

# Network Application Platforms

Hardware platforms for next generation networking infrastructure



**FW-8895**  
**V1.3**

User's Manual



Publication date: 2014-10-07

## Overview

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### Icon Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:



**NOTE:** This check mark indicates that there is a note of interest and is something that you should pay special attention to while using the product.



**WARNING:** This exclamation point indicates that there is a caution or warning and it is something that could damage your property or product.

### Online Resources

The listed websites are links to the on-line product information and technical support.

| Resource          | Website   |
|-------------------|---|
| Lanner            | <a href="http://www.lannerinc.com">http://www.lannerinc.com</a>                                   |
| Product Resources | <a href="http://www.lannerinc.com/download-center/">http://www.lannerinc.com/download-center/</a> |
| RMA               | <a href="http://eRMA.lannerinc.com">http://eRMA.lannerinc.com</a>                                 |

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### Compliances

#### CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

#### FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



## EMC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

## Safety Guidelines

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit; always check the circuit.

### LITHIUM BATTERY CAUTION:

Risk of Explosion if Battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

- Installation only by a trained electrician or only by an electrically trained person who knows all English Installation and Device Specifications which are to be applied.
- Do not carry the handle of power supplies when moving to other place.
- The machine can only be used in a fixed location such as labs or computer facilities.

### Operating Safety

- Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate

circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.

- Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.

- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

### Rack Mounting Installation Environment Precaution

1. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.
2. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading.
3. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips)."

### Revision History

| Version | Changes   |
|---------|---|
| V1.1    | Change the DIMM spec to not supporting non-ECC memory |
| V1.2    | Add ear-bracket mounting                              |
|         |   |



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## Chapter 1: Introduction

Thank you for choosing the FW-8895. The FW-8895 is an upgrade platform of FW-8892. It features many major advanced technologies as the following stated:

- 2nd Generation Intel Xeon E5-2600 Processor family for the LGA 2011:

The motherboard supports up to 2 CPU configurations (and up to 8 cores per CPU) in the latest 2nd generation Intel E5-2600 processor in the LGA 2011 package. This new CPU also comes with the newest PCIe 3.0 bus standard.

- Intel C600 Series Chipset:

The system supports a total of 4 SATA ports with transfer rates of 3Gb/s (with 1 SATA port supports 6Gb/s) and has a build-in software-RAID with Intel® Rapid Storage Technology enterprise (capable of RAID 0, 1, 5, and 10).

- Quad-Channel DDR3 DIMM support:

The motherboard supports DDR3 memory that features quad-channel memory configurations in 16 DIMMs.

- High performance SSL offload processing

An optional Cavium Nitrox CN1620 coprocessor can be added to accelerate SSL, IPsec, WPAv2(802.11i), TLS and WTLS processing.

- Customization and expansion opportunity with the number of hard disks and Ethernet modules as well as the RAID card:

8 Ethernet Modules with 64 GbE Ports:

A total of 8 module slots can be fitted with either 3.5" HDD or Ethernet modules (each has 8 LAN ports) in the front of the system. The RAID card can be inserted through a full-height expansion slot on the backside.

Refer to the chart below for a summary of the system's specifications.

## System Specification

|                                 |  |  |
|---------------------------------|--|--|
| <b>Form Factor</b>              |  | 2U Rackmount   |
| <b>Platform</b>                 | Processor Options  | 2 x Intel Xeon E5-2600 Series on LGA2011                             |
|                                 | Chipset  | Intel C600 Series  |
| <b>BIOS</b>                     |  | AMI BIOS<br>64Mbit SPI ROM   |
| <b>System Memory</b>            | Technology   | DDR3 1333 ECC DIMM or DDR3 1333/1600 Registered DIMM                 |
|                                 | Max. Capacity  | 128GB  |
|                                 | Socket   | 16 x 240P DIMM   |
| <b>OS Support</b>               |  | Windows 2003/2008 Server, Linux kernel 2.6 or above                  |
| <b>Storage</b>                  | HDD Bays   | 2 x 3.5" SATA HDD or 4 x 3.5" SATA HDD                               |
|                                 | CompactFlash   | 1 x Type II CompactFlash   |
| <b>Networking</b>               | Ethernet Ports   | 1 x GbE RJ45<br>65 GbE ports maximum                                 |
|                                 | Bypass   | Depends on Ethernet module specifications (support Lanner G3 bypass) |
|                                 | Controllers  | 2 x Intel 82574L   |
|                                 | Ethernet Modules   | up to 8 LAN modules  |
|                                 | Management Port  | Yes  |
|                                 | Security Acceleration                                    | Yes  |
| <b>I/O Interface</b>            | Reset Button   | 1 x reset button<br>Software reset by default                        |
|                                 | Console  | 1 x RJ45   |
|                                 | USB  | 2 x USB 2.0  |
|                                 | IPMI via OPMA slot                                       | Optional   |
| <b>Expansion</b>                | PCIe   | 1 x PCI-E x 8 expansion (optional)                                   |
|                                 | PCI  | N/A  |
| <b>Cooling</b>                  | Processor  | CPU heatsink with fan duct   |
|                                 | System   | 4 x independent hot-swappable cooling fans with smart fan control    |
| <b>Environmental Parameters</b> | Temperature, ambient operating / storage                 | 0 ~ 40° C / -40~70° C  |
|                                 | Humidity (RH), ambient operating / ambient non-operating | 5~90%, non-condensing / 5~95%, non-condensing                        |
| <b>Miscellaneous</b>            | LCD Module   | 128 x 32 LCM with keypad (Graphic optional)                          |
|                                 | Watchdog   | Yes  |
|                                 | Internal RTC with Li Battery                             | Yes  |



|                                 |                    |  |
|---------------------------------|--------------------|--|
| <b>Physical Dimensions</b>      | Dimensions (WxHxD) | 600 x 444 x 87.7 mm                                |
|                                 | Weight             | TBD  |
| <b>Power</b>                    | Type / Watts       | 1+1 ATX Redundant Powers (600W / each)             |
|                                 | Input              | AC 90~264V @47~63 Hz                               |
| <b>Approvals and Compliance</b> |                    | CE emission, FCC Class A, RoHS, UL                 |
| <b>Ordering Information</b>     |                    | 8 Ethernet modules & 2 hard drives, with CN1620    |
| <b>FW-8895A</b>                 |                    | 8 Ethernet modules & 2 hard drives, with CN1620    |
| <b>FW-8895B</b>                 |                    | 8 Ethernet modules & 2 hard drives, without CN1620 |
| <b>FW-8895C</b>                 |                    | 4 Ethernet modules & 4 hard drives, with CN1620    |
| <b>FW-8895D</b>                 |                    | 4 Ethernet modules & 4 hard drives, without CN1620 |

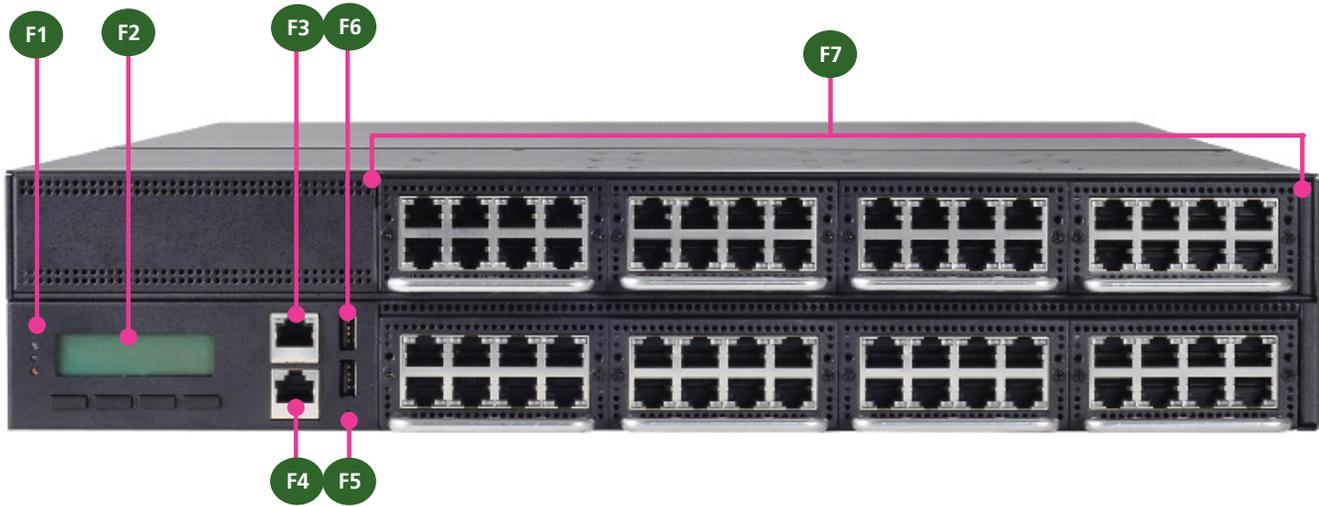
### Package Contents

Your package contains the following items:

- FW-8895 Network Security Platform
- 2 passive CPU heatsink
- 2 power cables
- 1 crossover Ethernet cable (1.8 meters)
- 1 straight-through Ethernet cable (1.8 meters)
- 1 RJ-45 to DB-9 female console cable
- 1 Nameplate
- Drivers and user's manual CD.



### Front Panel Features



#### F1 Power/Status/HDD LED

Power: If the LED is on it indicates that the system is powered on. If it is off, it indicates that the system is powered off.

Status: This LED is programmable. You could program it to display the operating status with the behavior like:

If the LED is green, it indicates that the system's operational state is normal. If it is red, it indicates that the system is malfunctioning.

HDD: If the LED blinks, it indicates data access activities; otherwise, it remains off.

#### F2 System Panel: LCD System Panel

The LCD System Panel can be programmed to display operating status and configuration information. For more details or sample programming code, please refer to the Drivers and user's manual CD.

#### F3 Management Port

This FastEthernet port can be connected for configuration or troubleshooting purpose. A conformity with IPMI (Intelligent Platform Management Interface) can be implemented through OPMA on this interface.

#### F4 Console Port

By using suitable rollover cable or RJ-45 to DB-9 Female (Cisco console cable), you can connect to a computer terminal for diagnostic or configuration purpose. Terminal Configuration Parameters: 115200 baud, 8 data bits, no parity, 1 stop bit, no flow control.

#### F5 Reset Switch

The reset switch can be used to reboot the system without turning off the power.

#### F6 Two USB 2.0 Ports

It connects to any USB devices, for example, a flash drive.

#### F7 Swappable Ethernet Modules (with LAN bypass model options)

LINK/ACT (Yellow)

- On/Flashing: The port is linking and active in data transmission.
- Off: The port is not linking.

SPEED (Green/Amber)

- Amber: The connection speed is 1000Mbps.
- Green: The connection speed is 100Mbps
- Off: .The connection speed is 10Mbps.



Using suitable RJ-45 cable, you can connect FW-8895 System to a computer, or to any other piece of equipment that has an Ethernet connection; for example, a hub or a switch. Moreover, 2 or 4 pair (LAN1-LAN2, LAN3-LAN4, LAN5-LAN6, LAN7-LAN8) on the Ethernet module can be configured as LAN Bypass when failure events occur (depending on the type of LAN modules). This feature can be implemented with a watch dog timer to enable it automatically. Refer to your User's Manual CD for a sample implementation of this feature.



**Note:**

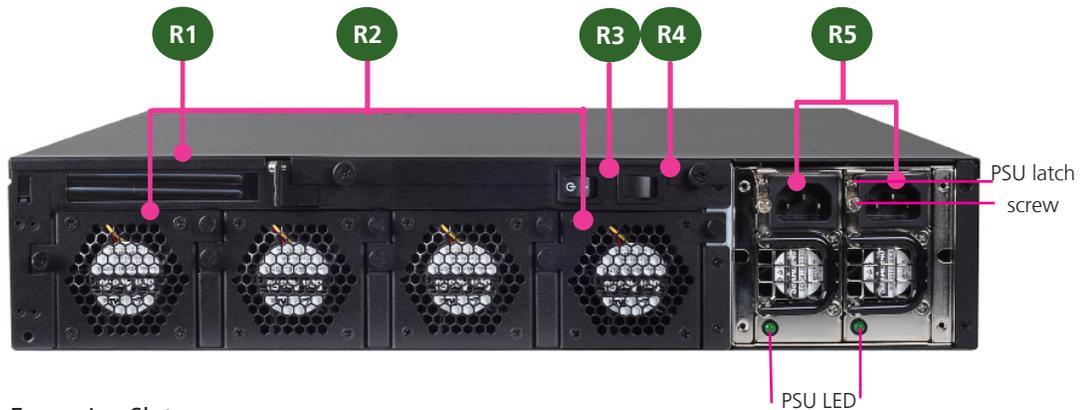
1. The availability of LAN Bypass varies depending on the model of Ethernet LAN module. For more information, visit the Lanner product website at [www.lannerinc.com/x86\\_Network\\_Appliances/Network\\_Modules](http://www.lannerinc.com/x86_Network_Appliances/Network_Modules)
2. The number of LAN modules varies depending on the model.

| FW-8895A                         | FW-8895B                         | FW-8895C                                  | FW-8895D                                   |
|----------------------------------|----------------------------------|---|--|
| with Cavium CN1620               | without Cavium CN1620            | with Cavium CN1620                        | without Cavium CN1620                      |
| 8 LAN modules in the front panel | 8 LAN modules in the front panel | 4HDD and 4 LAN modules in the front panel | 4 HDD and 4 LAN modules in the front panel |

3. The management port is optional depending on the model.



### Rear Panel Features



R1 Low Profile Expansion Slot

R2 4 Modular Fans (Corresponding connectors on the mainboard from left to right: FAN3, FAN2, FAN1, FAN4).

