SUPERMICRO®

SBI-7227R-T2
Blade Module

User's Manual

Revison 1.0

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Manual Revison 1.0

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Notes

Preface

About this Manual

This manual is written for professional system integrators, Information Technology professionals, service personnel and technicians. It provides information for the installation and use of Supermicro's SBI-7227R-T2 blade module. Installation and maintenance should be performed by experienced professionals only.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with SBI-7227R-T2 blade module and describes their main features.

Chapter 2: System Safety

You should familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing SBI-7227R-T2 blade module.

Chapter 3: Setup and Installation

Refer to this chapter for details on installing the SBI-7227R-T2 blade module into the SuperBlade® chassis. Other sections cover the installation and placement of memory modules and the installation of hard disk drives into the blade module.

Chapter 4: Blade Module Features

This chapter coves features and component information about SBI-7227R-T2 blade module. Included here are descriptions and information for mainboard components, connectors, LEDs and other features of the blade module.

Chapter 5: RAID Setup Procedure

RAID setup and operations for SBI-7227R-T2 blade module are covered in this chapter.

Chapter 6: BIOS

BIOS setup is covered in this chapter for SBI-7227R-T2 blade module.

Appendix A: BIOS POST Codes

BIOS POST Codes for SBI-7227R-T2 blade module are explained in this appendix.

Notes

Chapter 1
Introduction

1-1   Overview

This user's manual covers the SBI-7227R-T2 blade module. This blade module is a compact self-contained two-node server that connects into a pre-cabled enclosure that provides power, cooling, management and networking functions. One enclosure for the SBI-7227R-T2 blade module can hold ten blade units (twenty nodes).

In this manual, "blade system" refers to the entire system (including the enclosure and blades units), "blade" or "blade unit" refers to a single blade module and "blade enclosure" is the chassis that the blades, power supplies and modules are housed within.

Please refer to our web site for information on operating systems that have been certified for use with the SuperBlade (www.supermicro.com/products/superblade/).

1-2   Product Checklist of Typical Components

Your blade module ships with its B9DRT mainboard already installed in its chassis. Memory, hard disk drives and the CPU must all be installed by the user after shipment. See Chapter 3: " Setup and Installation" on page 3-1 for details on installation of these components.

Aside from the blade module unit itself, the following optional Mezzanine add-on cards (with InfiniBand Switch) may be ordered for your blade module:

- AOC-XEH-iN2
- AOC-IBH-XDD
- AOC-IBH-XQD
- AOC-IBH-XQS
- AOC-IBH-XDS

See the Supermicro website and the *SuperBlade Network Modules User's Manual* on your SuperBlade system's CD-ROM for more details on these add-on cards.

1-3 Blade Module Features

Table 1-1 lists the main features of the SBI-7227R-T2 blade module. See the proceeding section for components typically included in a blade system and other optional components. Specific details for the SBI-7227R-T2 blade module are found in Chapter 4: " Blade Module Features" on page 4-1.

Table 1-1. SBI-7227R-T2 Blade Module Specification Features

Mainboard	B9DRT (proprietary form factor) Chassis Dimensions (HxWxD): 11.32" x 1.19" x 18.9"
Processors	Supports up to two Intel™ Xeon® E5-2600 series 2011-pin processors per node. Please refer to our web site for a complete listing of supported processors.
QPI Speed	QPI up to 8 GT/s
Chipset	Intel C602
Graphics Controller	Integrated Matrox G200eW Graphics
BIOS	128 MB SPI Flash EEPROM with AMI® BIOS each node for each node
Memory Capacity	Each node supports up to 256 GB of RDIMM and 64 GB of UDIMM DDR3 1600/1333/1066 MHz speed SDRAM in eight (8) 240-pin DIMM sockets
SATA Controller	Intel C602 on-chip controller for two Serial ATA drives for each node
Hard Drive Bays	Each node supports two hot-swap drive bays for 2.5" SATA disk/SSD drives

Processors

Each of the SBI-7227R-T2 blade module's node supports dual 2011-pin (LGA 2011 Socket R) Intel Xeon E5-2600 series processors.

Refer to the Supermicro web site for a complete listing of supported processors (http://www.supermicro.com/products/superblade). Please note that you will need to check the detailed specifications of a particular blade module for a list of the CPUs it supports.

Details on installation of the processor into the SBI-7227R-T2 blade module are found in Chapter 3: " Setup and Installation" on page 3-1.

Memory

Each of the SBI-7227R-T2 blade module nodes has eight (8) 240-pin DIMM sockets that can support up to 256 GB RDIMM or 64 GB UDIMM of DDR3 1600/1333/1066 MHz speed SDRAM. Memory is interleaved, which requires modules of the same size and speed to be installed in groups (of two or three).

Please refer to the Supermicro web site for a list of supported memory (www.supermicro.com/products/superblade). The detailed specifications for a blade module will contain a link to a list of recommended memory sizes and manufacturers.

Details on installation of memory modules into the SBI-7227R-T2 blade module are found in Chapter 3: " Setup and Installation" on page 3-1.

Storage

The SBI-7227R-T2 blade module node can have up to two 2.5" SATA (Serial ATA)/SSD hard disk drives in front-mounted easy removable carriers for a total of four for the whole module. See Chapter 3: " Setup and Installation" on page 3-1 for storage installation details.

Density

A maximum of ten blade modules (twenty nodes) may be installed into a single blade enclosure. Each blade enclosure is a 7U form factor, so a standard 42U rack may accommodate up to six enclosures with 60 blade modules (120 nodes), or the equivalent of 120 1U servers. With the inclusion of six CMM modules, twelve Gigabit Ethernet switches and six InfiniBand switches, this would occupy up to 144U space in a conventional 1U server configuration.

1-4   Contacting Supermicro

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Technical Support:	
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Chapter 2
System Safety

2-1   Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SuperBlade from damage:

- Be aware of how to power on/off the enclosure power supplies and the individual blades as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the blade module when removing or installing such system components as the mainboard, memory modules and processors.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease electrostatic discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets. Power input requires 110-240 VAC, depending upon your power supply module.
- Mainboard Battery: This battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032 Lithium 3V battery). Dispose of used batteries according to the manufacturer's instructions.

 WARNING: There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarities.

- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

2-2   General Safety Precautions

Follow these rules to ensure general safety:

• Keep the area around the SuperBlade clean and free of clutter.

• Place the blade module cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

• While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

• Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

• After accessing the inside of the system, replace the blade module's cover before installing it back into the blade enclosure.

2-3   Electrostatic Discharge Precautions

Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards.

The following measures are generally sufficient to neutralize this difference **before** contact is made to protect your equipment from ESD:

• Use a grounded wrist strap designed to prevent static discharge.

• Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.

• Touch a grounded metal object before removing the board from the antistatic bag.

• Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.

• Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.

• When handling chips or modules, avoid touching their pins.

• Put the mainboard and peripherals back into their antistatic bags when not in use.

• For grounding purposes, make sure the blade enclosure provides excellent conductivity between the power supplies, the blade modules and the mainboard.

2-4   Operating Precautions

Care must be taken to assure that the cover of the blade unit is in place when the blade is operating to assure proper cooling. Out of warranty damage to the blade can occur if this practice is not strictly followed.

Any drive carrier without a hard drive installed must remain fully installed in the drive bay when the blade module is operating to ensure proper airflow.

Chapter 3
Setup and Installation

3-1   Overview

This chapter covers the setup and installation of the blade module and its components.

3-2   Installing Blade Modules

Up to ten SBI-7227R-T2 blade modules may be installed into a single blade enclosure. Blade modules with Windows and Linux operating systems may be mixed together in the same blade enclosure.

Powering Up a Blade Unit

Each blade unit may be powered on and off independently from the rest of the blades installed in the same enclosure. A blade unit may be powered up in two ways:

- Press the power button on the blade unit.
- Use IPMIView or the web-browser based management utility to apply power using the CMM module.

Powering Down a Blade Unit

A blade unit may be powered down in either of the following ways:

- Press the power button on the blade unit.
- Use IPMIView or the web-browser based management utility to power down (if you have Operator or Admin privileges on the CMM).
- Use IPMItool when connected to the CMM to power down (if you have Operator or Admin privileges on the CMM).

Removing a Blade Unit from the Enclosure

Although the blade system may continue to run, individual blades should always be powered down before removing them from the enclosure.

Removing a Blade Unit from the Enclosure

1. Power down the blade unit (see "Powering Down a Blade Unit" above).

2. Squeeze both handles to depress the red sections then pull out both handles completely and use them to pull the blade unit from the enclosure.

NOTE: Blade Modules can be Hot-Plugged from the enclosure.

Removing/Replacing the Blade Cover

The blade cover must be removed to access the mainboard when you need to install or remove processors, memory units, the onboard battery and so on.

Removing/Replacing the Blade Cover

1. Remove the blade unit from the enclosure (see "Removing a Blade Unit from the Enclosure" above).

2. Depress the two buttons on the cover while pushing the cover toward the rear of the blade unit. When it stops, lift the cover off the blade unit.

3. To replace the cover, fit the six grooves in the cover into the studs in the sides of the blade, then slide the cover toward the front of the blade to lock it into place.

Installing a Blade Unit into the Enclosure

Make sure the cover of the blade unit has been replaced first before installing a blade unit in the enclosure.

Installing a Blade Unit into the Enclosure

1. Slowly push the blade unit into its bay with the handles fully pulled out (see Figure 3-1).

2. When the blade stops, push the handles back in to their locked position, making sure the notches in both handles catch the lip of the enclosure (see Figure 3-2).

NOTE: Blade Modules can be Hot-Plugged into the enclosure.

WARNING: Use extreme caution when inserting a blade module into the enclosure. If the blade's power connector becomes damaged, it can damage pins on other blade bays that it is inserted into.

Figure 3-1. Inserting a Blade into the Enclosure
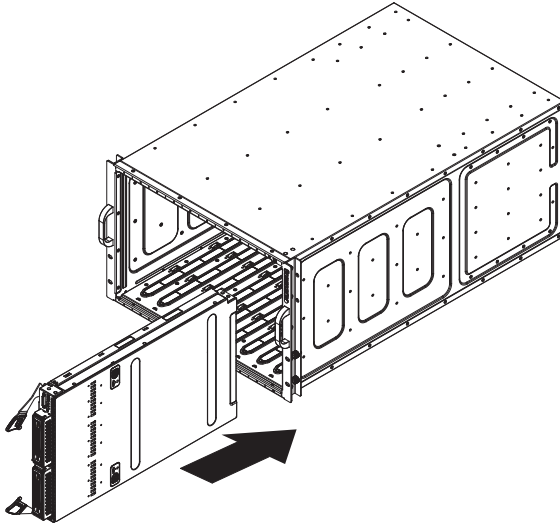
Figure 3-2. Locking the Blade into Position
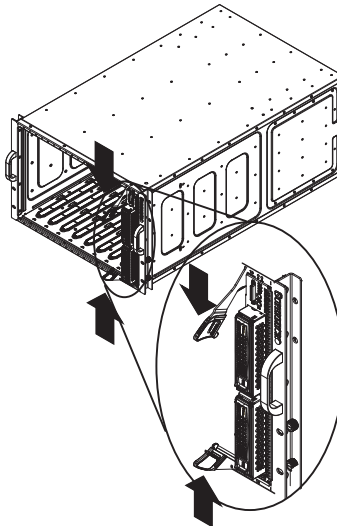
3-3   Processor Installation

One or two processors may be installed to the mainboard of each blade unit. See Chapter 1 for general information on the features of the blade unit and the Supermicro web site for further details including processor, memory and operating system support.

