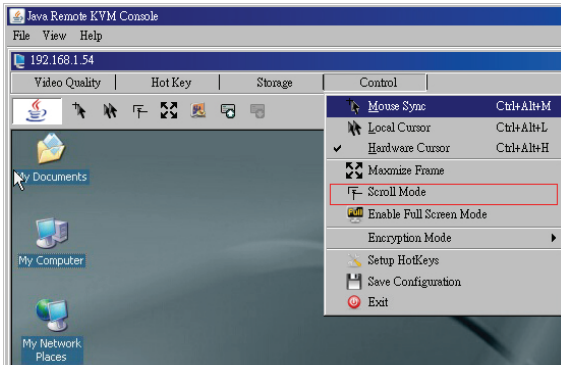
Color Text Adjust

If AST2000 displays blurred color text in some situations, adjust the Color Text Value to improve clarity.
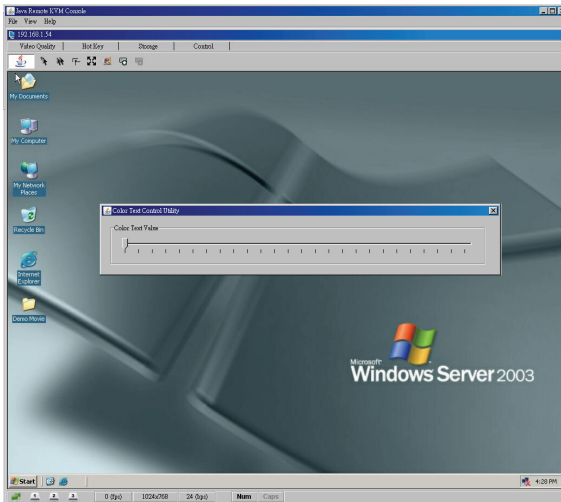
Encryption Mode

Encryption includes the following modes.

1. No encryption

2. Keyboard and mouse encryption: Uses AES method for encryption

3. Video Only encryption: Uses RC4 method for encryption.

4. Encryption All: Encrypts the Keyboard/Mouse and Video

The client side can only view encryption mode; however, users can access the web user interface to change the encryption mode and launch again.
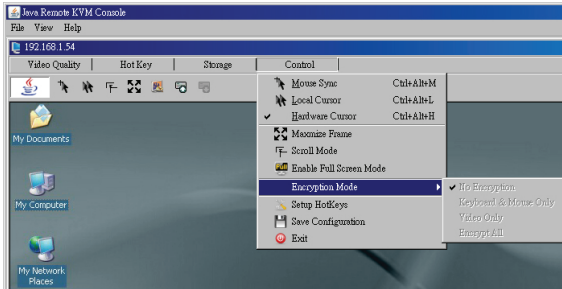
Virtual Storage

Through the USB storage emulation functions of the AST2000, users can install an operating system, device drivers or application software from the convenience of a remote side.

Mounting a Device

This section describes how to set up virtual storage for the QME-2200.

Follow these instructions to configure a storage device.

1. Click Storage | Mount Device.

The following screen appears.
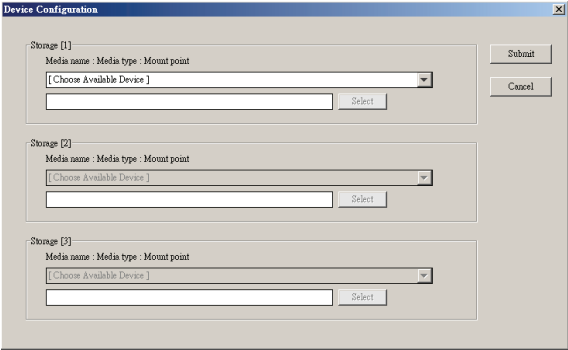
2. Select the storage device or ISO image from the drop down list.

3. When a storage device is mounted, the status bar displays an icon:

4. If you select ISO-Image, you will be prompted to browse to the location of the ISO file. ISO image format supports ISO9660. In addition, ISO image emulates a DVD ROM on the managed server through AST2000.

    Mounted device

5. To change the ISO-Image, Click Storage | Change ISO Image.

Supported Devices

Device	Action
Legacy Floppy	
USB Floppy	Read and Write (Floppy support Media Change)
USB Flash	

Device	Action
USB CD/DVD ROM	
IDE CD/DVD ROM	Read only (support Media Change)
ISO Image	

USB DVD Emulation

When DVD Emulation function is enabled, the managed server finds a USB DVD drive. As shown in the image below the user puts a target DVD disk into the remote console PC DVD drive. While managed server access this virtual attached USB DVD, AST2000 will redirect to the DVD in console PC and Java Remote KVM will access the target DVD disk instead. The DVD format will support DVD +R and –R according to your CD/DVD ROM.
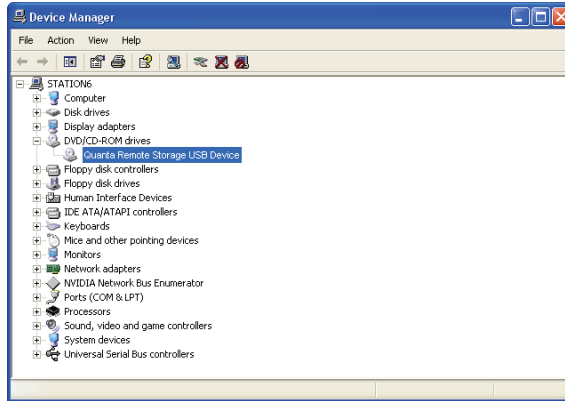
USB Floppy Emulation