R3 Power-on Switch

It is a switch to turn on or off the power.

R4 Power Supply Alarm Switch

When the alarm sounds (it indicates a power supply failure), switch off this button to turn off the alarm. Replace the failed power supply as soon as possible.

R5 Redundant Power Supply

The 600W redundant power supply is hot-swappable and can be withdrawn and replaced when the alarm sounds. The LED of the failed power supply will be turned off. To replace the failed power supply unit, unscrew the screw and press the latch to release the unit and pull it out.

## Chapter 2: Hardware Setup

### Preparing the Hardware Installation

To access some components and perform certain service procedures, you must perform the following procedures first.



**WARNING:** To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

1. Unpower the FW-8895 and remove the power cord.
2. Unscrew the 2 thumbscrews from the top cover of the FW-8895 System.
3. Slide the cover backwards and open the cover.

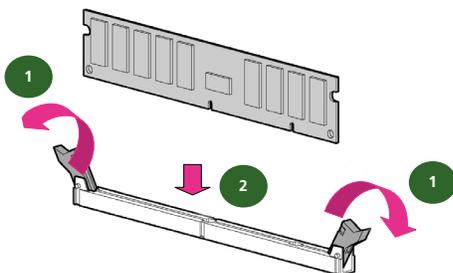


unscrew the thumbscrews on the back and open the top cover.

### Installing the System Memory

The motherboard supports DDR3 memory to meet the higher bandwidth requirements of the latest operating system and Internet applications. It comes with Quad-Channel DDR3 Dual Inline Memory Modules (DIMM) sockets (a total of 16 DIMMs for 2 CPUs).

1. Open the DIMM slot latches.
2. Install the DIMM.



#### Note:

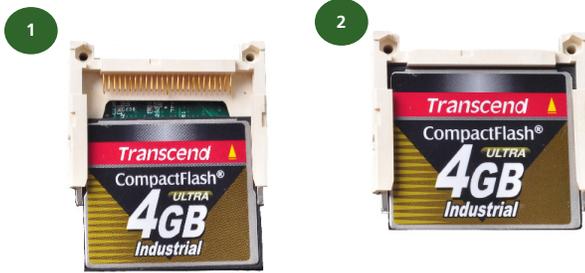
1. The motherboards can support up to 128 GB memory capacity in maximum (registered ECC or unbuffered ECC).
2. The system support dual CPU configuration. If you have only one CPU, populate the DIMMs close to the installed CPU socket
3. Since the system is capable of *Quad Channel* configuration, some installation guidelines have to be followed to enable Quad Channel mode: To insert 4 DIMMs on the system, insert DIMMs into the 4 slots with black latches nearest to the designated CPU socket (CPU socket No1 or No2). And use slots with white latches if more slots are required.
4. To activate Dual Channel instead of Quad Channel in the system, populate any 2 slots with black latches nearest to the designated CPU socket (CPU socket No1 or No2). And then use slot with white latch that belongs to the same channel as the populated slot with black latch for any additional DIMMs.
5. Starting from the board edge (same for both CPU socket No1 and No2), one pair of black and white-latched slots is configured as one channel.



### Installing the CompactFlash Card

FW-8895 provides one CompactFlash slot. Follow the procedures bellow for installing a CompactFlash card.

1. Align CompactFlash card and the card slot with the arrow pointing toward the connector.
2. Push the card to insert into the connector.

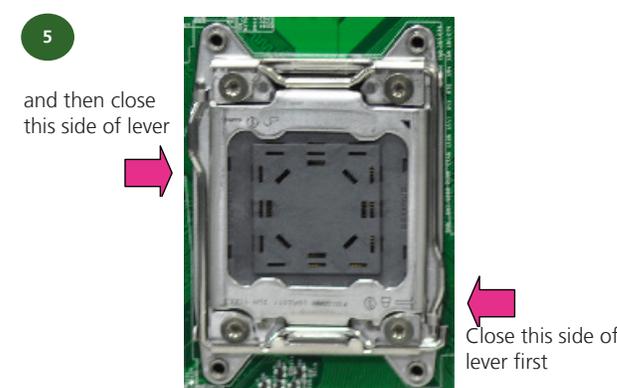
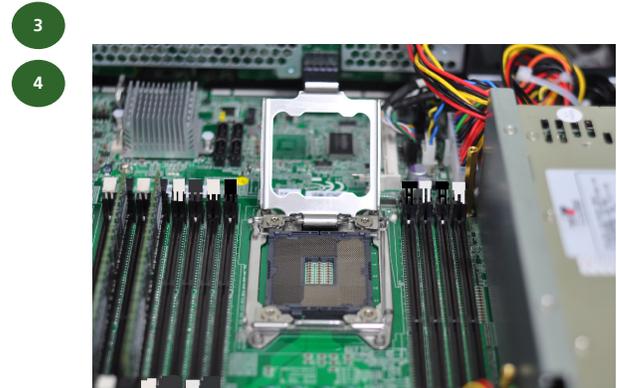
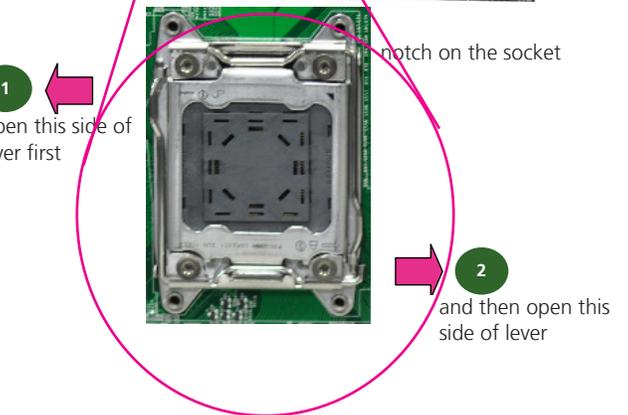
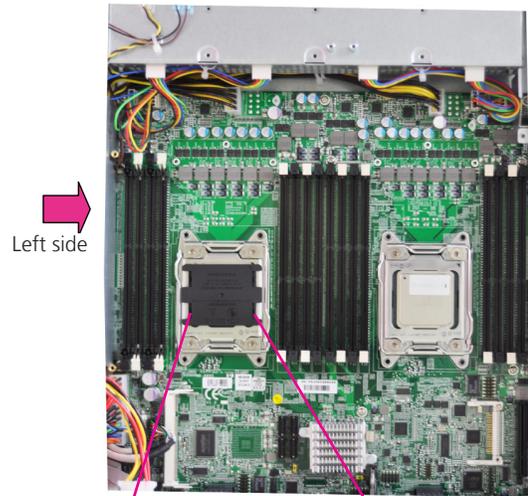


### Installing CPU and the Heat Sink

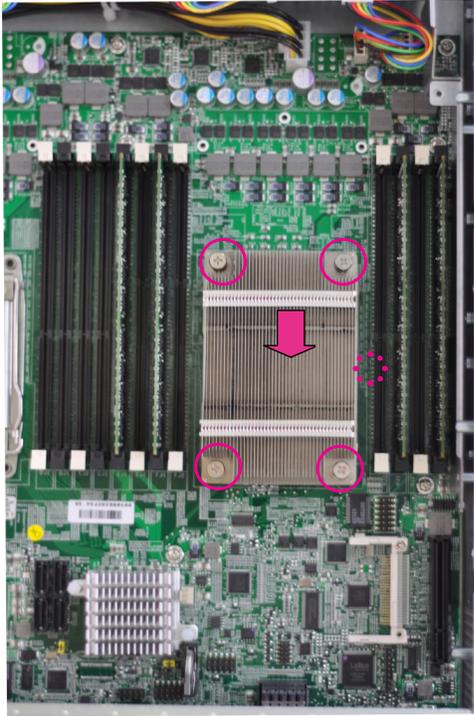
The FW-8895 sever system is powered by the MB-8895 sever board, which comes with two LGA2011 CPU sockets.

Follow the procedures bellow for installing a CPU

1. Remove the CPU socket cap.
2. Press the load lever and release it from the retention tab. There are two levers for each CPU socket. Follow the sequence as instructed on the right to release both of them.
3. Lift the load lever and then the plate.
4. Align the cut edge of the CPU and the notch on the socket. The CPU should fit perfectly into the socket. Note that the CPU fits in the socket in only one direction.
5. Close the plate and push the load lever to lock it back to the retention tab.
6. Put the heat sink on the installed CPU, match the screws with the screw holes on the board. Fasten two screws which are opposite to each other at a time and then the other two. It is easier this way to avoid the force of spring.
7. Place the heat sink cover on top of the installed heat sink and to fasten it with screws on the chassis.



6



### Note:

1. If you have only one CPU, install it on the left side (CPU socket No.1 with the front panel facing you). Failure to do so will result in boot failure .
2. To protect the CPU socket pins, retain the CPU cap when the CPU is not installed.

## Installing the Hard Disk

For models FW-8895A and FW-8895B, the system support two internal HDD installation. However, it requires that the top compartment to be unmounted.

To unmount the top compartment, follow these steps:

1. Take off the back cover by unscrewing two thumbscrews on the back. Disconnecting any cables that connect to the connectors of the top compartment.
2. To take out the top compartment, unscrew 3 screws from both sides and one screw on the bottom of the compartment.



unscrew the thumbscrews on the back and open the back cover.



Take out the first expansion module in the front slot and unscrew the screw on the bottom of the compartment



Lift the front compartment to unmount it from the system



### Rack Mounting

#### Installation environment caution:

1. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
2. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading.
3. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
4. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than



ect connections to the branch circuit (e.g. use of power strips)."

#### CAUTION :

Slide/rail mounted equipment is not to be used as a shelf or a work space.

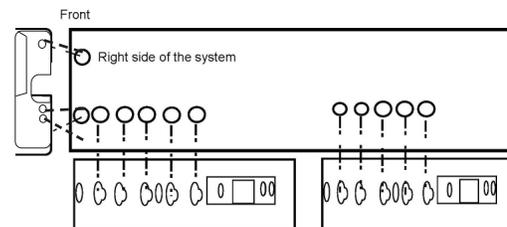
### Package Contents

|   |    |    |
|---|----|----|
|   |    |    |
| 3 pairs of sliding rails:<br>-The inner rails(x4)<br>-The outer rails (x2)  |    |    |
|   |    |    |
| 1.  | 2. | 3. |
|   |    |    |
| Screw pack: 1. countersink screws and conical washers for outer rail mount<br>2. ear-bracket screws.<br>3. crosshead threaded screws for inner rail mount |    |    |

### Inner Rail Installation

Use the following procedures to attach the inner rails to the chassis.

1. Position the inner rail alongside the side of the system's chassis with the finger tab facing outward as shown in the following diagram.
2. Align the screw holes of the rail and the mounting holes of the chassis and then attach the inner rail to the system with crosshead threaded screws.
3. Repeat the above steps for the other rails on the same side (two inner rails need to be installed on each side).
4. Attach the front ear bracket (short) to the system.
5. Likewise, attach the inner rails and front ear bracket to the other side of system's chassis.



### Mounting the outer rails to the rack

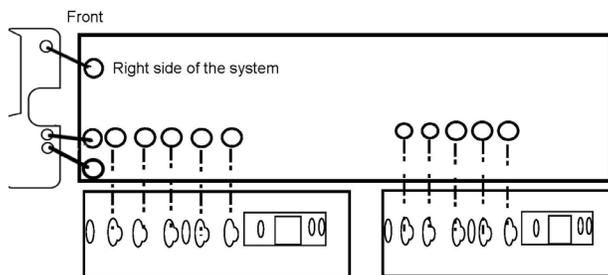
Use the following procedures to mount the outer rails to the rack.