WARNING: This action should only be performed by a trained service technician. Allow the processor heatsink to cool before removing it.

Removing a Processor

1. Power down and remove the blade unit from the enclosure (see Section 3-2: Installing Blade Modules on page 3-1 for details).

2. Remove the cover of the blade unit (see "Removing/Replacing the Blade Cover" on page 3-2).

3. Loosen the four screws that secure the heatsink to the mainboard.

4. Remove the heatsink by *gently* rotating it back-and-forth sideways with your fingers to release it from the processor. Set the heatsink aside and upside-down so that nothing comes into contact with the thermal grease on its underside.

5. Raise the lever of the processor socket up until the processor is released from the socket, then lift the silver cover plate and remove the processor.

6. Reapply plastic socket covers to the LGA2011 sockets to prevent pin damage.

WARNING: This action should only be performed by a trained service technician.

Installing a Processor

WARNING: Warning! When handling the processor package, avoid placing direct pressure on the label area.

Always connect the power cord last, and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.

Important! If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.

Make sure to install the system board into the chassis before you install the CPU heatsink.

When receiving a server board without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.

Refer to the Supermicro website for updates on CPU support.

1. There are two load levers on the LGA2011 socket. To open the socket cover, first press and release the load lever labeled 'Open 1st' (Figure 3-3).

Figure 3-3. Open First Load Lever

Press down on Load Lever labeled 'Open 1st'.
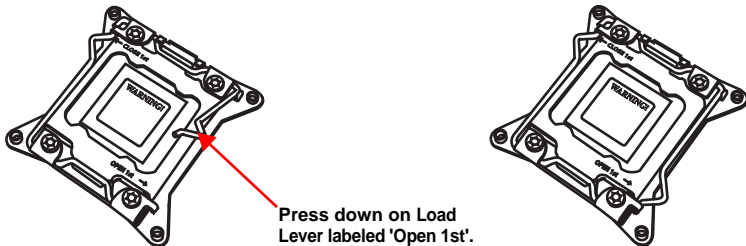
2. Press the second load lever labeled 'Close 1st' to release the load plate that covers the CPU socket from its locking position (Figure 3-4).

Figure 3-4. Close First Load Lever

Press down on Load the Lever labeled 'Close 1st'

Pull lever away from the socket
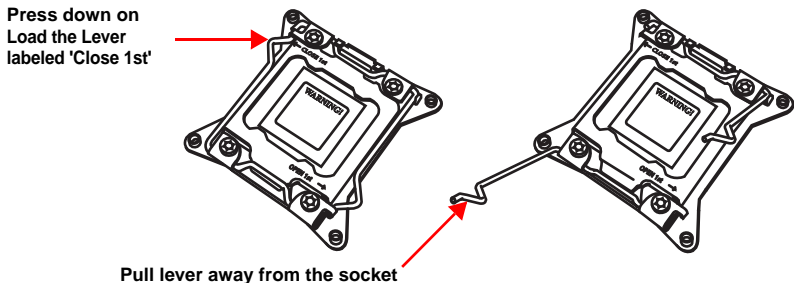
3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely (Figure 3-5).

Figure 3-5. Opening the Load Plate

Gently push down to pop
the load plate open.
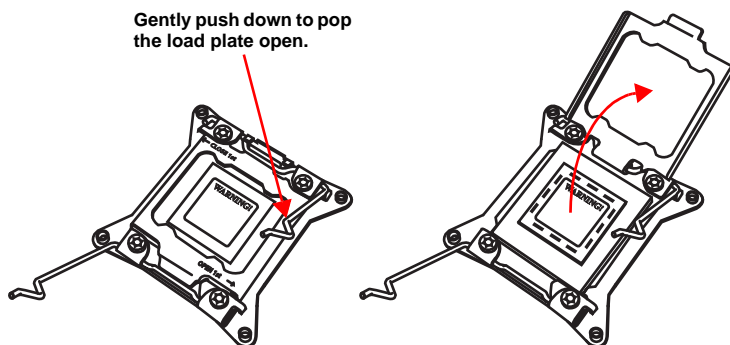
4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket (Figure 3-6).

Figure 3-6. Removing the Warning Plastic Cap
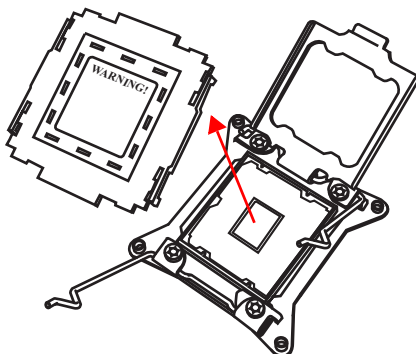
5. Use your thumb and index finger to hold the CPU on its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys (Figure 3-7).

Figure 3-7. Aligning CPU Keys with Socket Keys
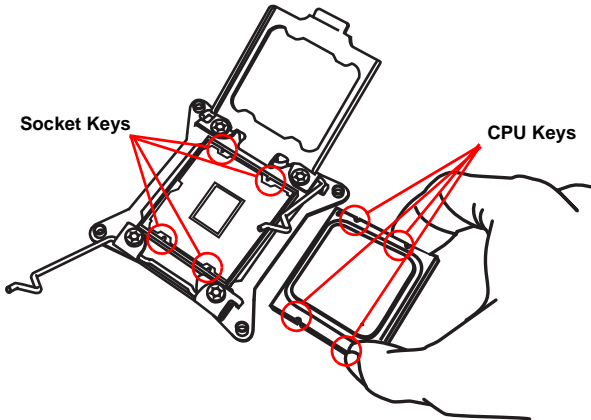
6. Once the keys are aligned, carefully lower the CPU straight down into the socket (Figure 3-8). Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically. Do not rub the CPU against the surface or against any pins of the socket to avoid damaging the CPU or the socket.

Figure 3-8. Lowering the CPU into the Socket
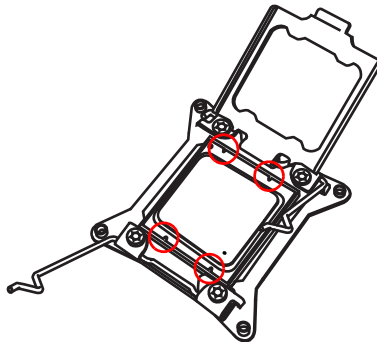
WARNING: You can only install the CPU inside the socket in one direction. Make sure that the CPU is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

7. With the CPU inside the socket, inspect the four corners of the CPU to make sure that the CPU is properly installed.

8. Close the load plate with the CPU inside the socket (Figure 3-9). Lock the lever labeled 'Close 1st' first (Figure 3-10), then lock the lever labeled 'Open 1st' second (Figure 3-11). Use your thumb to gently push the load levers down to the lever locks.

Figure 3-9. Closing the Load Plate
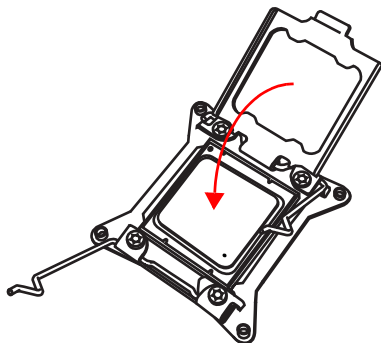
Figure 3-10. Locking the Close First Lever

Push down and lock the level labeled 'Close 1st'.
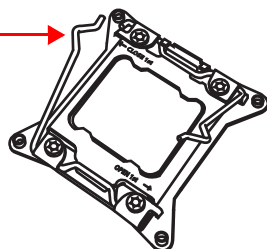
Figure 3-11. Locking the Open 1st Lever

Lever Lock

Push down and lock the lever labeled 'Open 1st'
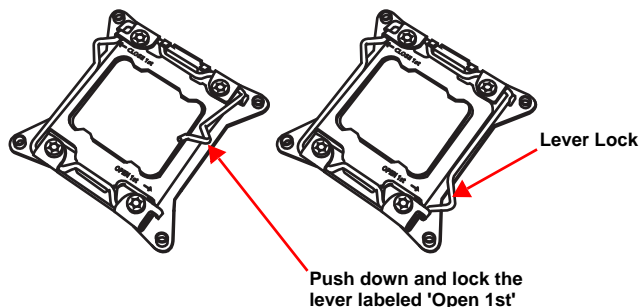
3-4   Onboard Battery Installation

A battery is included on the mainboard to supply certain volatile memory components with power when power has been removed from the blade module. If this battery dies, it must be replaced with an equivalent CR2032 Lithium 3V battery. Dispose of used batteries according to the manufacturer's instructions. See Figure 3-12 for a diagram of installing a new onboard battery.

WARNING: There is a danger of explosion if the onboard battery is installed upside down, which reverses its polarities.

Figure 3-12. Installing the Onboard Battery

Lithium Battery

Battery Holder
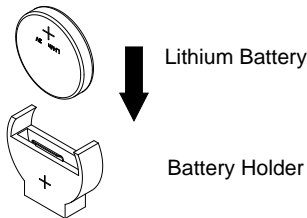
3-5   Memory Installation

The mainboard of each blade unit must be populated with DIMMs (Dual In-line Memory Modules) to provide system memory. **The DIMMs should all be of the same size and speed and from the same Super Micro authorized manufacturer due to compatibility issues.** See details below on supported memory and our web site (www.supermicro.com/products/superblade for recommended memory.

Populating Memory Slots

Each node on the mainboard of a SBI-7227R-T2 blade module has eight (8) memory slots, four for each processor. Both interleaved and non-interleaved memory are supported, so you may populate any number of DIMM slots.

Populating all slots with memory modules of the same size and of the same type will result in interleaved memory, which is faster than single-channel, non-interleaved memory. See Table 3-1: "Populating Eight Memory Slots for Interleaved Operation (Each Node)" on page 3-10 for details.

For an interleaved configuration, memory modules of the same size and speed must be used. You should not mix DIMMs of different sizes and speeds.

Table 3-1. Populating Eight Memory Slots for Interleaved Operation (Each Node)

# of DIMMs	CPU1				CPU2			
	Channel A	Channel B	Channel C	Channel D	Channel E	Channel F	Channel G	Channel H
	A1	B1	C1	D1	E1	F1	G1	H1
8	X	X	X	X	X	X	X	X

Figure 3-13. 8-slot DIMM Numbering
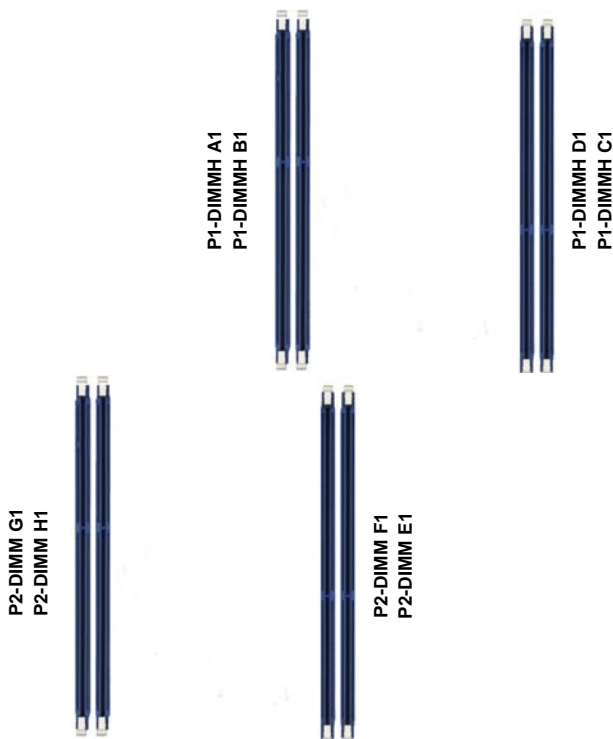
NOTE: Though multiple DIMM memory module types and speeds may be supported, you need to use DIMM memory modules of the same speed and type for each slot.