When **Floppy Emulation** function is enabled, the managed server will find a USB floppy drive. As shown in the image below the user puts a target diskette into the remote console PC floppy drive. While managed server will access this virtual attached USB floppy diskette, AST2000 will redirect to the diskette in console PC and Java Remote KVM will access the target diskette instead. The diskette access includes:

- In Solaris, Linux: use # xset m 1 1 at the command line.
- Read
- Write
- Format
- Media Changed (ejects then inserted diskette)
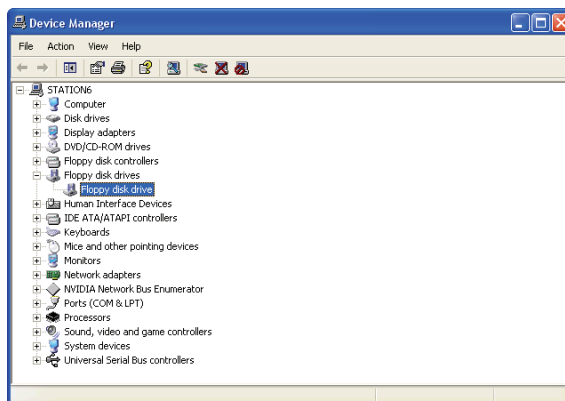
The below table describes the floppy LED status description.

Legacy Floppy behavior	As disk inside (LED status)	As No Disk inside (LED status)
Mount Begin	Light On about 1.5 min	Blinking (On: 3.5 sec, Off: 2.5 sec)
Ready	Blinking (On: 3.5 sec, Off: 2.5 sec)	None
No Media	None	Blinking (On: 3.5 sec, Off: 2.5 sec)

Note:
When the virtual floppy is mounted, it does not lock on the client site. It is recommended that the client does not access the client floppy file (even file write, remove).

USB CD-ROM Emulation

When **CD-ROM Emulation** function is enabled, the managed server will find a USB CD-ROM drive. User puts the target CD into the remote console PC CD-ROM drive. While managed server will access this virtual attached USB CD-ROM, AST2000 will redirect to the CD in console PC and Java Remote KVM will access the target CD instead. The CD format only supports data CD in Mode 1 and Mode 2 Form 1. It does not support VCD and CDDA.

USB Flash Disk Emulation

When **USB Flash Disk Emulation** function is enabled and with the USB flash disk inserted to console PC USB port, the managed server will find a USB removable drive. While managed server access this virtual attached USB flash drive, AST2000 will redirect to the flash disk in console PC and Java Remote KVM will access the target flash disk instead.

The diskette access includes:

- Read
- Write

Note:
When the virtual floppy is mounted, it does not lock yet on the client site, we recommend that the client to not access the client floppy file (even file write, remove).

CD /DVD ROM Emulation

Java RKVM can read CD/DVD ISO image file and emulate a CD/DVD ROM on the managed server. Now, we only support ISO9660 format.

Note:
- Regarding the CD/DVD-ROM ISO image file, we only support the data format. We do not support any WAV, Video and other extended formats (for example compressed format).
- If the Java Remote KVM customer selects an incorrect ISO format file, **No Media** status is activated. Click media **change** to select the correct ISO file.

Multidevice Configuration

Use the procedure below to configure OS specific managed devices on the server.

Redhat AS4.0

You are required to rebuild the initial ramdisk.

1. In **/etc/modprobe.conf** add the following line:

   ```
   options scsi_mod max_luns=xxx
   ```
   (whereas xxx is the number of LUNs to support)

2. Type the following to build the initial ramdisk and implement the changes:

   mkinitrd -f /boot/newimage-2.6.xx 2.6.xx (whereas xxx is the exact kernel version)

3. Change the following:

   boot/grub/menu.lst nitrd

   To

   boot/grub/menu.lst newimage-2.6.xx

4. Reboot the system.
   After rebooting, the LUNs appear.

Redhat 9.0

1. In the line

   /etc/modules.conf

   Add the following:

   options scsi_mod max_scsi_luns=8

2. Reboot.

Virtual Storage Configuration (Linux Kernel 2.4)

Use the procedure below to configure your OS (Linux kernel 2.4) on your local computer. After configuring the system, mount a local IDE CD/DVD ROM to the remote server.