1. Install the outer rail by attacking the rail bracket to the posts of the rackby using two countersink screws and conical washers(You may also use the original manufacture's rack bracket screws.) Do not completely tighten the screws; leave them loose so that the middle rail can slide for adjustment.
2. Extend and adjust the rear bracket to meet the appropriate depth of the rack and install it to the rack post firmly with rack bracket screws.
3. Repeat step 1 and 2 above to install the other rail to the rack.



### Installing the system to the rack

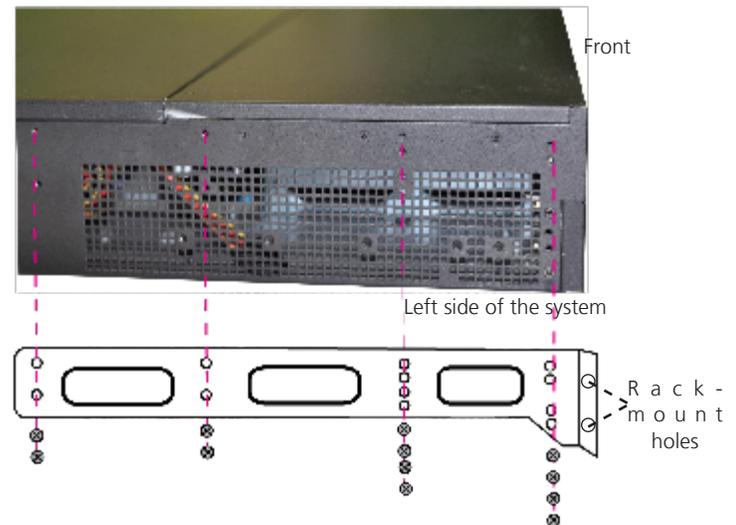
1. Extend the rails until they lock into place.
2. Holding the system with its front facing you, align the unit with the extended rails and carefully insert the system by sliding the inner rail into the outer rail. Push the chassis all the way toward the back until the front ear brackets contact the rack. Remember to release the extension safety lock along the way.
3. You may also fix the front ear brackets (short) to the rack if the system doesn't require frequent pulling out of the rack.



### Installing the Front Rack-Mount Ear Bracket

Attach the front rack-mount (long) brackets. Locate the threaded holes along sides of the chassis and use the package of black screws that shipped with the chassis.

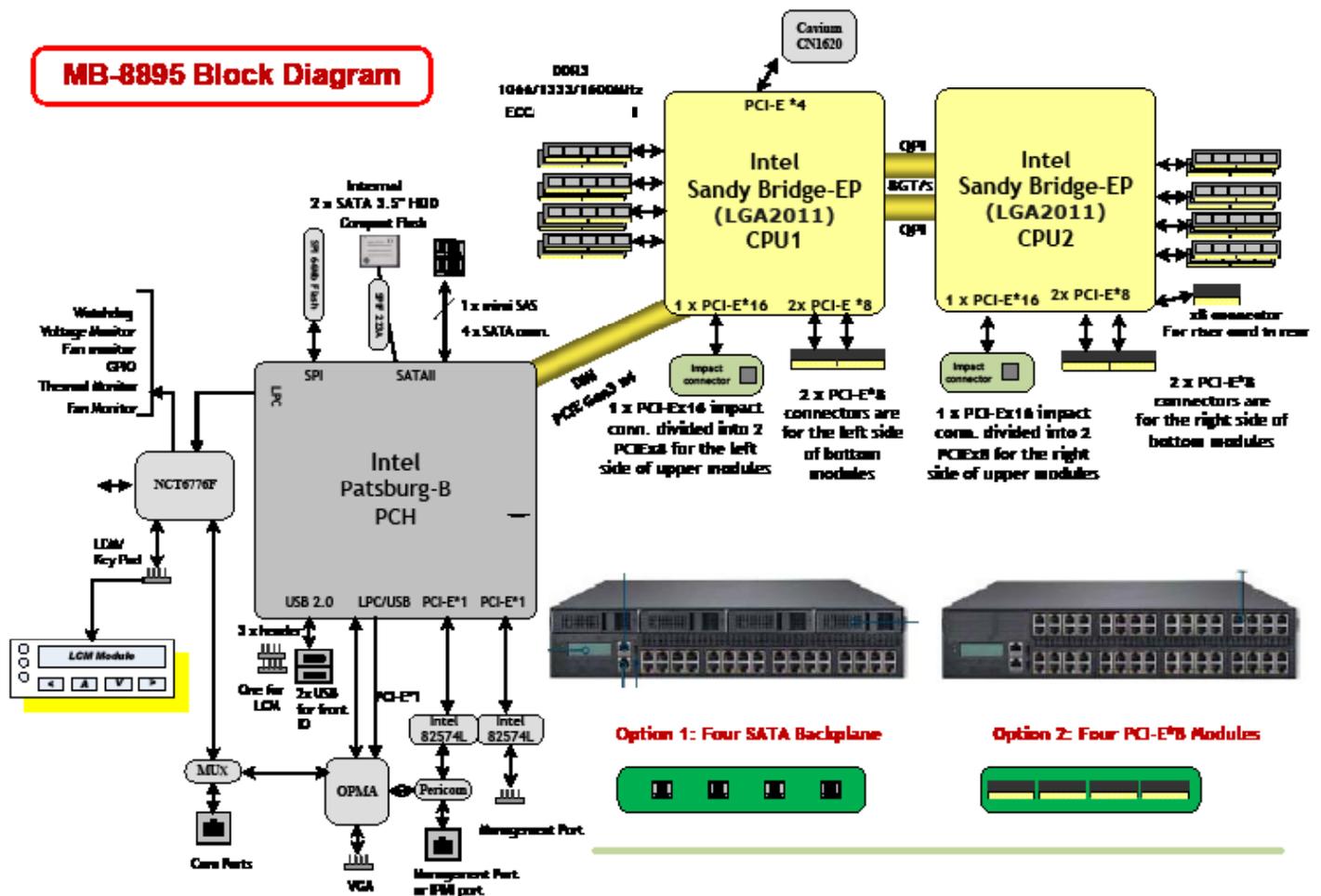
1. Align the front rack-mount bracket to one side of the chassis.
2. Insert and tighten the screws on one side.
3. Repeat the above steps for the other side of the chassis.
4. Installing the system to the rack



## Chapter 3: Motherboard Information

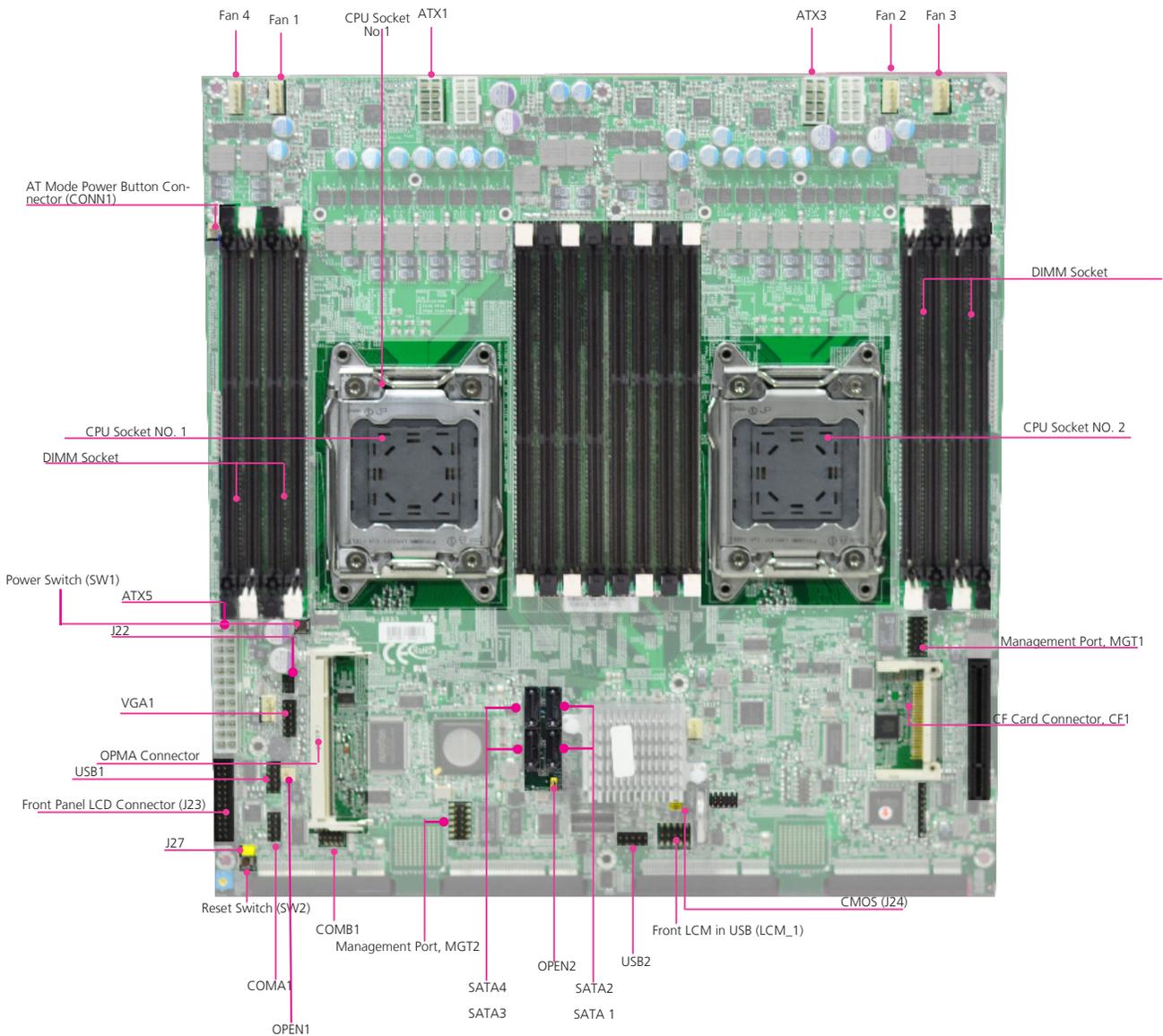
### Block Diagram

The block diagram depicts the relationships among the interfaces or modules on the motherboard. Please refer to the following figure for your motherboard's layout design.



### Motherboard Layout

The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.

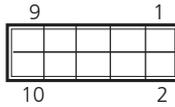


# Chapter 3

## Motherboard Information

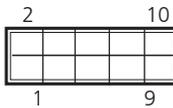
### Jumper Settings

**LCM\_1:** USB-type front LCD Message Display Module (LCM). It supports both text and graphic type of LCM. The board also facilitates Parallel -type LCM connector, refer to jumper J23.



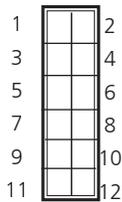
| Pin No. | Function    | Pin No. | Function  |
|---------|-------------|---------|-----------|
| 1       | P5V_SB      | 2       | P5V       |
| 3       | USB_PCH_P5N | 4       |           |
| 5       | USB_PCH_P5P | 6       | HDD_LED_N |
| 7       | GND         | 8       | GND       |
| 9       | NTXD2       | 10      | NRXD2     |

**LCM\_2:** USB-type front LCD Message Display Module (LCM). This connector is reserved for customization purpose.



| Pin No. | Function    | Pin No. | Function         |
|---------|-------------|---------|------------------|
| 1       | P5V_SB      | 2       | USB_PCH_P4N      |
| 3       | USB_PCH_P4P | 4       | GND              |
| 5       | PWR_LED-    | 6       | FAULT_N          |
| 7       | HDD_LED_N   | 8       | PWRON_N          |
| 9       | P3V3_AUX    | 10      | PCH_PLTRST_LCM_N |

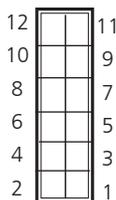
#### MGT1: RJ 45 management port connector



| Pin No. | Function      | Pin No. | Function      |
|---------|---------------|---------|---------------|
| 1       | MGT2_MDIP_0   | 2       | MGT2_MDIN_0   |
| 3       | MGT2_MDIP_1   | 4       | MGT2_MDIN_1   |
| 5       | MGT2_MDIP_2   | 6       | MGT2_MDIN_2   |
| 7       | MGT2_MDIP_3   | 8       | MGT2_MDIN_3   |
| 9       | MGT_LAN2_100# | 10      | MGT_LAN2_ACT# |
| 11      | MGT_LAN2_1G#  | 12      | P3V3_AUX      |

**Note:** Unlike the other management port connector (MGT2), it doesn't share an output port (the Management port on the front panel) with the IPMI signal. Hence, no switch is required to switch between these two signals.