NOTE: An "X" in Table 3-1 indicates the memory slot is populated by a DIMM module.

NOTE: For an optimized memory bandwidth, it is recommended that you populate the memory modules in sets of four (4) DIMMs for the CPU's.

DIMM Installation

WARNING: Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

Installing DIMM Memory Modules

1. Power down the blade module (see "Powering Down a Blade Unit" on page 3-1).

2. Remove the blade from the enclosure and the cover from the blade (see "Removing/Replacing the Blade Cover" on page 3-2).

3. Remove the air shroud that covers the DIMM slots.

4. Insert each DIMM vertically into its slot, starting with slots 1A and 2A. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM incorrectly (see Figure 3-14).

Figure 3-14. Installing a DIMM into a Memory Slot

To Install: Insert module vertically and press down until it snaps into place. Pay attention to the bottom notch.

To Remove: Use your thumbs to gently push each release tab outward to free the DIMM from the slot.

Note: The notch should align with the receptive key point on the slot.

Notch

Side View

Release Tabs

Top View
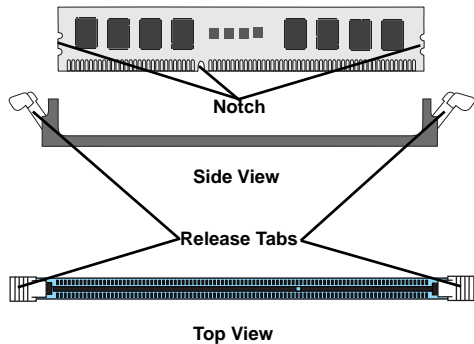
5. Gently press down on the DIMM until it snaps into place in the slot. Repeat for all modules (see Table 3-1 for installing DIMMs into the slots in the correct order).

6. Replace the air shroud and the blade cover and install the blade module back into the enclosure.

7. Power up the blade unit (see "Powering Up a Blade Unit" on page 3-1).

3-6   Hard Disk Drive Installation

Hard disk drives are installed in "carriers" which are hot-swappable and can be removed or replaced without powering down the blade unit they reside in. A blade module needs a hard disk drive with an operating system installed to operate.

WARNING: To maintain proper airflow, both hard drive bays must have drive carriers inserted during operation whether or not a drive is installed in the carrier.

To remove a hard drive carrier, do the following:

Removing a Hard Drive Carrier

1. Locate the colored "Open" button at the bottom of the drive carrier and press it with your thumb. This action releases the drive carrier from the drive bay.

2. Pull the release handle out about 45-degrees, then use it to pull the drive carrier out.

To Install a hard drive, use the following procedure:

Installing a Hard Drive

1. Remove a blank drive carrier from the blade (see removal procedure above).

2. Insert a drive into the carrier with the PCB side facing down and the connector end toward the rear of the carrier.

3. Align the drive in the carrier so that the screw holes of both line up. Note that there are holes in the carrier marked "SATA" to aid in correct installation.

4. Secure the drive to the carrier with six screws as shown in Figure 3-15.

5. Insert the drive carrier into its slot keeping the Open button at the bottom. When the carrier reaches the rear of the bay the release handle will retract.

6. Push the handle in until you hear the carrier click into its locked position.

Figure 3-15. Installing a Hard Drive in a Carrier
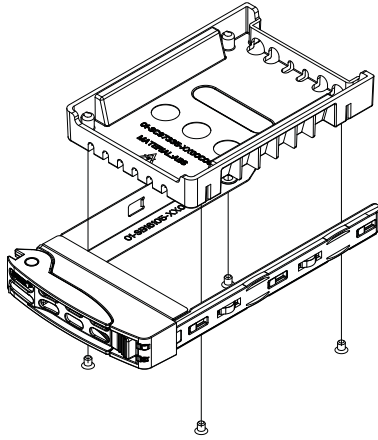
3-7   Installing the Operating System

An operating system (OS) must be installed on each blade module. Blades with Microsoft Windows OS and blades with Linux OS can both occupy and operate within the same blade enclosure. Refer to the SuperMicro web site for a complete list of supported operating systems.

There are several methods of installing an OS to the blade modules.

Installing with an External USB CD-ROM Drive

The most common method of installing the OS is with an external USB CD-ROM drive. Take the following steps to install the OS to a blade module:

⚠️ **WARNING:** Installing the OS from an external CD-ROM drive may take several hours to complete.

1. Connect an SUV cable (Serial port/USB port/Video port cable) to the KVM connector on the front of the blade module. You will then need to attach a USB hub to the USB port on this cable to provide multiple USB ports.

2. Connect the external CD-ROM drive, a USB keyboard and a mouse to the USB hub. You will also need to connect a monitor to the video connector on the SUV cable. Turn on the blade module.

3. Insert the CD containing the OS into the CD-ROM drive.

4. Follow the prompts to begin the installation.

Installing via PXE Boot

PXE (Preboot Execution Environment) is used to boot a computer over a network. To install the OS via PXE, the following conditions must be met:

1. The PXE BOOT option in BIOS must be enabled.

2. A PXE server has been configured (this can be another blade in the system).

3. The PXE server must be connected over a network to the blade to be booted.

4. The blade has only non-partitioned/unformatted hard drives installed and no bootable devices attached to it.

Once these conditions are met, make sure the PXE server is running. Then turn on the blade on which you wish to boot and/or install the OS. The BIOS in the blade will look at all bootable devices and finding none will connect to the PXE server to begin the boot/ install.

Installing via Virtual Media (Drive Redirection)

You can install the OS via Virtual Media through either the *IPMIview* (Java based client utility), *IPMItool* or the *Web-based Management Utility.* With this method, the OS is installed from an ISO image that resides on another system/blade.

Refer to the manuals on your SuperBlade CD-ROM for further details on the Virtual Media (CD-ROM or Drive Redirection) sections of these two utility programs.

3-8   Management Software

System management may be performed with either of three software packages: *IPMIview*, *IPMItool* or a *Web-based Management Utility*. These are designed to provide an administrator with a comprehensive set of functions and monitored data to keep tabs on the system and perform management activities.

Refer to the manuals on our website for further details on the various functions provided by these management programs.

3-9   Configuring and Setting up RAID

Each blade module that supports two or more hard drives may be used to create a RAID array. The procedures for doing this vary depending upon the blade model chosen for your SuperBlade system.

See Chapter 5 for details on how to configure and set up RAID on your blade module.

Notes

Chapter 4
Blade Module Features

Figure 4-1. SBI-7227R-T2 Blade Unit Front View

This chapter describes the SBI-7227R-T2 blade unit. Installation and maintenance should be performed by experienced technicians only.

See Figure 4-1 for a front view of the blade unit and Table 4-1 for its features.

Table 4-1. SBI-7227R-T2 Blade Unit Features

Feature	Description
Processors	Supports up to two 2011-pin (LGA2011 Socket R) Intel Xeon E5-2600 series processors per node
Memory	Supports up to 256 GB of RDIMM and 64 GB of UDIMM DDR3 1600/1333/1066 MHz speed SDRAM in eight (8) 240-pin DIMM sockets per node
Storage	Up to two hot-plug 2.5" hot pluggable 2.5" enterprise SATA/SSD drives per node
Ports	KVM ports (1) per node (two total)
Features	Each node has an onboard Integrated Matrox G200eW Graphics chip, IPMI 2.0, ATA/100, Plug and Play, APM 1.2, DMI 2.3, PCI 2.2, ACPI 1.0/2.0, SMBIOS 2.3, Real Time Clock and Watch Dog

4-1   Control Panel

Each of the two nodes for the SBI-7227R-T2 blade has an identical control panel (Figure 4-2) with power on/off button, a KVM connector, a KVM button and four LEDs on both the top and bottom front of the unit. The numbers mentioned in Figure 4-2 are described in Table 4-2.

Figure 4-2. Blade Control Panel
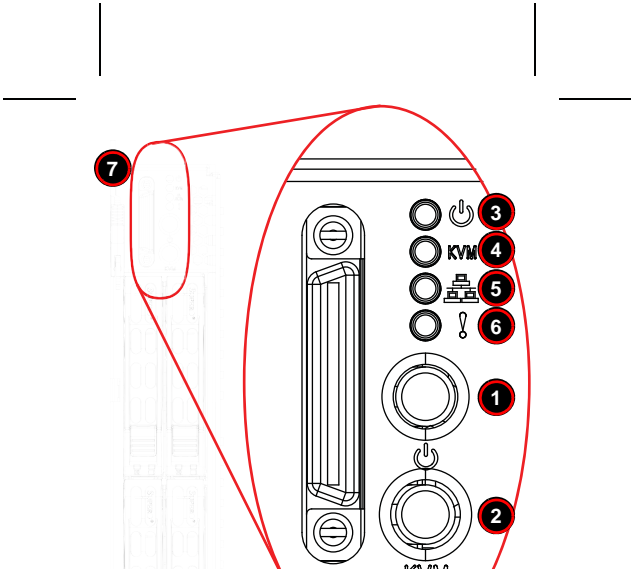
Table 4-2. Blade Control Panel

Item	Function	State	Description
1	Power Button	N/A	Turns blade module on and off
2	KVM Button	N/A	Initiates KVM function
3	Power LED	Green	Indicates power status "On"
		Orange	Indicates power status "Off" (with power cables plugged in)
4	KVM/UID LED	Blue	Indicates KVM being utilized on blade unit
		Flashing Blue	Indicates UID activated on blade module
5	Network/IB LED	Flashing Green	Indicates network activity over LAN
		Flashing Orange	Indicates network activity over InfiniBand module
6	System Fault LED	Red	Indicates a memory error, overheat, VGA error or any error that prevents booting
7	KVM Connector	N/A	Connector for SUV/KVM cable

Power Button

Each node has its own power button so that individual nodes for each blade unit within the enclosure may be turned on or off independently of the others. Press the power button (#1) to turn on the blade server. The power LED (#3) will turn green. To turn off, press and hold the power button for >4 seconds and the power LED will turn orange.

KVM Button

KVM stands for Keyboard/Video/Mouse. With KVM, a user can control multiple blades with a single keyboard/video/mouse setup. Connect your keyboard, mouse and monitor to the USB and VGA connectors on the CMM module, then push the KVM button on the control panel of the blade module you wish to access.

LED Indicators

Blade module LEDs are described below in Table 4-3.