Redhat AS3.0 (Linux kernel 2.4.x)

Using LILO

1. In the line **/etc/lilo.conf**, add the following:

    append xxx=ide-scsi (whereas xxx is the ID for the IDE CD/DVDROM to support)

    For example:
    ```
    ---lilo.conf---
    boot=/dev/had
    map=/boot/map
    install=/boot/boot.b
    timeout=50
    message=/boot/message

    image=/boot/vmlinuz-2.4.21-40.EL
    label=linux
    initrd=/boot/initrd--2.4.21-40.EL.img
    read-only
    Quanta Confidential 53/62
    root=/dev/hda1
    append= "hdc=ide-scsi"
    append= "hdd=ide-scsi"
    ```

Using GRUB

If you are using GRUB to boot,

1. To the end of the kernel line, add the following

    ```
    /etc/grub.conf xxx=scsi
    ```
    (whereas xxx is the ID for the IDE CD/DVDROM to support)

    For example:
    ```
    ---grub.conf---
    default=0
    timeout=10
    splashimage=(hd0,0)/grub/splash.xpm.gz
    title Red Hat Enterprise Linux AS (2.4.21-40.EL)
    root (hd0,0)
    kernel /vmlinuz-2.4.21-40.EL ro root=LABEL=/ hdc=ide-scsi hdd=ide-scsi
    ```

2. Reboot and verify by using the line that follows:

    ls -al /dev/cdrom

    ```
    Ensure the message displays as below:
    ```

    lrwxrwxrwx 1 root root /dev/cdrom -> /dev/scd0

BMC Firmware Update Utility

The BMC (Baseboard Management Controller) firmware update utility is a DOS-based program used to update the BMC firmware code. This utility should only be run if new firmware code is necessary.

BMC Firmware Update Procedure

Before proceeding, read the BMC firmware release notes to determine which update utility version is appropriate for the new firmware version.

1. Copy the BMC firmware update utility upfw.exe and BMC firmware image file **S87vxxx.bin** to a bootable DOS diskette. Where xxx means BMC firmware version.

2. Shutdown the server and insert this diskette, then power on the server and boot to the diskette.

3. At the DOS prompt (e.g. A:\>), type *upfw S87vxxx.BIN* (not case sensitive) and press the ENTER key.

4. upfw.exe displays a message during the flash in progress.

5. Wait for the flash to complete and make sure no error or failure message appears.

6. Power off the server and remove the diskette, then power on.

Component	Feature
CPU	Dual Processor for Intel Xeon DP
	1066/1333/1600 MHz bus
	Supports Intel Dempsey/Woodcrest/Clovertown (Also supports Harpertown/Wolfdale)
	VRD11
Chipset	Northbridge Intel Seaburg1600: • 1066/1333/1600 MHz FSB • ESI interface, 2.5GB/s • 8XFBD DDR2 DIMMs
	Southbridge ESB2-E: • ESI interface, 2.5GB/s to SB • Ultra 100 IDE • SATA II x 6 • USB 2.0 x 4
	Kumeran interface to external Gigabit Ethernet PHY
Memory	2 DIMM per channel, total 4 channels Supports up to 32 GB Supports FBD 533/667/800 DDR2
USB	Rear panel x 2 Front panel x 2
VGA	Onboard VGA (AST2000)
LAN	Onboard Gigabyte Ethernet x 2 (Intel 82563EB)
SUPER I/O	PS/2 Keyboard/Mouse, Serial port
	NS87427
ROM	FWH 8M bit
ACPI	ACPI compliance, S0, S1, S4, S5 support
Board Management Control (BMC) Hardware monitor	Main Logic Board Sensors: System voltage detection System Temperature Detection, Adaptive FAN Speed Control, FAN Speed Detection CPU Temperature Detection CPU VID code
BMC	AST 2000
Form factor	2U system
	Full size ATX. 12-inch x 13-inch
BIOS	AMI Server BIOS

SKU Information

Component		Hybrid SATA	Hybrid SAS
SKU ID			
CPU		Dempsey	Dempsey
		Woodcrest	Woodcrest
		Wolfdale-DP	Wolfdale-DP
		Clovertown	Clovertown
		Harpertown	Harpertown
MCH		Seaburg	Seaburg
SB		ESB2-E	ESB2-E
Memory		8 DDR2 RDIMMs on 4 channels	8 DDR2 RDIMMs on 4 channels
		32 GB MAX	32 GB MAX
SIO		Nat42x	Nat42x
IO		5 slots:	5 slots:
		1 PCI-X 64/100	1 PCI-X 64/100
		1 PCI-X 64/133	1 PCI-X 64/133
		1 PCI-E x 4	1 PCI-E x 4
		1 PCI-E x 4 (ROMB CARD)	1 PCI-E x 4 (ROMB CARD)
		1 PCI-E x 16	1 PCI-E x 16
Storage	SATA	STATII 6-ports (via ESB2-E)	8-SAS ports
	SAS	MB SAS controller depop	LSI 1068E SAS controller
Video		AST2000	AST2000

Note:
The following CPU types are supported:

Dual-Core Intel® Xeon® processor 5000 series (Dempsey)
Dual-Core Intel® Xeon® processor 5100 series (Woodcrest)
Dual-Core Intel® Xeon® processor 5200 series (Wolfdale-DP)
Quad-Core Intel® Xeon® processor 5300 series (Clovertown)
Quad-Core Intel® Xeon® processor 5400 series (Harpertown)