#### MGT2: RJ 45 management port connector

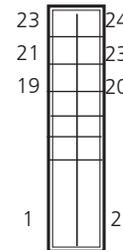


| Pin No. | Function     | Pin No. | Function     |
|---------|--------------|---------|--------------|
| 1       | MGT2_MDIP_0  | 2       | MGT_MDIN_0   |
| 3       | MGT2_MDIP_1  | 4       | MGT_MDIN_1   |
| 5       | MGT2_MDIP_2  | 6       | MGT_MDIN_2   |
| 7       | MGT2_MDIP_3  | 8       | MGT_MDIN_3   |
| 9       | MGT_LAN_100# | 10      | MGT_LAN_ACT# |
| 11      | MGT_LAN_1G#  | 12      | P3V3_AUX     |



**Note:** This MGT2 signal will not pass through when the IPMI card is present (board reference NO. OPMA1); The management port and IPMI share the same output port (the Management port on the front panel). Use the jumper OPEN2 to switch between these two signals.

#### ATX5: 24-Pin ATX Power Connector



| Pin No. | Function    | Pin No. | Function |
|---------|-------------|---------|----------|
| 1       | +3.3V       | 2       | +3.3V    |
| 3       | +3.3V       | 4       | -12V     |
| 5       | Ground      | 6       | Ground   |
| 7       | +5V         | 8       | PSON-    |
| 9       | Ground      | 10      | Ground   |
| 11      | +5V         | 12      | Ground   |
| 13      | Ground      | 14      | Ground   |
| 15      | Power Good  | 16      | NC       |
| 17      | Stand-By 5V | 18      | +5V      |
| 19      | +12V        | 20      | +5V      |
| 21      | +12V        | 22      | +5V      |
| 23      | 3.3V        | 24      | GND      |

#### ATX1, ATX3: 8-Pin ATX Power Connector

| Pin No. | Function | Pin No. | Function |
|---------|----------|---------|----------|
| 1       | GND      | 2       | 12V      |
| 3       | GND      | 4       | 12V      |
| 5       | GND      | 6       | 12V      |
| 7       | GND      | 8       | 12V      |

#### SATA1: SATA Revision III Drive Connector

#### SATA2~SATA4: SATA Revision II Drive Connector

It is for connecting a 3.5" SATA harddisk to be served as your system's storage. The system can support up to 4 3.5" disks in maximum. The system's BIOS supports



# Chapter 3

## Motherboard Information

3 modes of SATA configuration, i.e., IDE, RAID, and AHCI. The chipset provides hardware support for Advanced Host Controller Interface (AHCI) which is a programming interface for SATA host controllers. AHCI provides advanced performance and usability enhancements with SATA such as Hot-Plug, no master/slave designation for SATA devices and native command queuing (NCQ).



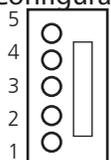
| Pin No. | Function |
|---------|----------|
| 1       | GND      |
| 2       | TX_P     |
| 3       | TX_M     |
| 4       | GND      |
| 5       | RX_M     |
| 6       | RX_P     |
| 7       | GND      |



### Note:

- To configure your Hard disk using the integrated RAID feature, the Intel® Rapid Storage Technology Utility has to be installed on your Operating System.
- You will need to select the RAID mode in the BIOS for your SATA drives first. There is also a Intel® RSTe OpROM utility for creating RAID volume; to enter the RSTe OpROM, press Ctrl-I during POST.
- For operating systems other than Microsoft® Windows Vista and Windows® 7, it is required to pre-install the Intel Rapid Storage Technology driver during the F6 installation of Windows setup ("press F6 if you need to install a third party SCSI or RAID driver..."). Visit the Intel support page at [http://www.intel.com/p/en\\_US/support/highlights/chpsts/imsm](http://www.intel.com/p/en_US/support/highlights/chpsts/imsm) for more information and download links.
- The Intel controller hubs are also supported by Linux. Beginning with Linux kernel version 2.6.27, the *mdadm* utility 3.0 supports RAID 0, RAID 1, RAID 5, and RAID 10. To use the RAID features in *dmraid* and *mdadm*, you will need to set up the RAID volume using the Intel® Matrix Storage Manager option ROM (click CTRL + I when prompted during boot to enter the option ROM user interface).

**FAN1~4:** 5-Pin FAN Connector. The 4-pin connector is for connecting the CPU and system fans. These fans have smart features that which can be automatically set to operate at certain speed according to the detected CPU or system temperatures. For more information, see Smart Fan Mode Configuration on *Chapter 4 BIOS Settings*.



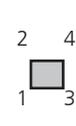
| Pin No. | Description |
|---------|-------------|
| 1       | Ground      |
| 2       | 12V         |
| 3       | RPM Sense   |
| 4       | RPM Sense   |
| 5       | PWM Status  |

### CONN1: Power-on Switch



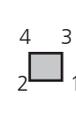
| Pin No. | Description |
|---------|-------------|
| 1       | Ground      |
| 2       | FP_SWIN_R   |

### SW1: on-board power switch for debug.



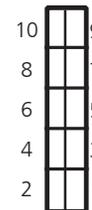
| Pin No. | Description |
|---------|-------------|
| 1       | Ground      |
| 2       | Ground      |
| 3       | FP_SWIN_R   |
| 4       | FP_SWIN_R   |

### SW2: An onboard reset button for debug purpose.



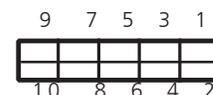
| Pin No. | Description |
|---------|-------------|
| 1       | Ground      |
| 2       | Ground      |
| 3       | FP_RST_SEL  |
| 4       | FP_RST_SEL  |

**USB1:** USB Connector. It is for connecting the USB module cable. It complies with USB2.0 and support up to 480 Mbps connection speed.



| Pin No. | Description       | Pin No. | Description       |
|---------|-------------------|---------|-------------------|
| 1       | USB_VCC           | 2       | USB_VCC           |
| 3       | USBD0-            | 4       | USBD1-            |
| 5       | USBD0+            | 6       | USBD1+            |
| 7       | Ground            | 8       | Ground            |
| 9       | USB Port#1 Ground | 10      | USB Port#2 Ground |

### USB2: USB Connector



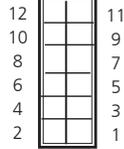
| Pin No. | Description       | Pin No. | Description       |
|---------|-------------------|---------|-------------------|
| 1       | USB_VCC           | 2       | USB_VCC           |
| 3       | USBD2-            | 4       | USBD3-            |
| 5       | USBD2+            | 6       | USBD3+            |
| 7       | Ground            | 8       | Ground            |
| 9       | USB Port#3 Ground | 10      | USB Port#4 Ground |



# Chapter 3

## Motherboard Information

**VGA1:** VGA Interface. with a 2x6 (2.54") pin header. It is for connecting the VGA interface cable. **Note the IPMI card (connector Reference NO. OPMA1) has to be present for this connector to work, i.e., the IPMI card provides VGA interface/signal.**



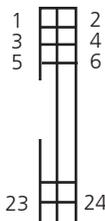
| Pin No. | Function            | Pin No. | Function              |
|---------|---------------------|---------|-----------------------|
| 1       | R                   | 2       | Ground                |
| 3       | G                   | 4       | Ground                |
| 5       | B                   | 6       | Ground                |
| 7       | H-SYNC              | 8       | Ground                |
| 9       | V-SYNC              | 10      | Ground                |
| 11      | Detect-display Data | 12      | Detecte-display CLOCK |

**Note:** A 2x6 pin (2.0") header (J1) on the OPMA card is also provided as an VGA interface connector.

### CF1: CF Card Connector

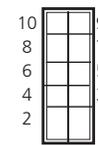
| Pin No. | Description | Pin No. | Description |
|---------|-------------|---------|-------------|
| 1       | GND         | 26      | CD1-        |
| 2       | DATA3       | 27      | DATA11      |
| 3       | DATA4       | 28      | DATA12      |
| 4       | DATA5       | 29      | DATA13      |
| 5       | DATA6       | 30      | DATA14      |
| 6       | DATA7       | 31      | DATA15      |
| 7       | CE1#        | 32      | CE2#        |
| 8       | A10         | 33      | VS1#        |
| 9       | OE#         | 34      | IOR#        |
| 10      | A9          | 35      | IOW#        |
| 11      | A8          | 36      | WE#         |
| 12      | A7          | 37      | READY#      |
| 13      | CFVCC3      | 38      | CFVCC3      |
| 14      | A6          | 39      | CSEL        |
| 15      | A5          | 40      | VS2#        |
| 16      | A4          | 41      | RESET       |
| 17      | A3          | 42      | WAIT#       |
| 18      | A2          | 43      | INPACK#     |
| 19      | A1          | 44      | REG#        |
| 20      | A0          | 45      | DASP#       |
| 21      | DATA0       | 46      | DIAG#       |
| 22      | DATA1       | 47      | DATA8       |
| 23      | DATA2       | 48      | DATA9       |
| 24      | WP          | 49      | DATA10      |
| 25      | CD2-        | 50      | GND         |

**J23:** Parallel -type front LCM connector. It supports both text and graphic type of LCM. The board also facilitates USB -type LCM connector, refer to jumper LCM\_1.



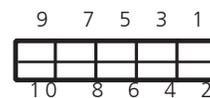
| PIN | DESCRIPTION | PIN | DESCRIPTION |
|-----|-------------|-----|-------------|
| 1   | VCC         | 2   | IOGND       |
| 3   | LSTIN-      | 4   | VEE         |
| 5   | LAFD-       | 6   | LINIT-      |
| 7   | LPD1        | 8   | LPD0        |
| 9   | LPD3        | 10  | LPD2        |
| 11  | LPD5        | 12  | LPD4        |
| 13  | LPD7        | 14  | LPD6        |
| 15  | LCD         | 16  | VCC         |
| 17  | K1          | 18  | K2          |
| 19  | K3          | 20  | K4          |
| 21  | RESET       | 22  | VCC3        |
| 23  | GPIO        | 24  | VCC3        |

### COMA1: COM PORT Connector



| Pin No. | Description | Pin No. | Description |
|---------|-------------|---------|-------------|
| 1       | DCD1        | 2       | DSR1        |
| 3       | RXD1        | 4       | RTS1        |
| 5       | TXD1        | 6       | CTS1        |
| 7       | DTR1        | 8       | RI1         |
|         | GND         | 10      | FP_RESET_N  |

### COMB1: COM PORT



| Pin No. | Description | Pin No. | Description |
|---------|-------------|---------|-------------|
| 1       | DCD2-       | 2       | DSR2-       |
| 3       | RXD2        | 4       | RTS2-       |
| 5       | TXD2        | 6       | CTS2-       |
| 7       | DTR2-       | 8       | RI2-        |
| 9       | GND         | 10      |             |

### DIMM Sockets:

Since the system is capable of *Quad Channel* configuration, some installation guidelines have to be followed to enable Quad Channel mode. To insert 4 DIMMs on the system, insert DIMMS into the 4 slots with black latches nearest to the designated CPU socket (CPU socket No1 or No2). And then use slots with white latches if more slots are required.

**Note:**

- To activate Dual Channel instead of Quad Channel in the system, populate any 2 slots with black latches nearest to the designated CPU socket (CPU socket No1 or No2). And then use slot with white latch that belongs to the same channel as the populated slot with black latch for any additional DIMMs.
- Starting from the board edge (same for both CPU socket No1 and No2), one pair of black and white-latched slots is configured as one channel.



# Chapter 3

## Motherboard Information

**CPU Socket NO.1 and CPU Socket NO. 2:** When using only one CPU, install the CPU on the *socket NO.1* or the system will not function.

**OPMA1:** OPMA Connector. The OPMA connector is for connecting the OPMA card. When the OPMA card is connected, the management port will comply with the Intelligent Platform Management Interface (IPMI) standard.