Table 4-3. Blade Module LED Indicators

LED	State	Description
Power LED	Green	Power On
	Amber	Standby
	Red	Power Failure[a]
KVM/UID LED (Blue)	Steady On	Indicates that KVM has been initialized on this blade module
	Flashing	Serves as a UID indicator (the UID function is activated with a management program)
Network LED (Green)	Flashing	Flashes on and off to indicate traffic (Tx and Rx data) on the LAN connection to this blade module.
System Fault LED (Red)	Steady On	This LED illuminates red when a fatal error occurs. This may be the result of a memory error, a VGA error or any other fatal error that prevents the operating system from booting up.

a. In the event of a power failure, the N+1 Redundant Power Supply (if included in your system's configuration) automatically turns on and picks up the system load to provide uninterrupted operation. The failed power supply should be replaced with a new one as soon as possible.

KVM Connector

Alternatively, you may connect a KVM cable (CBL-0218L, with a keyboard/video/mouse attached) to the KVM connector (#7) of the node you wish to access. To switch to another node, disconnect the cable then reconnect it to the new node.

See the *Web-based Management Utility User's Manual* on your SuperBlade system CD-ROM for further details on using the KVM function remotely.

4-2   Mainboard

The mainboard of the SBI-7227R-T2 blade unit is a proprietary design, which is based on the Intel C602 chipset. See Figure 4-4 for a block diagram of this chipset, Figure 4-3 for a view of the B9DRT mainboard and Figure 4-5 for an exploded view diagram of the blade unit.

Figure 4-3. B9DRT Mainboard

Table 4-4. B9DRT Mainboard Layout

Item	Description
1	LGA 2011 CPU Sockets
2	DIMM Slots (see Figure 3-5: "Memory Installation" on page 3-9 for details)
3	two 2.5" SATA Hard Drive Bays
4	InfiniBand Connectors (for InfiniBand or 10G card)
5	Gbx Connectors (for power and logic to backplane)
6	Intel C602 Chipset
7	KVM Module
8	JBT1 Left Node CMOS Clear
9	JKBT1 Right Node CMOS Clear

Figure 4-4. Intel C602 Chipset: Block Diagram (For Each Node)

Jumpers

The jumpers present on the mainboard are used by the manufacturer only; there are no jumpers used to configure the operation of the mainboard.

CMOS Clear

JBT1 and JKBT1 are each used to clear CMOS for each respective node on the mainboard and will also clear any passwords. Each consists of two contact pads located on the board underneath the chipset heatsinks.

Clearing CMOS

1. First power down the blade and remove it from the enclosure.

2. Remove the blade cover to access the mainboard (see Section : Removing/ Replacing the Blade Cover on page 3-2 for further details). Short the CMOS pads with a metal object such as a small screwdriver.

3. Replace the cover, install the blade back into the enclosure and power it on.

4-3   Blade Unit Components

Figure 4-5. Exploded View of a SBI-7227R-T2 Blade Module
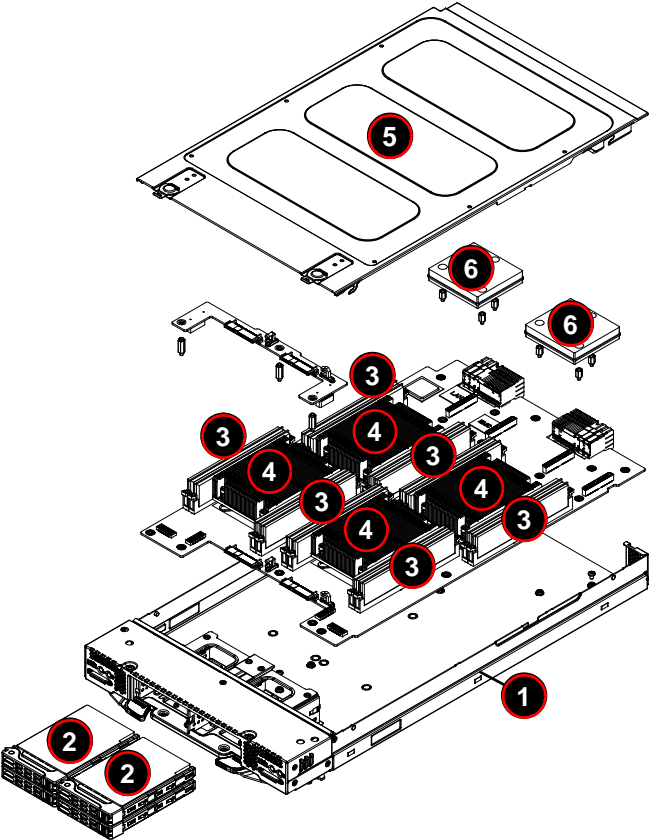
Table 4-5. Main Components of a SBI-7227R-T2 Blade Module

Item	Description
1	Blade Unit/Module
2	2.5" Hard Drives (two)
3	DIMMs (system memory)
4	CPU Heatsinks (2)
5	Top Cover
6	Mezzanine Cards

Memory Support

Each node of the SBI-7227R-T2 blade module supports up to 256 GB of RDIMM and 64 GB of UDIMM DDR3 1600/1333/1066 MHz speed SDRAM in eight (8) 240-pin DIMM sockets. See Section 3-5: Memory Installation on page 3-9 for further details on mainboard memory installation.

Hard Disk Drives

Each node of the SBI-7227R-T2 blade unit supports up to two 2.5" SATA hard disk drives, which are mounted in drive "trays". The drives can be hot-swapped and removed or replaced without powering down the blade unit they reside in. The two drives for each node can be used to set up a RAID array (RAID 0, 1, 5 and 10 Windows; RAID 0, 1 and 10 Linux) or JBOD. These drives use a yellow color for the Blade HDD active LED. See Chapter 5: "RAID Setup Procedure" on page 5-1 for further details on RAID Setup.

WARNING: To maintain proper airflow, both hard drive bays must have drive carriers inserted during operation whether or not a drive is installed in the tray.

Chapter 5
RAID Setup Procedure

Each SBI-7227R-T2 blade module supports up to three hard drives, which may be used to create a RAID 0, 1, 5 and 10 (Windows) or RAID 0, 1 and 10 (Linux) array. For RAID setup use the procedure below. This blade's BIOS has a RAID utility available in its setup.

5-1   RAID Configurations

With two or hard drives per blade, the following RAID configurations are supported:

•   RAID 0 (Data Striping): this writes data in parallel, interleaved ("striped") sections on two hard drives. Data transfer rate is doubled over using a single disk.

•   RAID1 (Data Mirroring): an identical data image from one drive is copied to another drive. The second drive must be the same size or larger than the first drive.

•   Enhanced RAID 5 or RAID 10 (Data Mirroring): as RAID1 with data mirrored from one or more disks to one or more disks of a second, larger size. You can couple the disks from the source to create a virtual volume and use one or more disks of a second, larger size to provide a single larger volume (or multiple larger volumes) that serve as the mirroring drive or drives for the array.

5-2   Preparing for Setup

Before you begin the installation, verify the following:

1.   The SBI-7227R-T2 blade module has two or more hard drives installed.

2.   These drives must not have an OS installed and must be non-partitioned (formatted is ok).

3.   The installation procedure is done via KVM, so have a KVM cable (CBL-0218L) connected to the KVM connector on the blade module with a keyboard, mouse and monitor attached.

> **NOTE:** You may also instead use IPMI or the Web-based Management utility to access the blade.

5-3   RAID Setup Procedure

This section provides instructions for configuring arrays and logical drives with the RAID BIOS Configuration Utility.

It is recommended that you use drives with the same capacity when you create a storage configurations. If you use drives with different capacities in one array, the configuration utility limits each drive to the capacity of the smallest drive.

The number of physical drives in a specific array determines the possible RAID levels that you can implement with the array.

Enabling SATA RAID in the BIOS

Before installing the Windows Operating System, you must change some settings in BIOS. Boot up the system and hit the <Del> key to enter the BIOS Setup Utlility. After the Setup Utility loads,

1. Use the arrow keys to move to the EXIT menu. Scroll down with the arrow keys to the LOAD OPTIMAL DEFAULTS setting and press <ENTER>. Select OK to confirm, then <ENTER> to load the default settings.

2. Use the arrow keys to move to the ADVANCED menu, then scroll down to SATA CONFIGURATION. Once in this submenu, scroll down to SATA MODE and choose the RAID MODE option (see Figure 5-1).

3. Hit the <ESC> key twice and scroll to the EXIT menu. Select SAVE CHANGES AND EXIT and hit <ENTER>, then hit <ENTER> again to verify.

4. After exiting the BIOS Setup Utility, the system will reboot. When prompted during the startup, press the <CTRL+A> key when prompted to run the Intel RAID Utility program (see "Using the Intel RAID Utility" on page 5-3).