**OPEN2:** A switch to switch the output signal between MGT2 and OPMA1 since they share the same access port (the management port on the front panel). To let the MGT2 signal pass through instead of the OPMA signal, take out this jumper. In this way, you could have both VGA and Management connections.



| Pin No.   | Description                 |
|-----------|-----------------------------|
| Short 1-2 | IPMI Pass-through (default) |
| Open 1-2  | MGT2 Pass-through           |



**Note:** To have both VGA and Management (non-IPMI compliant) connections, take out the jumper block.

**J27:** A reset switch to switch between hardware and software reset function for the front panel reset button. A hardware reset function will reset the whole system while a software reset function will reset the designated software to its default value.



| Pin No. | Description    |
|---------|----------------|
| 1-2     | Hardware Reset |
| 2-3     | Software Reset |

**OPEN1:** Case open detection jumper. Use this to detect case open event.

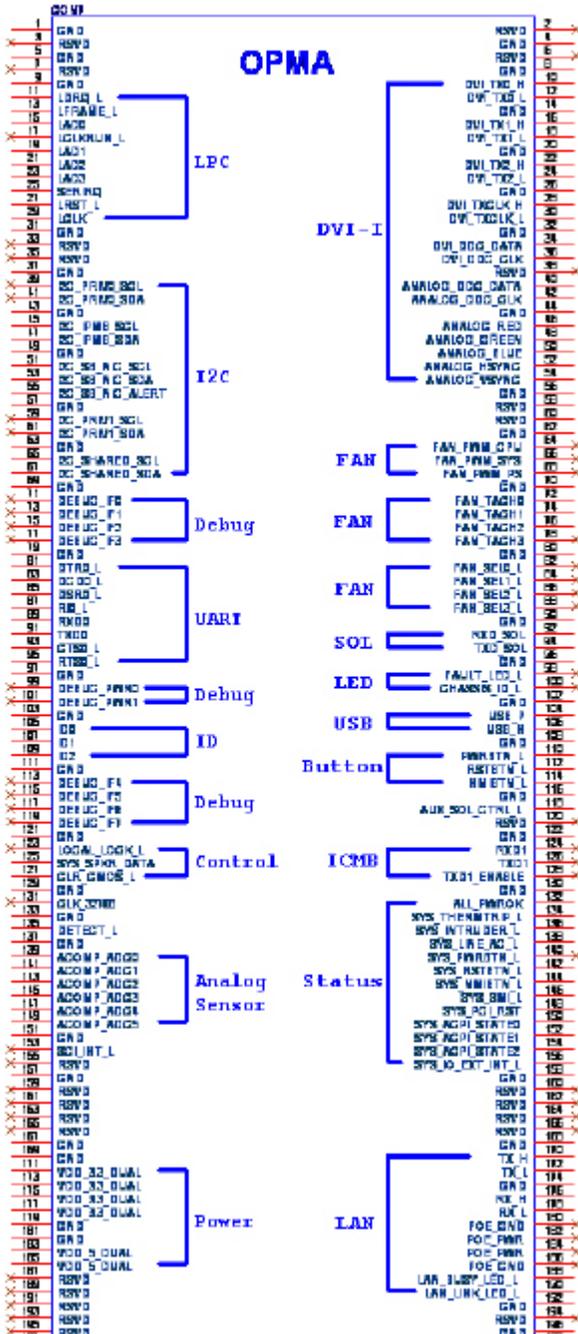


| Pin No. | Description |
|---------|-------------|
| 1       | GROUND      |
| 2       | CSOPEN_N    |

**J24:** Clear CMOS Jumper. Use this jumper to reset the BIOS setting to its factory default.



| Pin No. | Description      |
|---------|------------------|
| 1-2     | Normal (default) |
| 2-3     | Clear CMOS       |



**Note:** A 2x6 pin (2.0") header (J1) on the OPMA card is provided as an VGA interface connector.



## Chapter 4: BIOS Settings

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### Updating the BIOS

The Basic Input/Output System (BIOS) can be updated using the designated Flash Utility. To obtain the utility, please contact us either through the sales rep or technical support.



### Accessing the BIOS menu

When you are installing a motherboard or when the system prompts “Run Setup” during start-up, you will use the BIOS Setup program to configure the system, . This section explains how to configure your system using this program.

Even if you are not prompted to enter the BIOS Setup program when you are installing a motherboard, you can still change the configuration of your computer later on with this program. For example, you may want to enable the security password feature or change the power management settings. This requires you to reconfigure your system by using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM .

When you start up the computer, the system provides you with the opportunity to run this program. Press <Delete> during the Power-On-Self-Test (POST) to enter the Setup utility (There are a few cases that other keys may be used, such as <F1>, <F2>, and so forth.); otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

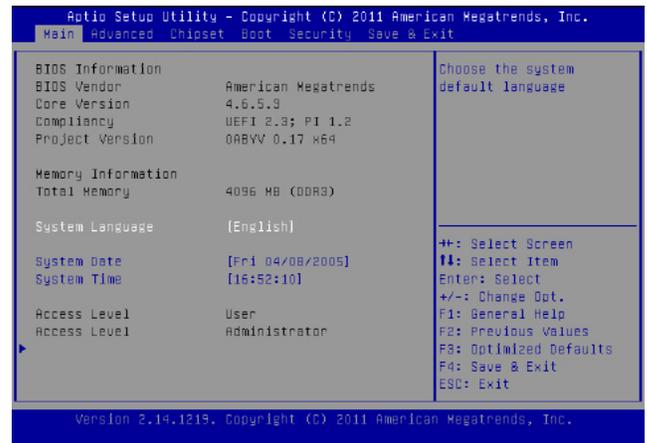


**Note:** This manual describes the standard look of the setup screen. There may be some instances in which the motherboard features can vary from one to another due to customization. This means that some of the options described in this manual may not match that of your motherboard’s AMIBIOS.

### Navigating the BIOS menu

The BIOS setup utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.



| Keys                   | Description   |
|------------------------|---|
| -><- Left/Right<br>↑ ↓ | The Left and Right <Arrow> keys allow you to select an setup screen. For example: Main screen, Advanced screen, Boot screen, and so on. |
| Up/Down                | The Up and Down <Arrow> keys allow you to select an setup item or sub-screen.   |
| +– Plus/Minuss         | The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item. For example: Date and Time.             |
| Tab                    | The <Tab> key allows you to select setup fields.  |



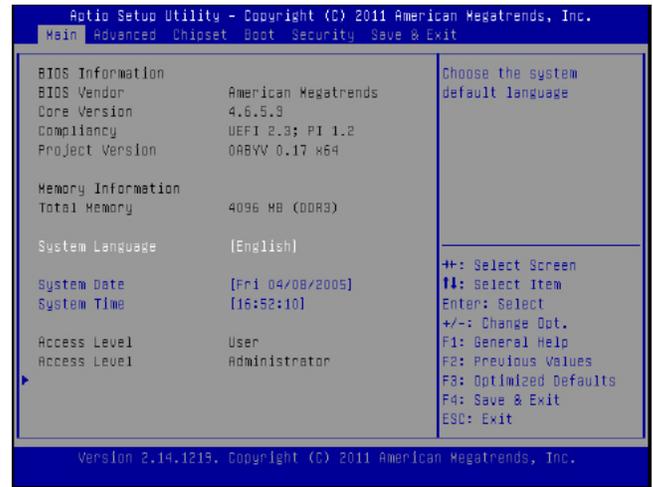
**Note:** The <F8> key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the <F8> key on your keyboard. The Fail-Safe settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.

### The Main Menu

The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this chapter.

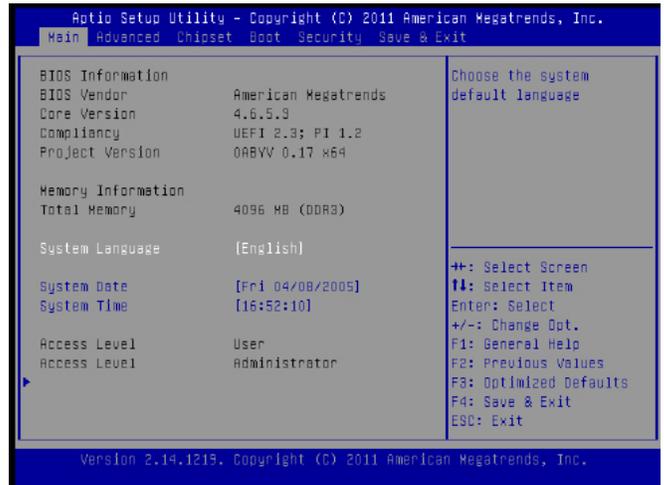
The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options are configured parameters and cannot be modified. On the other hand, Options in blue can be modified.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.



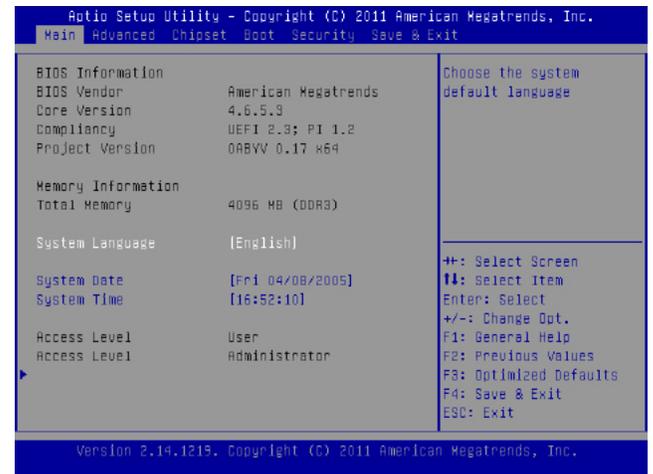
### System Language

Use this item to choose the BIOS language.



### System Time/System Date

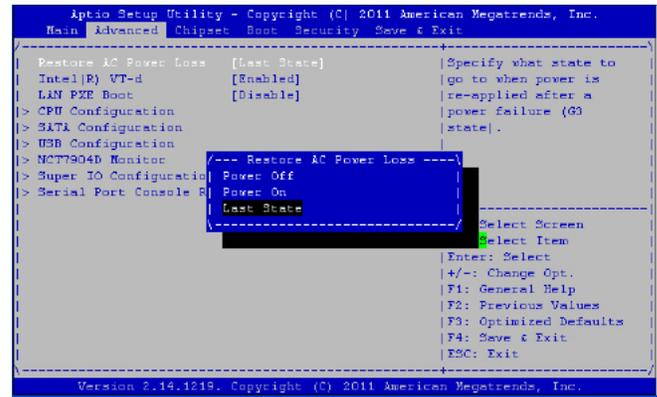
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.



### Advanced Settings

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS

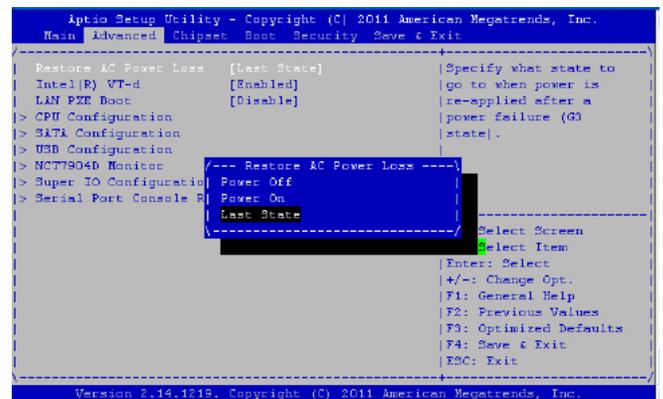
Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown at the right. The sub menus are described on the following pages.



### Restore AC Power Loss

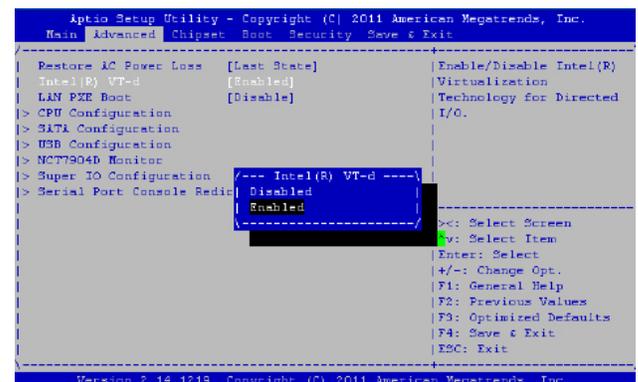
This option lets you set the state of the system when it has just recovered from a power outage.

| Option     | Description  |
|------------|--|
| Power Off  | When setting to Power Off, the system goes into "off state" after an AC power interruption.            |
| Power On   | When setting to Power on, the system turns on automatically after a power interruption                 |
| Last State | When setting to Last State, the system goes into whatever the state was before the power interruption. |



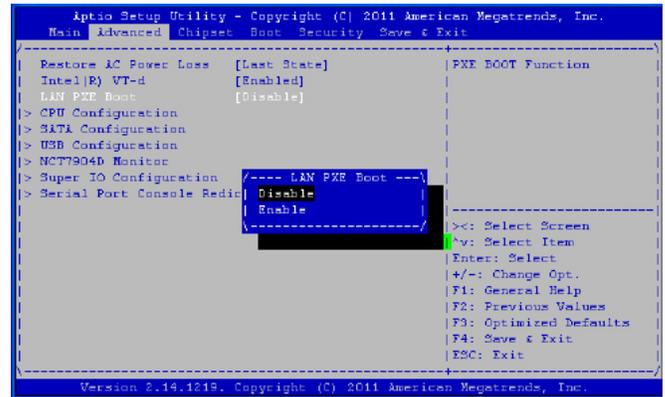
### Intel VT-d

Select to enable or disable the Intel Virtualization Technology for Directed I/O" (VT-d). The Memory and I/O virtualization are supported by the chipset as part of Intel Virtualization Techonology for hardware-assisted virtualization.