Figure 5-1. BIOS Setup Screen

```
                Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
         Advanced

 SATA Configuration                                      (1) IDE Mode. (2) AHCI Mode.
                                                         (3) RAID Mode.
 SATA Port0                        Not Present
 SATA Port1                        Not Present
 SATA Port2                        Not Present
 SATA Port3                        Not Present
 SATA Port4                        Not Present
 SATA Port5                        Not Present

 SATA Mode                      ┌──── SATA Mode ────┐
 Aggressive Link Power Management │  Disabled         │
                                 │  IDE Mode         │
 Port 0 Hot Plug                 │  AHCI Mode        │
 Port 1 Hot Plug                 │  RAID Mode        │    ++: Select Screen
 Port 2 Hot Plug                 └───────────────────┘    ↑↓: Select Item
 Port 3 Hot Plug                 [E                        Enter: Select
 Port 4 Hot Plug                 [Enabled]                 +/-: Change Opt.
 Port 5 Hot Plug                 [Enabled]                 F1: General Help
                                                           F2: Previous Values
   Staggered Spin-up             [Disabled]                F3: Optimized Defaults
   Staggered Spin-up             [Disabled]                F4: Save & Exit
   Staggered Spin-up             [Disabled]                ESC: Exit
   Staggered Spin-up             [Disabled]
   Staggered Spin-up             [Disabled]
   Staggered Spin-up             [Disabled]


                Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Using the Intel RAID Utility

The Intel® RAID Utility program is where you can define the drives you want to include in the RAID array and the mode and type of RAID. In the INTEL RAID UTILITY PROGRAM screen you can create an array, add hotspares and configure your drives.

Notes

Chapter 6
BIOS

6-1   Introduction

This chapter describes the BIOS for Intel SuperBlade modules. The Intel Blade modules use a 128 MB SPI Flash EEPROM with AMI® BIOS each node™ that is stored in a flash chip. This BIOS can be easily upgraded using a floppy disk-based program. Each node in the SBI-7227R-T2 blade module has its own BIOS system.

NOTE: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the http://www.supermicro.com/products/SuperBlade/module/ web site for further details on BIOS setup and the BIOS menus for your SuperBlade blade module.

System BIOS

BIOS stands for Basic Input Output System. The 128 MB SPI Flash EEPROM with AMI® BIOS each node BIOS flash chip stores the system parameters, types of disk drives, video displays, in the CMOS. The CMOS memory requires very little electrical power. When the blade unit is turned off, a backup battery provides power to the BIOS flash chip, enabling it to retain system parameters. Each time the blade is powered on it is configured with the values stored in the BIOS ROM by the system BIOS, which gains control at boot up.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing the <DELETE> key at the appropriate time during system boot. (See "Starting the Setup Utility" below.)

Starting the Setup Utility

Normally, the only visible POST (Power-On Self-Test) routine is the memory test. As the memory is being tested, press the <DELETE> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Security and Power menus.

WARNING: To prevent possible boot failure, do not shut down or reset the system while updating the BIOS.

6-2   BIOS Updates

It may be necessary to update the BIOS used in the blade modules on occasion. However, it is recommended that you not update BIOS if you are not experiencing problems with a blade module.

Updated BIOS files are located on our web site(www.supermicro.com/products/superblade/). Please check the current BIOS revision and make sure it is newer than your current BIOS before downloading.

There are several methods you may use to upgrade (flash) your BIOS. After downloading the appropriate BIOS file (in a zip file format), follow one of the methods described below to flash the new BIOS.

Flashing BIOS

Use the procedures below to "Flash" your BIOS with a new update using the KVM dongle, USB ports on the CMM module or by use of a Floppy disk.

Flashing a BIOS using the KVM Dongle:

For this method, you must use a KVM "dongle" cable (CBL-0218L, included with the system).

1. Copy the contents of the zip file to a bootable USB pen drive.

2. Connect the KVM dongle (CBL-0218L) to the KVM connector at the front of the blade you will be flashing the BIOS to.

3. Connect your bootable USB pen drive to one of the two USB slots on the KVM dongle.

4. Boot to the USB pen drive and go to the directory where you saved the contents of the zip file.

5. Type **flash filename.rom** (replace *filename.rom* by the actual ROM file name).

Flashing a BIOS using the USB Ports on the CMM:

1. Copy the contents of the zip file to a bootable USB pen drive.

2. Connect your bootable USB pen drive to one of the two USB slots on the CMM (located on the back side of the enclosure).

3. Boot to the USB pen drive and go to the directory where you saved the contents of the zip file.

4. Type **flash filename.rom** (replace *filename.rom* by the actual ROM file name).

Flashing a BIOS using a Floppy Image File

This method must be performed remotely.

1. Copy the image file from the zip file to your desktop.

2. Use the web browser or IPMIView to access your CMM remotely using its IP Address.

3. Go to the VIRTUAL MEDIA menu and select FLOPPY IMAGE UPLOAD.

4. BROWSE or OPEN to locate the **.***img* file on your desktop and select it.

5. Press the UPLOAD button and wait a few seconds for the image to upload to the CMM.

6. Once the upload finishes, turn on the blade module and press <DEL> to enter the BIOS setup utility.

7. In the BOOT MENU, bring **USB LS120: PEPPCMM VIRTUAL DISC 1** to the top of the boot priority list.

8. Exit while saving the changes. The blade module will boot to the virtual media (floppy image) **A:\>**.

9. Type **flash *filename*.rom**.

> **NOTE:** Replace *filename.rom* by the actual ROM file name (such as **B8DTE142.rom** for example) in the command.

6-3   Running Setup

> **NOTE:** Default settings are in **bold** text unless otherwise noted.

The BIOS setup options described in this section are selected by choosing the appropriate text from the MAIN BIOS SETUP screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options.

When you first power on the computer, the BIOS is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <DELETE> immediately after turning the system on, or

2. When the message **Press the <Delete> key to enter Setup** appears briefly at the bottom of the screen during the POST, press the <DELETE> key to activate the main SETUP menu:

6-4   Main BIOS Setup

Figure 6-1. BIOS Setup Screen
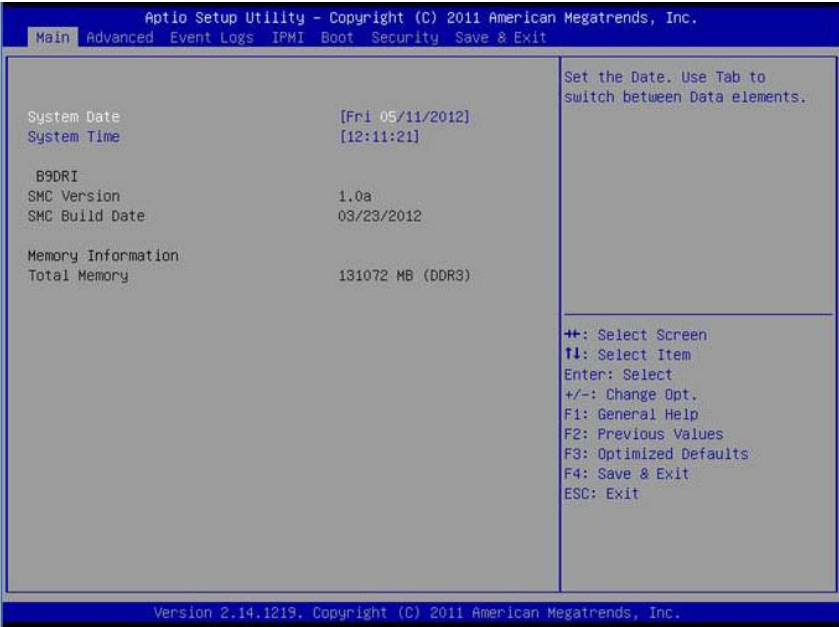
All Main Setup options are described in this section.

Use the UP/DOWN arrow keys to move among the different settings in each menu. Use the LEFT/RIGHT arrow keys to change the options for each setting.

Press the <ESC> key to exit the CMOS SETUP menu. The next section describes in detail how to navigate through the menus.

Items that use sub-menus are indicated with the ▶ icon. With the item highlighted, press the <ENTER> key to access the submenu.

Menu options found in the MAIN BIOS SETUP menu are described in Table 6-1.

Table 6-1. Main BIOS Setup Menu Options

Menu Option	Description
System Date	Using the arrow keys, highlight the month, day and year fields, and enter the correct data for the system date. Press the <Enter> key to save the data.
System Time	To set the system date and time, key in the correct information in the appropriate fields. Then press the <Enter> key to save the data.
BIOS Information	BIOS static display information including the motherboard number, SMC version, SMC Build Date and Total Memory is also shown on the screen.

6-5   Advanced Setup

Choose **Advanced** from the BIOS Setup Utility main menu with the arrow keys to display the ADVANCED SETUP menu. The items with a triangle beside them are sub-menus that can be accessed by highlighting the item and pressing <ENTER>. Options for PIR settings are displayed by highlighting the setting option using the arrow keys and pressing <ENTER>.

Table 6-2 describes all sub-menus found in the ADVANCED SETUP menu.

Table 6-2. Advanced Setup Menu Options

Sub-menu	Description
▶Boot Feature	See Table 6-3 for a description of BIOS setup menu options in this sub-menu.
▶CPU Configuration	See Table 6-4 for a description of BIOS setup menu options in this sub-menu.
▶Chipset Configuration	See Table 6-5 for a description of BIOS setup menu options in this sub-menu.
▶SATA Configuration	See Table 6-6 for a description of BIOS setup menu options in this sub-menu.
▶PCIe/PII/PnP Configuration	See Table 6-7 for a description of BIOS setup menu options in this sub-menu.
▶SuperIO Configuration (WPCM450)	See Table 6-8 for a description of BIOS setup menu options in this sub-menu.
▶Serial Port Console Redirection	See Table 6-9 for a description of BIOS setup menu options in this sub-menu.
▶ACPI Configuration	See Table 6-10 for a description of BIOS setup menu options in this sub-menu.
▶ME Subsystem	See Table 6-11 for a description of BIOS setup menu options in this sub-menu.

Table 6-3. Boot Feature Submenu

Menu Option	Description
Quiet Boot	When Disabled the BIOS displays normal POST messages. When **Enabled** the BIOS displays an OEM Logo instead of POST messages.
AddOn ROM Display Mode	This setting sets the display mode for Option ROM. Options include **Force BIOS** or Keep Current.
Bootup NUM-Lock	This setting selects the Power-On state for Numlock. Options include **On** or Off.
Wait for 'F1' If Error	When enabled, the system will wait for the F1 key to be pressed if an error occurs. Options are **Enabled** or Disabled.
Interrupt 19 Capture	When enabled this setting allows option ROMs to trap Interrup 19. Options include **Enabled** or Disabled.
Watch Dog Timer	This setting allows the system to restart when it is not active more than 5 minutes. Option include Enabled and **Disabled**.

Table 6-3. Boot Feature Submenu (Continued)

Menu Option	Description
Power Button Function	This setting specifies the power button's function when pressed. Option include 4 Seconds Override or **Instant Off**.
Restore on AC Power Loss	This setting specifies what the system will do when power is restored after an AC power loss to the system. Options include **Stay Off** (system power remains off after power loss), Power-On (system power turns on after power loss) or Last State (allows the system to resume its last state before the power loss).

Table 6-4. CPU Configuration Submenu

Menu Option	Description
▶Socket 1 CPU Information ▶Socket 2 CPU Information	These submenus, when selected, shows information on the Socket 1/Socket 2 processors and other information including CPU Signature, Microcode Patch, CPU Stepping, Max CPU Speed, Min CPU Speed, Processor Cores, Intel HT Technology, Intel VT-x Technology, L1 Data Cache, L1 Code Cache, L2 Cache and L3 Cache. Additionally, the CPU Configuration submenu shows information about the CPU Speed and 64-bit support. The information shown is only readable and cannot be changed.
Clock Spread Spectrum	This setting enables or disables spread spectrum modulation. Options are Enabled and **Disabled**.
Hyper-threading	This setting is **Enabled** for Windows XP and Linux (OS optimized for Hyper-threading technology), and Disabled for other OSes (any OS not optimized for Hyper-threading techology). When Disabled, only one thread per enabled core is enabled.
Active Processor Cores	This setting selects the number of cores to enable in each processor package. Options include **All**, 1, 2, 4 and 6.
Limit CPUID Maximum	This setting is disabled for Windows XP. Options include Enabled or **Disabled**.
Execute Disable Bit	XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS such as Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2 or RedHat Enterprise 3 Update 3. Options include **Enabled** or Disabled.
Hardware Prefetcher	If set to **Enabled**, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache in the forward or backward manner to improve CPU performance. Options are **Enabled** and Disabled. For UP platforms leave it enabled. for DP/MP servers, this setting may be used to tune performance to the specific application.
Adjacent Cache Line Prefetch	The CPU fetches the cache line for 64-bytes if this option is set to Disabled. The CPU fetches both cache lines for 128-bytes as comprised if **Enabled**. For UP platforms leave it enabled. for DP/MP servers, this setting may be used to tune performance to the specific application.
DCU Streamer Prefetcher	For UP platforms, leave this option **Enabled**. For DP/MP servers, this option may be used to tune performance to the specific application. Options are **Enabled** or Disabled.
DCU IP Prefetcher	This setting **Enables** or Disables prefetch of the next L1 line based upon sequential load history.

Table 6-4. CPU Configuration Submenu (Continued)

Menu Option	Description
Intel® Virtualization Technology	Select **Enabled** to use this Virtualization Technology feature to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer system. The options are **Enabled** and Disabled. Please refer to the Intel website for further detailed information. **NOTE:** A full reset of the system is required when you change this setting.
▶CPU Power Management Configuration	Power management options and information is displayed on this submenu. In addition to the options in this submenu, information is displayed for Factory Long Duration Power Limit, Factory Long Duration Maintained and Recommended Short Duration Power.
Power Technology	This option enables power managment features. Options include Disable, **Energy Efficient** and Custom. Selecting "Custom" allows you to either Enable or Disable the following features and their defaults: • EIST (Enabled) • Turbot Mode (Enabled) • C1E Support (Enabled) • CPU C3 Report (Disabled) • CPU C6 Report (Enabled) • CPU C7 Report (Enabled) • Package C-state Limit (C6) • Energy Performance • Long Duration Power Limit • Long Duration Maintained
Energy Performance	This option allows you to optimize between power and energy savings. Windows 2008 and later OSes overides this value according to its power plan. Options include Performance, **Balanced Performance**, Balanced Energy and Energy Efficient.
Long Duration Power Limit	This option allows you to set the long duration power limit in Watts. To set the value, enter a number from your keyboard in the field highlighted. To reset the number, enter a new number.
Long Duration Maintained	This option allows you to set the time window for which the long duration power limit is maintained. To set the time value, enter a number from your keyboard in the field highlighted. To reset the number, enter a new number.
Short Duration Power Limit	This option allows you to set the short duration power limit in Watts. To set the value, enter a number from your keyboard in the field highlighted. To reset the number, enter a new number.

Table 6-5. Chipset Configuration Sub-menu

Menu Option	Description
▶North Bridge Configuration	This sub-menu configures North Bridge features and shows configuration information.
▶IOH Configuration	This submenu configures Intel VT-d and Intel I/OAT in your system and configures IOU PCIe port bifurcation controls.
Intel VT-d	This setting allows you to **Enable** or Disable Intel Virtualization Technology for in your system.
Intel I/OAT	This setting allows you to **Enable** or Disable Intel I/O Acceleration Technology in your system.
DCA Support	This setting allows you to **Enable** or Disable DCA support in your system.
IOH 0/1 PCIe Port Bifurcation Controls	Both IOH 0 and IOH 1 PCIe port bifurcation controls are available to set IOU Link Speed and PCIe Port settings. Options include Gen 1, **Gen 2** or Gen 3 link speed settings or various port PCIe settings for x4x4, x8, x4x4x4, x4x4x8, x8x4x4, x8x8 or x16 (default depends upon setting).
▶QPI Configuration	This submenu statically displays Current QPI Link Speed and Current QPI Link Freq as well as providing options for Isoc, QPI Link Speed Mode and QPI Link Frequency Select.
Isoc	This setting allows you to Enable or **Disable** Isoc in your system.
QPI Link Speed Mode	This setting allows you to select QPI Link Speed as being either **Fast** or Slow mode.
QPI Link Frequency Select	This setting allows you to select the QPI link frequency. Options include **Auto**, 6.4 GT/s, 7.2 GT/s or 8.0 GT/s.
▶DIMM Configuration	This submenu displays static Memory Configuration information (Current Memory Mode, Current Memory Speed, Mirroring and Sparing), DIMM Information and other option settings.
▶DIMM Information	DIMM presence and size information is shown in this submenu when selected.
Memory Mode	This setting sets the system memory mode. Options include the following: • **Independent** (default) – All DIMMs are available to the operating system. • Mirroring – The mainboard maintains two identical copies of all data in memory for redundancy. • Lock Step – The mainboard uses two areas of memory to run the same set of operations in parallel. • Sparing – A preset threshold of correctable errors is used to trigger fail-over. The spare memory is put online and used as active memory in place of the failed memory.
DRAM RAPL Mode	This setting allows you to select DRAM RAPL Mode for your system. Options include Disabled, DRAM RAPL Mode0 and **DRAM RAPL MODE1**.
DDR Speed	This setting allows you to force DDR speed for your system. Options include **Auto**, Force DDR3 800, Force DDR 1066, Force DDR 1333, Force DDR 1600 and Force SPD.
Channel Interleaving	This setting allows you to select different channel interleaving settings. Options include **Auto**, 1 Way, 2 Way, 3 Way and 4 Way.

Table 6-5. Chipset Configuration Sub-menu (Continued)

Menu Option	Description
Rank Interleaving	This setting allows you to select different rank interleaving settings. Options include **Auto**, 1 Way, 2 Way, 4 Way and 8 Way.
Patrol Scrub	This setting allows you to either **Enable** or Disable Patrol Scrub for your system.
Demand Scrub	This setting allows you to Enable or **Disable** the Demand Scrubbing in your system.
Data Scrambling	This setting allows you to **Enable** or Disable the Data Scrambling in your system.
Device Tagging	This setting allows you to Enable or **Disable** the Device Tagging in your system.
Thermal Throttling	For this setting, selecting Disabled sets Open Loop Thermal Throttling, whereas selecting **CLTT** sets Closed Loop Thermal Throttling.
▶South Bridge Configuration	This sub-menu static displays PCH Information (chipset Name, Stepping and USB Devices), and allows you to configure other South Bridge features.
All USB Devices	This setting allows you to enable USB devices in your system. Options include **Enabled** or Disabled.
EHCI Controller 1/ EHCI Controller 2	This setting allows you to **Enable** or Disabled USB 2.0 (EHCI) support for Controller 1/2.
Legacy USB Support	This setting allows you to enable the use of Legacy USB devices. If this option is set to Auto, legacy USB support will be automatically enabled if a legacy USB device is installed on the mainboard, and disabled if no USB devices are connected. The options include Disabled, **Enabled** and Auto.
Port 60/64 Emulation	This setting **Enables** or Disables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
EHCI Hand-off	This setting is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by the EHCI driver. Options include Enabled or **Disabled**.

Table 6-6. SATA Configuration Sub-menu

Menu Option	Description
SATA Configuration	This submenu contains settings for SATA configuration options as well as information at the top on what hard disk drives are installed on the system.
SATA Mode	This setting allows you to specify the SATA mode used for your system. Options include Disabled, IDE Mode, **AHCI Mode** and RAID Mode.
Aggressive Link Power Management	This setting allows you to **Enable** or Disable Aggressive Link Power Management for your system.
Port 0~5 Hog Plug	These settings allow you to **Enable** or Disable SATA Port Hot Plug support for each port specified.
Staggered Startup (5)	These settings allow you to Enable or **Disable** AHCI Staggered Spin-up support for each drive.

Table 6-7. PCIe/PCI/PnP Configuration Sub-menu

Menu Option	Description
PCI ROM Priority	Use this setting in case of multiple Option ROMs to specify what PCI Option ROM to launch. Options include **Legacy ROM** and EFI Compatible ROM.
PCI Latency Timer	This sets the value to programmed into the PCI Latency Timer Register. Options include 32, **64**, 96, 128, 160, 192, 224 an 248.PCI Bus Clocks.
Above 4G Decoding	This setting allows you to Enables or **Disables** decoding of 64-bit capable devices in the Above 4G Address Space. This setting is only usable if your system supports 64-bit PCI decoding.
PERR# Generation	This setting allows you to Enable or **Disable** the PCI device to generate a PERR#.
SERR# Generation	This setting allows you to Enable or **Disable** the PCI device to generate a SERR#.
Maximum Payload	Use this setting to set the maximum payload of the PCI Express device or allow the system BIOS to select the value. Options include **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes or 4096 Bytes.
Maximum Read Request	Use this setting to set the maximum read request size of the PCI Express device or allow the system BIOS to select the value. Options include **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes or 4096 Bytes.
ASPM Support	This sets the ASPM Level for your system. Options include **Disabled** (disables ASPM), Auto (lets BIOS auto configure) or Force L0s (force all links to L0s state).
Onboard LAN Option ROM Select	This setting allows you to select the onboard LAN option ROM to be either **PXE** or iSCSI. Note: If iSCSI is selected, LAN1 Option ROM select will cover all other Oboard LANs.
Load Onboard LAN 1 Option ROM	This setting **Enables** or Disables onboard option ROM for LAN1.
Load Onboard LAN 2 Option ROM	This setting Enables or **Disables** onboard option ROM for LAN2.
Network Stack	This setting allows you to Enable or **Disable** the network stack (Pxe and UEFI).

Table 6-8. SuperIO Configuration Sub-menu

Menu Option	Description
Super IO Chip	This static display shows the name of the Super IO chip installed for your system.
▶Serial Port 1 Configuration	This submenu allows you to configure Serial Port 1.
Serial Port	This setting allows you to **Enable** or Disable the Serial Port.
Change Settings	Use this setting to select an optimal setting for the Super IO device to use for the Serial Port. Options include **Auto**, IO=3F8h/IRQ=4, IO=3F8h/IRQ=3~12, IO=2F8h/IRQ=3~12, IO=3E8h/IRQ=3~12 and IO=2E8h/IRQ=3~12
Serial Port Mode	This setting allows you to set the Serial Port Mode to either Serial Over LAN (SOL) or COM. Options include **Normal** or High Speed.

Table 6-8. SuperIO Configuration Sub-menu (Continued)

Menu Option	Description
▶Serial Port 2 Configuration submenu	This submenu allows you to configure Serial Port 2.
Serial Port	This setting allows you to **Enable** or Disable the Serial Port.
Change Settings	Use this setting to select an optimal setting for the Super IO device to use for the Serial Port. Options include **Auto**, IO=3F8h/IRQ=4, IO=3F8h/IRQ=3~12, IO=2F8h/IRQ=3~12, IO=3E8h/IRQ=3~12 and IO=2E8h/IRQ=3~12
Serial Port Attribute	This setting allows you to set either Serial over LAN (**SOL**) or COM for the serial port attribute.
Serial Port Mode	This setting allows you to set the Serial Port Mode to either Serial Over LAN (SOL) or COM. Options include **Normal** or High Speed.

Table 6-9. Serial Port Console Redirection Sub-menu

Menu Option	Description
COM1	
Console Redirection	Use this setting to **Enable** or Disable Console Redirection for the COM1 port.
▶Console Redirection Settings	This submenu contains Console Redirection settings for the COM1 port.
Terminal Type	This setting allows you to select the Terminal Type to use for Console Redirection emulation. Options include ANSI (extended ASCII character set), **VT100** (ASCII character set), VT100+ (extends VT100 to support color, function keys, etc.) and VT-UTF8 (uses UTF8 encoding to map Unicode characters onto one or more bytes).
Bits per Second	This setting selects the serial port transmission speed, which must be matched on the other side. Long or noisy lines may require lower speeds. Options include 9600, 19200, 38400, 57600 and **115200**.
Data Bits	This sets the number of data bits as either 7 or **8**.