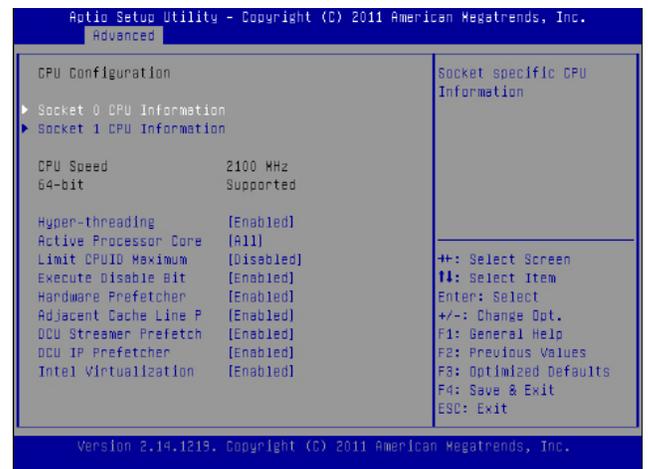
### LAN PXE Boot

The Preboot eXecution Environment (PXE) allows you to boot computers using a network interface independently of data storage devices (like hard disks) or installed operating systems. Enable or disable this function with this option here.



### CPU Information

You can use this screen to view the basic information and capabilities of your CPU. For instance, the L1 to L3 level cache sizes and the clock rate are displayed here.



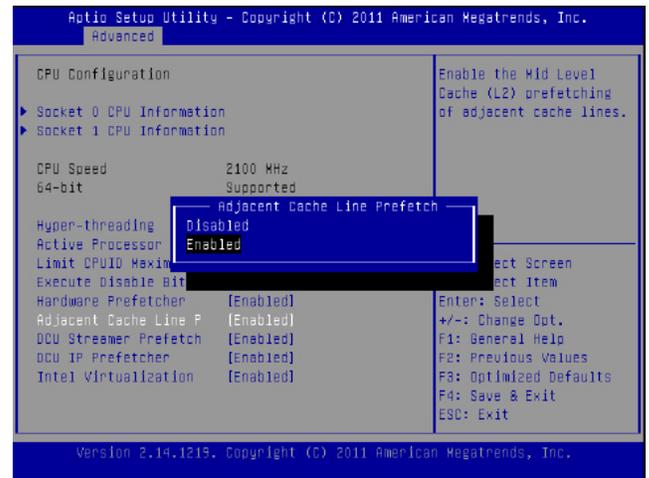
### CPU Configuration Settings

You can use this menu to enable/disable certain functions of your CPU. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described below.

| Item                  | Selection  |
|-----------------------|--|
| Intel Hyper-Threading | The Intel Hyper-Threading Technology allows a hyper-threading processor to appear as two logical processors to the operating system, allowing the operating system to schedule two threads or processes simultaneously.<br>Select to enable or disable this feature. |
| Active Processor Core | Select the number of processor cores to be active in each processor package.   |
| Limit CPUID Maximum   | Allows legacy operating systems to boot even without support CPUs with extended CPUID functions.<br>Select to enable or disable this function  |
| Execute Disable Bit   | Select to enable or disable the No-Execution Page Protection Technology.   |



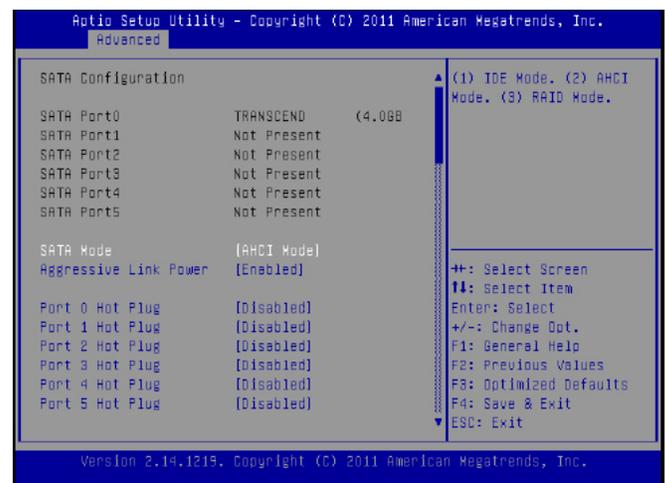
| Item                           | Selection  |
|--------------------------------|--|
| Hardware Prefetcher            | The processor has a hardware prefetcher that automatically prefetches data and instructions from the memory into the Level 2 cache that are likely to be required in the near future. This reduces the latency associated with memory reads.<br>When enabled, the processor's hardware prefetcher will be enabled and allowed to automatically prefetch data and code for the processor.<br>When disabled, the processor's hardware prefetcher will be disabled. |
| Adjacent Cache Line Prefetcher | Select to enable or disable prefetching of adjacent line   |
| DCU Streamer Prefetcher        | Enable prefetch of next L1 Data Line based on multiple loads in the same cache line.   |
| DCU IP Prefetcher              | Enable prefetch of next L1 line based on sequential load history.  |
| Intel Virtualization           | The Intel VT is a hardware-assisted virtualization. This processor supports Intel Virtualization. Enable or disable this feature.  |



### SATA Mode Selection

The system supports advanced SATA features such as software RAID.

| Item      | Selection  |
|-----------|--|
| IDE Mode  | Set to IDE mode when you want to use the Serial-ATA hard disk drives as Parallel ATA physical storage devices.   |
| AHCI Mode | Set to AHCI mode when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced SATA features that increases storage performance or workloads where multiple simultaneous read/write requests are outstanding, most often occurring in server-type applications (native command queuing). It also facilitates hot swapping. |
| RAID      | Set to the RAID mode when you want to create a RAID configuration from the SATA Hard disk drives. This chipset supports software RAID by using the Intel® Matrix Storage Manager software. For more information, visit <a href="http://www.intel.com/design/chipsets/matrixstorage_sb.htm#benefit">http://www.intel.com/design/chipsets/matrixstorage_sb.htm#benefit</a>   |



### Aggressive Link Power

Aggressive Link Power Management (ALPM) is a power-saving technique that helps the disk save power by setting a SATA link to the disk to a low-power setting during idle time. Power savings come at the expense of disk latency. As such, you should only use ALPM if you expect the system to experience long periods of idle I/O time. ALPM is only available on SATA controllers that use the Advanced Host Controller Interface (AHCI).

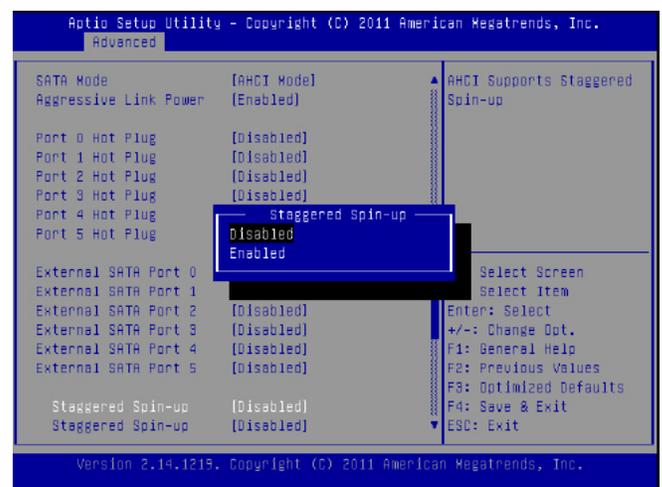
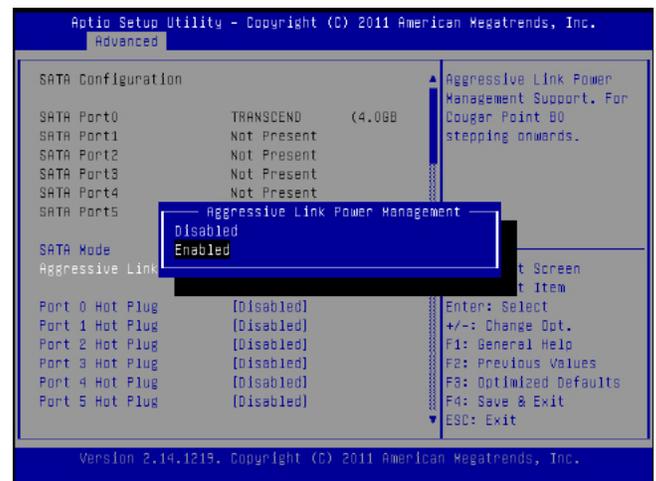
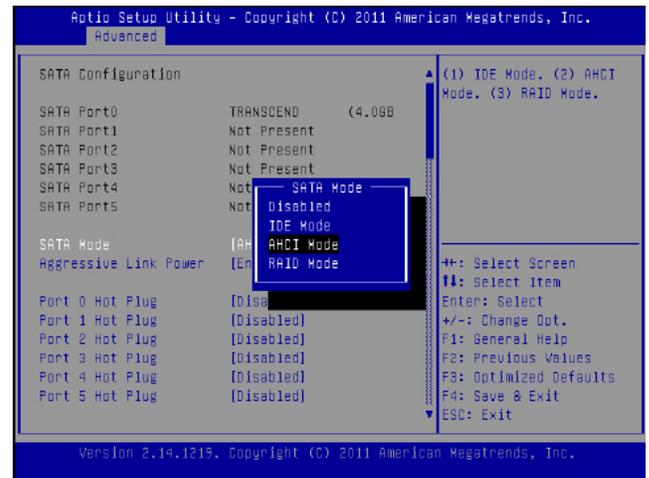
### Serial ATA Port 0/1/2/3/4/5

Use this menu to configure specific SATA Port for all ports on the system.

| Option        | Description  |
|---------------|--|
| Hot Plug      | The AHCI of SATA provides hot plug capability to allow drives to be added or removed with the PC running.  |
| External SATA | Called external SATA or eSATA, you can now utilize shielded cable lengths up to 2 meters outside the PC to transform SATA to be an external storage. enable or disable this feature. |

### Staggered Spin-up

Spin-up can be employed to prevent the excessive power-consumption of spin-up from resulting in a power shortage in computers with multiple hard drives. Staggered spin-up typically starts one drive at a time, either waiting for the drive to signal it is ready or allowing a predefined period of time to pass before starting the next drive. Select to enable or disable this feature.



### USB Configuration Setting

You can use this screen to select options for the USB Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages.