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Options include **None** (no parity bit), Even (parity bit is 0 if the number of 1's in the data bits is even), Odd (parity bit is 0 if the number of 1's in the data bits is odd), Mark (parity bit is always 1) or Space (parity bit is always 0. The Mark and Space Parity do not allow for error detection.
Stop Bits	Stop bits indicate the end of a serial data packet (a start bit indicates the beginning). The standard setting is **1** stop bit. Communications with slow devices may require more than 1 stop bit. Options are **1** or 2.
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. Options include **None** and Hardware RTS/CTS.
VT-UTF8 Combo Key Support	This setting **Enables** or Disables VT-UTF8 Combination Key support for ANSI/VT100 terminals.

Table 6-9. Serial Port Console Redirection Sub-menu (Continued)

Menu Option	Description
Recorder Mode	This setting Enables or **Disables** Recorder Mode. When enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	This setting **Enables** or Disables extended terminal resolution.
Legacy OS Redirection Resolution	This allows you to set for legacy OSes the number of rows and columns supported for redirection. Options include **80x24** or 80x25.
Putty KeyPad	This setting allows you to select the funtion key and KeyPad to use on the Putty keyboard. Options include **VT100**, LINUX, XTERMR6, SCO, ESCN or VT400.
COM2	
Console Redirection	Use this setting to **Enable** or Disable Console Redirection for the COM2 port.
▶Console Redirection Settings	This submenu contains Console Redirection settings for the COM2 port.
Terminal Type	This setting allows you to select the Terminal Type to use for Console Redirection emulation. Options include ANSI (extended ASCII character set), VT100 (ASCII character set), **VT100+** (extends VT100 to support color, function keys, etc.) and VT-UTF8 (uses UTF8 encoding to map Unicode characters onto one or more bytes).
Bits per Second	This setting selects the serial port transmission speed, which must be matched on the other side. Long or noisy lines may require lower speeds. Options include 9600, 19200, 38400, 57600 and **115200**.
Data Bits	This sets the number of data bits as either 7 or **8**.
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Options include **None** (no parity bit), Even (parity bit is 0 if the number of 1's in the data bits is even), Odd (parity bit is 0 if the number of 1's in the data bits is odd), Mark (parity bit is always 1) or Space (parity bit is always 0. The Mark and Space Parity do not allow for error detection.
Stop Bits	Stop bits indicate the end of a serial data packet (a start bit indicates the beginning). The standard setting is **1** stop bit. Communications with slow devices may require more than 1 stop bit. Options are **1** or 2.
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. Options include **None** and Hardware RTS/CTS.
VT-UTF8 Combo Key Support	This setting **Enables** or Disables VT-UTF8 Combination Key support for ANSI/VT100 terminals.
Recorder Mode	This setting Enables or **Disables** Recorder Mode. When enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	This setting **Enables** or Disables extended terminal resolution.
Legacy OS Redirection Resolution	This allows you to set for legacy OSes the number of rows and columns supported for redirection. Options include 80x24 or **80x25**.

Table 6-9. Serial Port Console Redirection Sub-menu (Continued)

Menu Option	Description
Putty KeyPad	This setting allows you to select the funtion key and KeyPad to use on the Putty keyboard. Options include **VT100**, LINUX, XTERMR6, SCO, ESCN or VT400.
Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)	
Console Redirection	Use this setting to Enable or **Disable** Console Redirection for Out-of-Band Management/Windows Emergency Management Services (EMS).
▶Console Redirection Settings	This submenu contains Console Redirection settings for Out-of-Band Management/Windows Emergency Management Services (EMS). Static display information for Data Bits, Parity and Stop Bits is also shown in this submenu.
Out-of-Band Mgmt Port	Microsoft Windows Emergency Managment Services (EMS) allows for remote managment of a Windows Server OS through a serial port. This setting allows you to specify which port to use (**COM1** or COM2).
Terminal Type	VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. Options include ANSI (extended ASCII character set), VT100 (ASCII character set), VT100+ (extends VT100 to support color, function keys, etc.) and **VT-UTF8** (uses UTF8 encoding to map Unicode characters onto one or more bytes).
Bits per Second	This setting selects the serial port transmission speed, which must be matched on the other side. Long or noisy lines may require lower speeds. Options include 9600, 19200, 57600 and **115200**.
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. Options include **None**, Hardware RTS/CTS and Software Xon/Xoff.

Table 6-10. ACPI Settings Sub-menu

Menu Option	Description
ACPI Sleep State	This setting selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. Options include Suspend Disabled and **S1 (CPU Stop Clock)**.
High Precision Timer	Use this setting to **Enable** or Disable the High Precision Event Timer.

Table 6-11. ME Subsystem Sub-menu

Menu Option	Description
Intel ME Subsystem Configuration	This submenu displays static information for the ME BIOS Interface Version and the ME Version for your system.
ME Subsystem	This setting allows you to **Enable** or Disable ME Subsystem help.

6-6   Event Logs Setup

Table 6-12. Event Logs Menu

Menu Option	Description
▶Change SMBIOS Event Log Settings	This submenu allows you to change the SMBIOS Event Log configuration settings.
SMBIOS Event Log	This setting allows you to **Enable** or Disable SMBIOS Event Logging.
Runtime Error Logging Support	Use this setting to **Enable** or Disable runtime error logging support.
Memory Corr. Error Threshold	Use this setting to enter the memory correctable error threshold value of between 1 and 15. The default value is **10**.
PCI Error Logging Support	Use this setting to Enable or **Disable** PCI error logging support.
Erase Event Log	Use this setting for erasing the SMBIOS Event Log. Erasing is done prior to any logging activation during reset. Options are **No**, Yes Next Reset and Yes Every Reset.
When Log is Full	Use this setting to choose options for reactions to a full SMBIOS Event Log. Options include **Do Nothing** and Erase Immediately.
Log System Boot Event	Use this setting to choose the option to Enable or **Disable** logging of system boot events.
MECI	This setting (Multiple Event Count Increment) is used to select the number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry is updated. This is specified as a numeric value in the range of 1 to 255. The default for this setting is set to **1**.
METW	This setting (Multiple Event Time Window) is used to select the number of minutes which must pass between duplicate log entries that utilize a multiple-event counter. The value ranges from 0 to 99 minutes. The default for this setting is set to **60**.
View SMBIOS Event Log	Selecting this option displays the SMIBIOS Event Log for viewing.

6-7   IPMI Setup

Table 6-13. IPMI Menu

Menu Option	Description
IPMI Information	IPMI Firmware Revision and IPMI Status information are statically displayed at the top of this menu.
▶System Event Log	Selecting this submenu displays settings for changing the SEL Event Log configuration.
SEL Components	Change this setting to **Enable** or Disable all features of the System Event Logging during boot-up.
Erase SEL	Use this setting for erasing the SEL. Options are **No**, Yes On Next Reset and Yes On Every Reset.
When SEL is Full	Use this setting to choose options for reactions to a full SEL. Options include **Do Nothing** and Erase Immediately.
Log EFI Status Codes	Use this setting to **Enable** or Disable logging of EFI status codes, log only error codes or only progress codes
▶BMC Network Configuration	Use this submenu to configure BMC network parameters.
BMC Network Configuration Information	The submenu contains static display information for the Station IP Address, Subnet Mask, Station MAC Address and Gateway IP Address.
Update IPMI LAN Configuration	Specify Yes or **No** for the BIOS to use this setting for IPMI in the next boot-up.
Configuration Address Source	This setting allows you to configure LAN channel parameters Statically or Dynamically (by BIOS or BMC). Unspecified option will not modify any BMC network parameters during the BIOS phase. Options are **DHCP** (dynamic) or Static.

6-8   Boot

Choose **Boot** from the BIOS Setup Utility main menu with the arrow keys to bring up the
BOOT SETUP menu. Security setting options are displayed by highlighting the setting
using the arrow keys and pressing <ENTER>. All Security BIOS settings are described in
Table 6-14 below.

Table 6-14. Boot Setup Menu Options

Menu Option	Description
Boot Device Priorities	These menu settings allow you to specify the sequence of priority for the boot device (such as hard disk drives, USB devices, CD-ROM drives, Network drives and so on). The menu options are for 1st Boot Device, 2nd Boot Device and 3rd Boot device, 4th Boot Device and so on. Each numbered boot device can be set to a specific device installed in your system or to Disabled. **NOTE:** A device enclosed in parenthesis has been disabled in the corresponding type menu.
▶USB Device BBS Priorities	This submenu allows you to set the order of the legacy devices in this group for setting the boot order.
▶Network Device BBS Priorities	This submenu allows you to set the order of the legacy devices in this group for setting the boot order.
▶Add New Boot Option	This submenu allows you to add a new EFI boot option to the boot order.
Add Boot Option	Use this setting to add a new boot option.
Select Filesystem	Use this setting to select one file system from the list.
Path for Boot Option	Enter here a path to the boot option in the format fs0:\path\filename.efi
Create	Select this setting to create your boot option.
▶Delete Boot Option	This submenu allows you to remove an EFI boot option form the boot order.

6-9   Security

Choose **Security** from the BIOS Setup main menu with the arrow keys to bring up the
SECURITY SETUP menu. Security setting options are displayed by highlighting the setting
using the arrow keys and pressing <ENTER>. All Security BIOS settings are described in
Table 6-15 below.

Table 6-15. Security Menu Options

Menu Option	Description
Administrator Password	This allows you to create an administrator password for the system.
User Password	This allows you to create user password for the system.

6-10 Save & Exit

Choose SAVE & EXIT from the 128 MB SPI Flash EEPROM with AMI® BIOS each node BIOS Setup Utility main menu with the arrow keys to display the SAVE & EXIT SETUP menu. All Exit BIOS settings are described in Table 6-16 below.

Table 6-16. Exit Menu Options

Menu Option	Description
Discard Changes and Exit	Highlight this item and hit <ENTER> to exit the BIOS Setup utility without saving any changes you may have made. Any changes you have made to the BIOS Setup will not take effect upon system bootup.
Save Changes and Reset	Highlight this item and hit <ENTER> to save any changes you made and to exit the BIOS Setup utility. The system will reboot and implement the changes you have made to the BIOS Setup.
Save Changes	Highlight this item and hit <ENTER> to save changes done so far to any of the setup options.
Discard Changes	Highlight this item and hit <ENTER> to discard (cancel) any changes you made. You will remain in the Setup utility.
Restore Optimized Defaults	Highlight this item and hit <ENTER> to load the default settings for all items in the BIOS Setup. These are the safest settings to use and are designed for maximum system performance, but may not work best for all computer applications.
Save as Users Defaults	Highlight this item and hit <ENTER> to save changes done so far as user defaults.
Restore User Defaults	Highlight this item and hit <ENTER> to restore the user defaults to all the setup options.
Boot Override	For each boot device you have the option of saving the configuration for it and exiting.

Notes

Disclaimer

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Appendix A
BIOS POST Codes

A-1   BIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for problems. If a problem is found, the BIOS will activate an alarm or display a message. The following is a list of such BIOS messages.