### Legacy USB Support

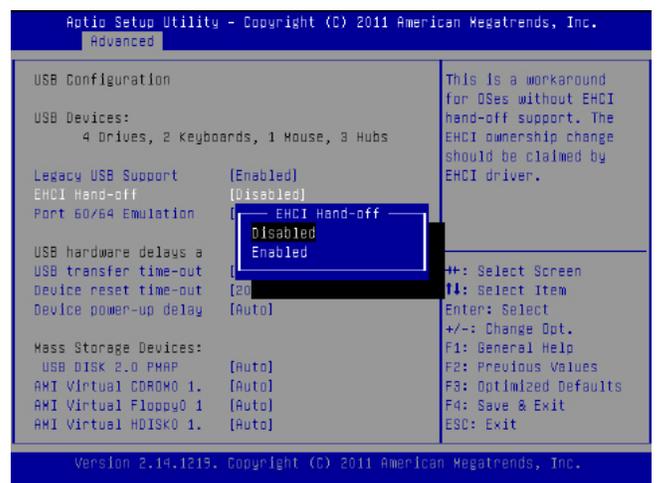
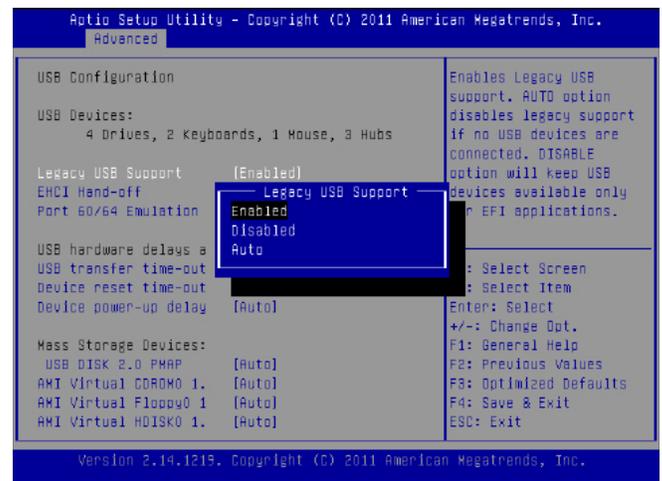
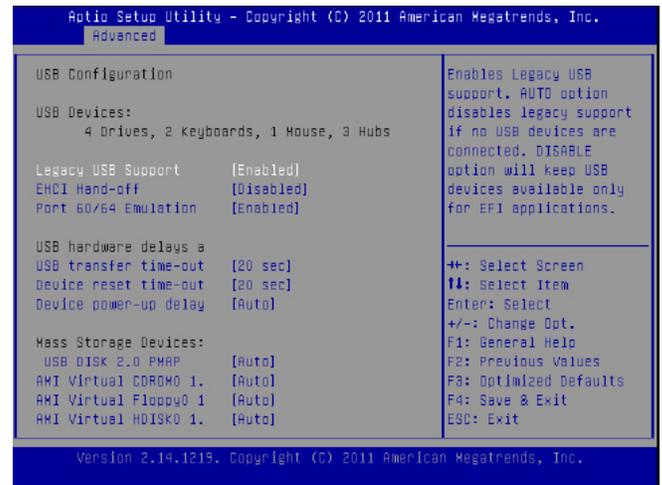
This option enable or disable the support for USB devices on legacy operating systems (OS), e.g., Windows ME/98/NT, and MS-DOS. Normally if this option is not enabled, any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can be used on the system even when there is no USB drivers loaded on it.

| Option   | Description   |
|----------|---|
| Auto     | Allow the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If it is not detected, the USB controller legacy mode is disabled. |
| Enabled  | Enable the support for USB devices on legacy operating system   |
| Disabled | Disable this function.  |

### EHCI Hand-Off

It allows you to enable support for operating systems which do not have the Enhanced Host Controller Interface hand-off (EHCI hand-off) feature for USB devices.

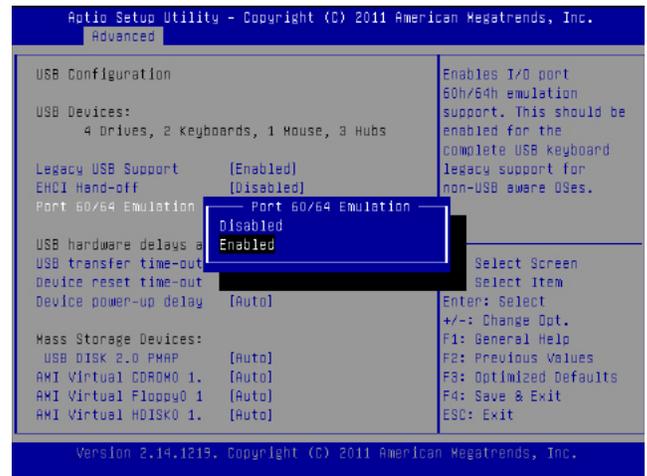
| Option   | Description          |
|----------|----------------------|
| Enabled  | Enable this feature  |
| Disabled | Disable this feature |



### Port 60/64 Emulation

This BIOS feature allows you to enable emulation of I/O ports 64h and 60h so that there is full PS/2 legacy support for USB keyboards and mice. It is also useful in providing USB keyboard and mouse support in Windows NT which does not natively support USB.

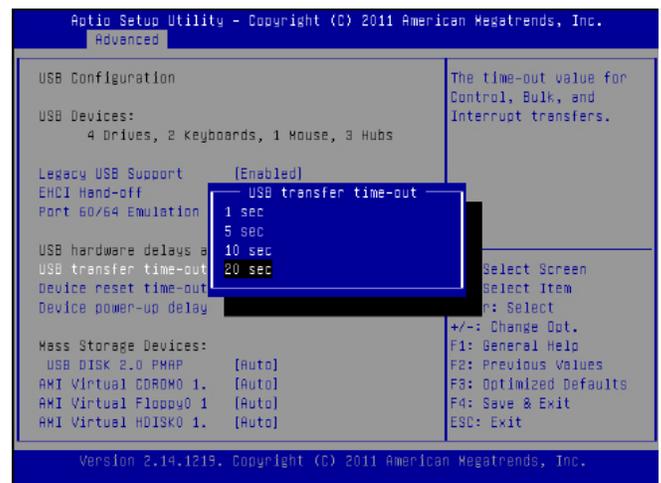
| Option  | Description  |
|---------|--|
| Enable  | The BIOS will emulate I/O ports 64h and 60h for the USB keyboard and mouse. This enables PS/2 functionality like keyboard lock, password setting and code selection. |
| Disable | The BIOS will not emulate I/O ports 64h and 60h for the USB keyboard and mouse. They will not have PS/2 functionality.   |



### USB Hardware Delays a

The menu sets delay time for USB operations.

| Item                  | Description   |
|-----------------------|---|
| USB transfer time-out | set transfers to an endpoint to complete within a specific time. <ul style="list-style-type: none"> <li>If set to zero, transfers will not time out because the host controller will not cancel the transfer. In this case, the transfer waits indefinitely until it is manually canceled or the transfer completes normally.</li> <li>If set to a nonzero value (time-out interval), the host controller starts a timer when it receives the transfer request. When the timer exceeds the set time-out interval, the request is canceled.</li> </ul> |
| Device reset time-out | This option sets the reset timing for the USB Mass Storage to be initialized. When set to 10 Sec, the BIOS will wait for up to 30 seconds for the USB flash drive to initialize.  |
| Device power-up delay | This option sets the power-up timing for the USB Mass Storage to be initialized.  |



### PC Health Status

This menu shows the hardware monitor configuration settings. Select an item then press <Enter> to display the configuration options.

### CPU0/CPU1/System Temp1/System Temp2 Temperature

The onboard hardware monitor automatically detects and displays the CPU and motherboard temperatures.

### FAN1B/FAN2B/FAN3B/FAN4B Speed

The onboard hardware monitor automatically detects and displays the CPU , chassis and system fan speeds in rotations per minute (RPM). If the fan is not connected to the motherboard, it displays N/A.

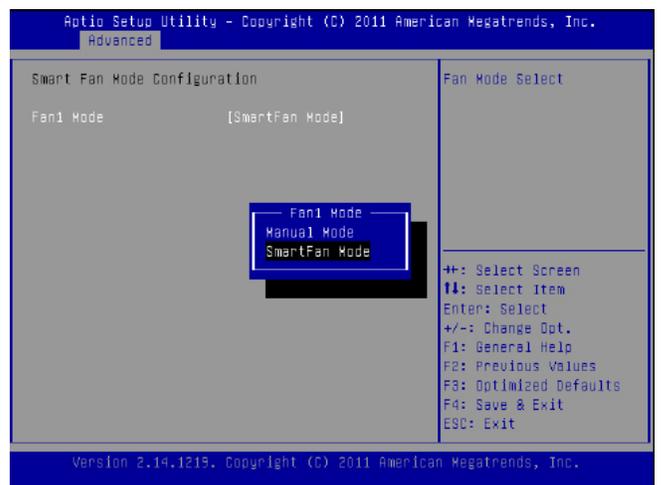
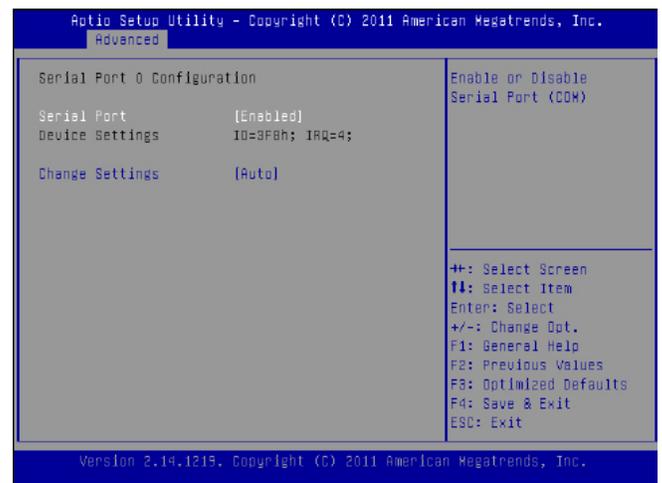
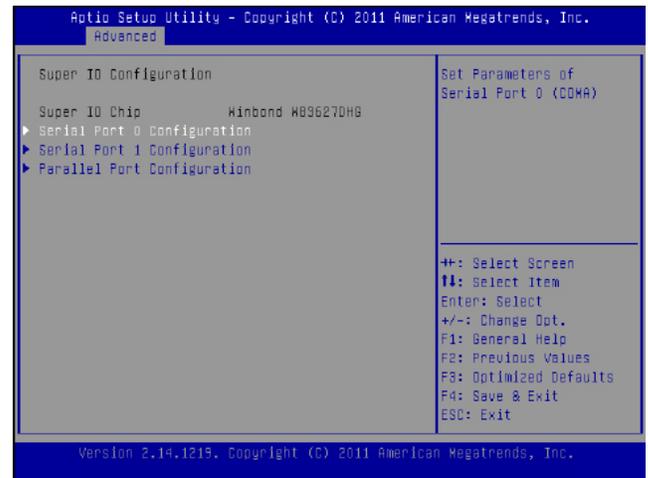
### CPU Voltage, 3V voltage, 5V voltage voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

### Smart Fan Mode Configuration

It allows you to configure the smart fan feature. You can manually turn on the CPU fan or enable the smart fan feature. And the CPU fan can be turned on automatically and operate at a slower or faster speed according to a preset temperature and duty cycle values. Refer to *Motherboard Layout* on Chapter 3 *Block Diagram* for CPU and system fan connectors. Note that all fans are configured the same with a uniform configuration.

| Item           | Selection   |
|----------------|---|
| Manual Mode    | Manually set the fan speed  |
| Smart Fan Mode | The preset the target CPU and system temperature at which the system fan will start running according to a preset duty cycle %.<br>30(°C).....13.7% duty cycle<br>50(°C).....49% duty cycle<br>60(°C).....60.8% duty cycle<br>72(°C).....78.4% duty cycle<br>80(°C).....100% duty cycle |



### SuperIO Configuration

In this screen, you will be able to modify the IRQ address of the serial and parallel ports which are provided by the Winbond SuperIO chip.

### Serial Port 0/1 Configuration

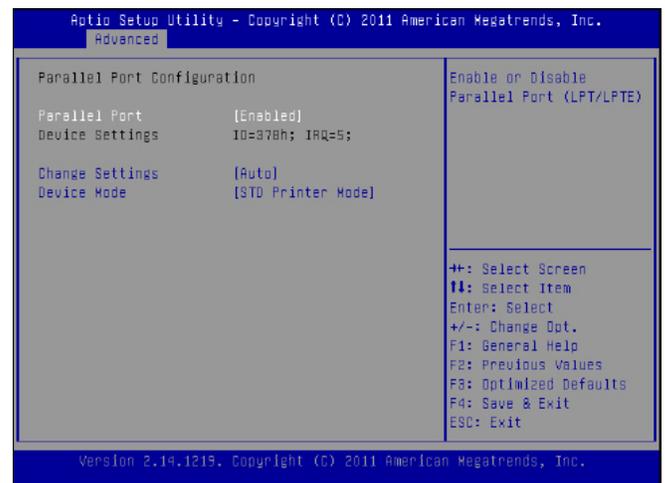
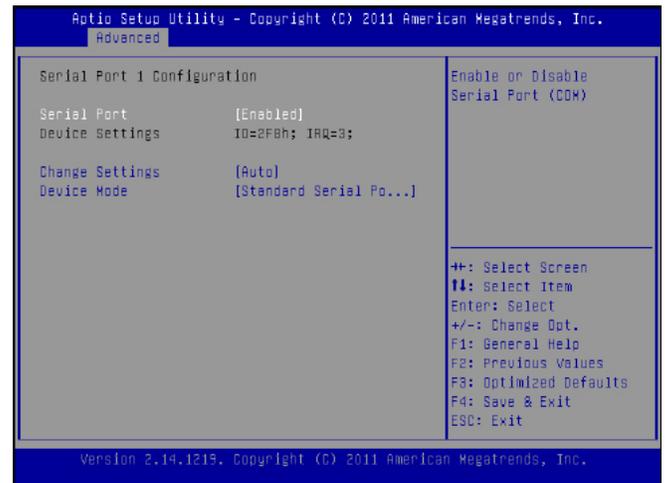
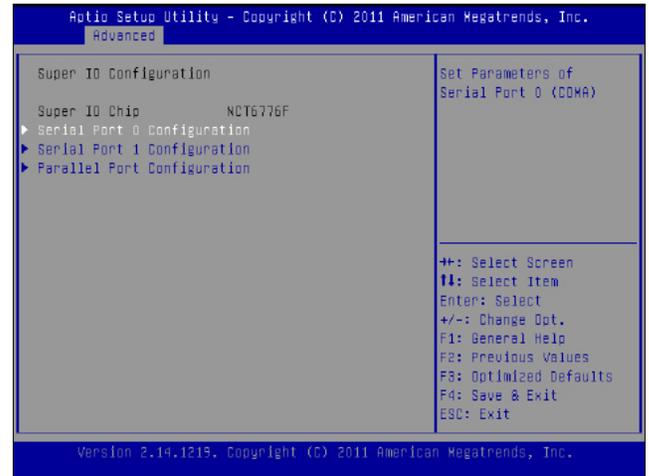
This option specifies the base I/O port address and Interrupt Request address of serial port 0 and 1.