Table A-1. BIOS POST Messages

BIOS Message	Description
Failure Fixed Disk	Fixed disk is not working or not configured properly. Check to see if fixed disk is attached properly. Run Setup. Find out if the fixed-disk type is correctly identified.
Stuck key	Stuck key on keyboard.
Keyboard error	Keyboard not working.
Keyboard Controller Failed	Keyboard controller failed test. May require replacing keyboard controller.
Keyboard locked - Unlock key switch	Unlock the system to proceed.
Monitor type does not match CMOS - Run SETUP	Monitor type not correctly identified in Setup
Shadow Ram Failed at offset: nnnn	Shadow RAM failed at offset **nnnn** of the 64k block at which the error was detected.
System RAM Failed at offset: nnnn	System RAM failed at offset **nnnn** of in the 64k block at which the error was detected.
Extended RAM Failed at offset: nnnn	Extended memory not working or not configured properly at offset **nnnn.**
System battery is dead - Replace and run SETUP	The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.
System CMOS checksum bad - Default configuration used	System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact your dealer.
System timer error	The timer test failed. Requires repair of system board.
Real time clock error	Real-Time Clock fails BIOS hardware test. May require board repair.
Check date and time settings	BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

Table A-1. BIOS POST Messages (Continued)

BIOS Message	Description
Previous boot incomplete - Default configuration used	Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with control of **wait states**, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the waitstate configuration is correct. This error is cleared the next time the system is booted.
Memory Size found by POST differed from CMOS	Memory size found by POST differed from CMOS.
Diskette drive A error Diskette drive B error	Drive A: or B: is present but fails the BIOS POST diskette tests. Check to see that the drive is defined with the proper diskette type in Setup and that the diskette drive is attached correctly.
Incorrect Drive A type - run SETUP	Type of floppy drive A: not correctly identified in Setup.
Incorrect Drive B type - run SETUP	Type of floppy drive B: not correctly identified in Setup.
System cache error - Cache disabled	RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. See your dealer. A disabled cache slows system performance considerably.
CPU ID:	CPU socket number for Multi-Processor error.
EISA CMOS not writeable	ServerBIOS2 test error: Cannot write to EISA CMOS.
DMA Test Failed	ServerBIOS2 test error: Cannot write to extended **DMA** (Direct Memory Access) registers.
Software NMI Failed	ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).
Fail-Safe Timer NMI Failed	ServerBIOS2 test error: Fail-Safe Timer takes too long.
device Address Conflict	Address conflict for specified **device.**
Allocation Error for: device	Run ISA or EISA Configuration Utility to resolve resource conflict for the specified **device**.
CD ROM Drive	CD ROM Drive identified.
Entering SETUP...	Starting Setup program
Failing Bits: nnnn	The hex number **nnnn** is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. See errors 230, 231, or 232 above for offset address of the failure in System, Extended, or Shadow memory.
Fixed Disk n	Fixed disk **n** (0-3) identified.
Invalid System Configuration Data	Problem with NVRAM (CMOS) data.
I/O device IRQ conflict	I/O device IRQ conflict error.
PS/2 Mouse Boot Summary Screen:	PS/2 Mouse installed.

Table A-1. BIOS POST Messages (Continued)

BIOS Message	Description
nnnn kB Extended RAM Passed	Where **nnnn** is the amount of RAM in kilobytes successfully tested.
nnnn Cache SRAM Passed	Where **nnnn** is the amount of system cache in kilobytes successfully tested.
nnnn kB Shadow RAM Passed	Where **nnnn** is the amount of shadow RAM in kilobytes successfully tested.
nnnn kB System RAM Passed	Where **nnnn** is the amount of system RAM in kilobytes successfully tested.
One or more I2O Block Storage Devices were excluded from the Setup Boot Menu	There was not enough room in the IPL table to display all installed I2O block-storage devices.
Operating system not found	Operating system cannot be located on either drive A: or drive C:. Enter Setup and see if fixed disk and drive A: are properly identified.
Parity Check 1 nnnn	Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.
Parity Check 2 nnnn	Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays **????**.
Press <F1> to resume, <F2> to Setup, <F3> for previous	Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an **Option ROM**, i.e., an add-on card). Write down and follow the information shown on the screen.
Press <F2> to enter Setup	Optional message displayed during POST. Can be turned off in Setup.
PS/2 Mouse:	PS/2 mouse identified.
Run the I2O Configuration Utility	One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O Configuration Utility (e.g. the SAC utility).
System BIOS shadowed	System BIOS copied to shadow RAM.
UMB upper limit segment address: *nnnn*	Displays the address *nnnn* of the upper limit of **Upper Memory Blocks**, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.
Video BIOS shadowed	Video BIOS successfully copied to shadow RAM.

A-2   BIOS POST Codes

This section lists the POST (Power-On Self-Test) codes for the 128 MB SPI Flash EEPROM with AMI® BIOS each node BIOS. POST codes are divided into two categories: recoverable and terminal.

Recoverable POST Errors

When a recoverable type of error occurs during POST, the BIOS will display an POST code that describes the problem. BIOS may also issue one of the following beep codes:

- **One long and two short beeps** – video configuration error
- **One repetitive long beep** – no memory detected

Terminal POST Errors

If a terminal type of error occurs, BIOS will shut down the system. Before doing so, BIOS will write the error to *port 80h*, attempt to initialize video and write the error in the top left corner of the screen.

The following is a list of codes that may be written to *port 80h*.

Table A-2. Terminal POST Errors

Post Code	Description
02h	Verify Real Mode
03h	Disable Non-Maskable Interrupt (NMI)
04h	Get CPU type
06h	Initialize system hardware
07h	Disable shadow and execute code from the ROM.
08h	Initialize chipset with initial POST values
09h	Set IN POST flag
0Ah	Initialize CPU registers
0Bh	Enable CPU cache
0Ch	Initialize caches to initial POST values
0Eh	Initialize I/O component
0Fh	Initialize the local bus IDE
10h	Initialize Power Management
11h	Load alternate registers with initial POST values
12h	Restore CPU control word during warm boot
13h	Initialize PCI Bus Mastering devices
14h	Initialize keyboard controller
16h	1-2-2-3 BIOS ROM checksum
17h	Initialize cache before memory Auto size
18h	8254 timer initialization
1Ah	8237 DMA controller initialization
1Ch	Reset Programmable Interrupt Controller
20h	1-3-1-1 Test DRAM refresh

Table A-2. Terminal POST Errors (Continued)

Post Code	Description
22h	1-3-1-3 Test 8742 Keyboard Controller
28h	Auto size DRAM
29h	Initialize POST Memory Manager
2Ah	Clear 512 kB base RAM
2Ch	1-3-4-1 RAM failure on address line *xxxx*[*]
2Eh	1-3-4-3 RAM failure on data bits *xxxx*[*] of low byte of memory bus
2Fh	Enable cache before system BIOS shadow
32h	Test CPU bus-clock frequency
33h	Initialize Phoenix Dispatch Manager
36h	Warm start shut down
38h	Shadow system BIOS ROM
3Ah	Auto size cache
3Ch	Advanced configuration of chipset registers
3Dh	Load alternate registers with CMOS values
41h	Initialize extended memory for RomPilot
42h	Initialize interrupt vectors
45h	POST device initialization
46h	2-1-2-3 Check ROM copyright notice
47h	Initialize I20 support
48h	Check video configuration against CMOS
49h	Initialize PCI bus and devices
4Ah	Initialize all video adapters in system
4Bh	QuietBoot start (optional)
4Ch	Shadow video BIOS ROM
4Eh	Display BIOS copyright notice
4Fh	Initialize MultiBoot
50h	Display CPU type and speed
51h	Initialize EISA board
52h	Test keyboard
54h	Set key click if enabled
55h	Enable USB devices
58h	2-2-3-1 Test for unexpected interrupts
59h	Initialize POST display service
5Ah	Display prompt "Press F2 to enter SETUP"
5Bh	Disable CPU cache

Table A-2. Terminal POST Errors (Continued)

Post Code	Description
5Ch	Test RAM between 512 and 640 kB
60h	Test extended memory
62h	Test extended memory address lines
64h	Jump to UserPatch1
66h	Configure advanced cache registers
67h	Initialize Multi Processor APIC
68h	Enable external and CPU caches
69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size
6Bh	Load custom defaults (optional)
6Ch	Display shadow-area message
6Eh	Display possible high address for UMB recovery
70h	Display error messages
72h	Check for configuration errors
76h	Check for keyboard errors
7Ch	Set up hardware interrupt vectors
7Dh	Initialize Intelligent System Monitoring
7Eh	Initialize coprocessor if present
80h	Disable onboard Super I/O ports and IRQs
81h	Late POST device initialization
82h	Detect and install external RS232 ports
83h	Configure non-MCD IDE controllers
84h	Detect and install external parallel ports
85h	Initialize PC-compatible PnP ISA devices
86h	Re-initialize onboard I/O ports.
87h	Configure Motherboard Configurable Devices (optional)
88h	Initialize BIOS Data Area
89h	Enable Non-Maskable Interrupts (NMIs)
8Ah	Initialize Extended BIOS Data Area
8Bh	Test and initialize PS/2 mouse
8Ch	Initialize floppy controller
8Fh	Determine number of ATA drives (optional)
90h	Initialize hard-disk controllers
91h	Initialize local-bus hard-disk controllers
92h	Jump to UserPatch2

Table A-2. Terminal POST Errors (Continued)

Post Code	Description
93h	Build MPTABLE for multi-processor boards
95h	Install CD ROM for boot
96h	Clear huge ES segment register
98h	1-2 Search for option ROMs. One long, two short beeps on check-sum failure
99h	Check for SMART Drive (optional)
9Ah	Shadow option ROMs
9Ch	Set up Power Management
9Dh	Initialize security engine (optional)
9Eh	Enable hardware interrupts
9Fh	Determine number of ATA and SCSI drives
A0h	Set time of day
A2h	Check key lock
A4h	Initialize typematic rate
A8h	Erase F2 prompt
AAh	Scan for F2 key stroke
ACh	Enter SETUP
AEh	Clear Boot flag
B0h	Check for errors
B1h	Inform RomPilot about the end of POST.
B2h	POST done - prepare to boot operating system
B4h	1 One short beep before boot
B5h	Terminate QuietBoot (optional)
B6h	Check password (optional)
B7h	Initialize ACPI BIOS
B9h	Prepare Boot
BAh	Initialize SMBIOS
BBh	Initialize PnP Option ROMs
BCh	Clear parity checkers
BDh	Display MultiBoot menu
BEh	Clear screen (optional)
BFh	Check virus and backup reminders
C0h	Try to boot with INT 19
C1h	Initialize POST Error Manager (PEM)
C2h	Initialize error logging
C3h	Initialize error display function

Table A-2. Terminal POST Errors (Continued)

Post Code	Description
C4h	Initialize system error handler
C5h	PnPnd dual CMOS (optional)
C6h	Initialize note dock (optional)
C7h	Initialize note dock late
C8h	Force check (optional)
C9h	Extended checksum (optional)
CAh	Redirect Int 15h to enable remote keyboard
CBh	Redirect Int 13h to Memory Technologies Devices such as ROM, RAM, PCMCIA, and serial disk
CCh	Redirect Int 10h to enable remote serial video
CDh	Re-map I/O and memory for PCMCIA
CEh	Initialize digitizer and display message
D2h	Unknown interrupt

The following are for the boot block in Flash ROM:

Table A-3. Boot Block Flash ROM Terminal POST Errors

Post Code	Description
E0h	Initialize the chipset
E1h	Initialize the bridge
E2h	Initialize the CPU
E3h	Initialize system timer
E4h	Initialize system I/O
E5h	Check force recovery boot
E6h	Checksum BIOS ROM
E7h	Go to BIOS
E8h	Set Huge Segment
E9h	Initialize Multi Processor
EAh	Initialize OEM special code
EBh	Initialize PIC and DMA
ECh	Initialize Memory type
EDh	Initialize Memory size
EEh	Shadow Boot Block
EFh	System memory test
F0h	Initialize interrupt vectors
F1h	Initialize Run Time Clock

Table A-3. Boot Block Flash ROM Terminal POST Errors (Continued)

Post Code	Description
F2h	Initialize video
F3h	Initialize System Management Manager
F4h	Output one beep
F5h	Clear Huge Segment
F6h	Boot to Mini DOS
F7h	Boot to Full DOS

If the BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (*xxxx*) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the low order byte of the error. It repeats this sequence continuously.

Notes