| item             | Selection   |
|------------------|---|
| Enabled/Disabled | Set this value to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port physically becomes unavailable. |
| Change Settings  | Selects the serial port base address and IRQ for the interrupt address.   |

### Parallel Port Configuration

This option specifies the I/O address used by the parallel port.

| Item            | Selection   |
|-----------------|---|
| Parallel Port   | Enable or disable this parallel port  |
| Device Settings | Selects the serial port base address  |
| Device Mode     | Selects the modes from the following possibilities: STD Printer, Standard Parallel Port (SPP), Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP). Currently, new products have support of a mixture of these protocols. Consult your device's specification for exact protocols supported by your product.<br><br>SPP: denotes normal or standard mode.<br><br>EPP: used specifically for non-printer devices that would attach to the parallel port, particularly storage devices that needed the highest possible transfer rate.<br><br>ECP: used specifically to provide improved speed and functionality for printers |



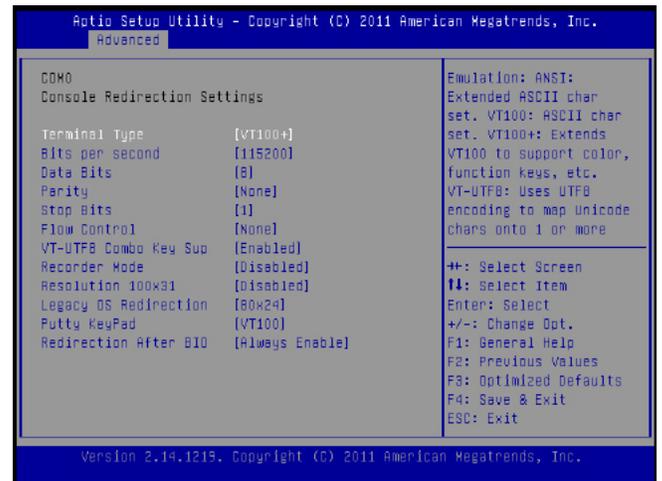
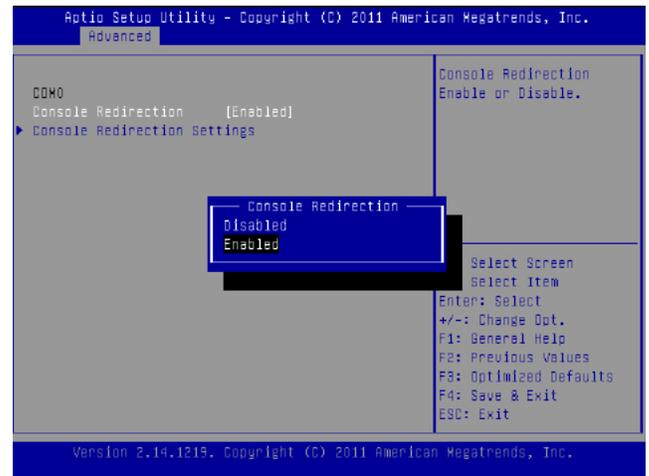
### Console Redirection

Use this menu to set the settings for BIOS remote access feature.

| Item                         | Selection                                    |
|------------------------------|--|
| Console Redirection          | Enable or disable BIOS through remote access |
| Console Redirection Settings | Enter to view more options                   |

### COM0/COM1 Console Redirection Settings

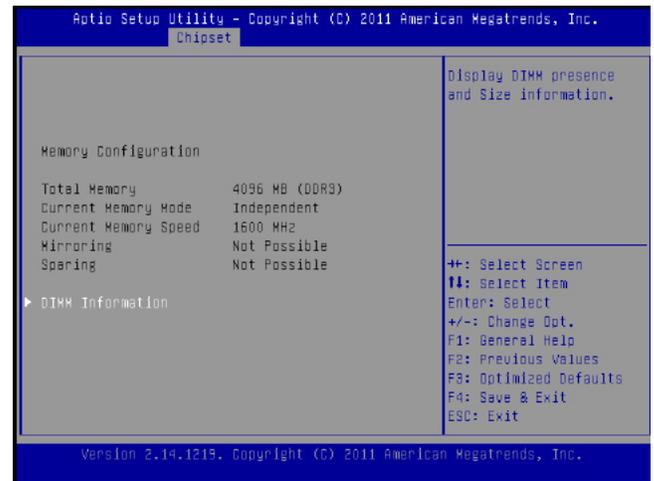
| Item  | Selection   |
|---|---|
| Terminal Type   | Sets the connection terminal type   |
| Bits per second, Data bits, Parity, Stop Bits, Flow Control | Sets the terminal connection parameters such as the baud rate, parity check mechanism, etc. |



### Chipset

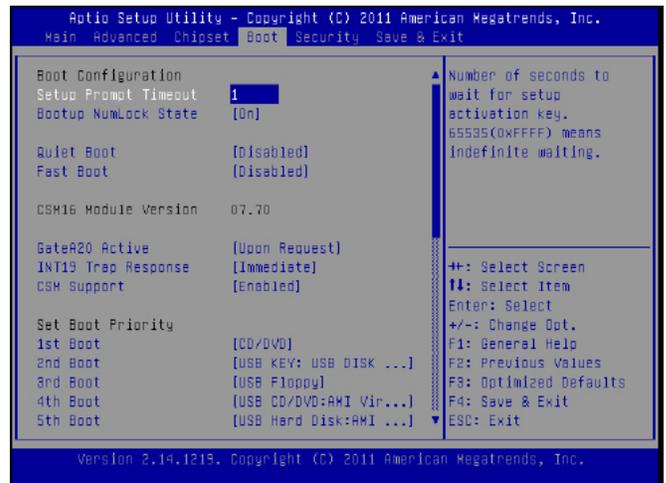
The chipset menu will let you further configure your Intel PCH information:

It also shows the memory capacity of the system and the installed memory on the system.



### Boot Configuration

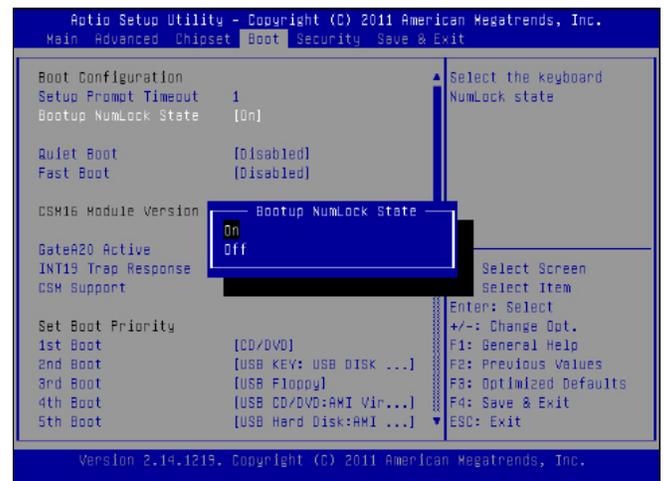
Select the Boot tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display an Boot BIOS Setup option by highlighting it using the <Arrow> keys. Select an item on the Boot Setup screen to access the sub menus for the following described functions.



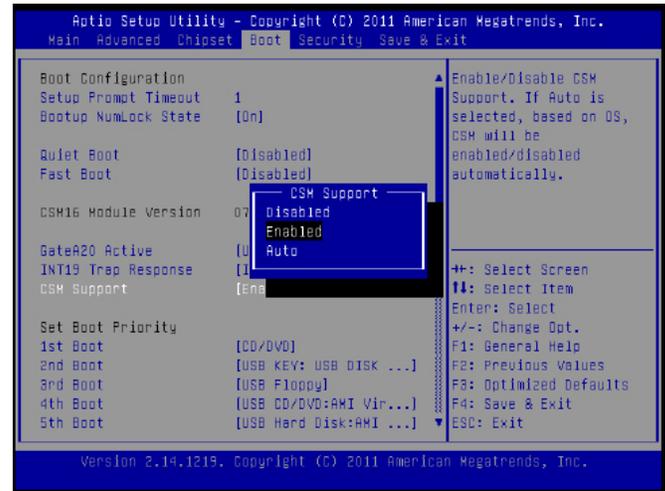
### Boot Settings Configuration

In this screen, you will be able to configure the boot procedures and the related elements.

| Items                   | Options  |
|-------------------------|--|
| Setup Prompt Timeout    | Specify the number of seconds for the boot setup prompt to wait for user's intervention during the POST.   |
| Bootup Num-Lock State   | This option lets you to enable or disable the function of the NumLock key.   |
| Quiet Boot              | Enabling this item allows the BIOS to suppress the message displayed during the POST.  |
| GateA20 Active          | This option sets the A20 address line controlling method for handling above 1MB memory access. By enabling the A20 gate, we have access to all 32 lines on the address bus, and hence, can reference 32-bit addresses, or up to 0xFFFFFFFF - 4 GB of memory. The controlling mode includes:<br><br>Upon Request: when it is enabled by user programs.<br><br>ALWAYS: never disables the A20 line |
| Interrupt19TrapResponse | Set this value to configure how option ROMs such as network controllers trap BIOS interrupt 19.  |



| Items                                    | Options   |
|--|---|
| CSMSupport(Compatibility Support Module) | It provides compatibility support for traditional legacy BIOS. This allows booting an operating system that requires a traditional option ROM support<br><br>Select to enable or disable this function. |
| Set Boot Priority                        | Use this screen to specify the order in which the system checks for the device to boot from.  |



### Security Settings

Select Security Setup from the Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection, are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

#### Administrator Password

If you have set an administrator password, you should enter the administrator password for accessing the system. Otherwise, you will only be able to see or change selected fields in the BIOS setup program.

#### User Password

If you have set a user password, you must enter the user password for accessing the system.

To set an Administrator/User password:

1. Select the option item and press Enter.
2. From the Create New Password box, key in a password, then press enter.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the option item and press Enter.
2. From the Enter Current Password box, key in the current password, then press enter.
3. From the Create New Password box, key in a new password, then press Enter.
4. Confirm the password when prompted.

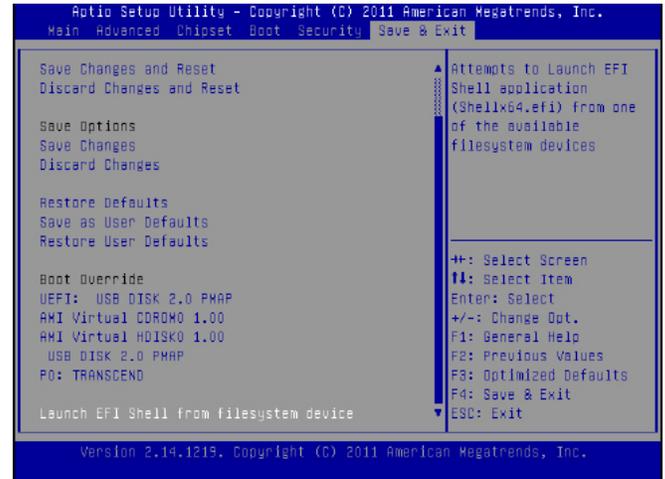
To clear the administrator password, follow the same steps as in changing an administrator password, then press Enter when prompted to create/confirm the password.



### Save & Exit

Select the Exit tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the <Arrow> keys. The following table lists the options in this menu.

| Item                                    | Options   |
|---|---|
| Save Changes and Reset                  | When you have completed the system configuration changes, select this option to leave setup and reboot the computer so the new system configuration parameters can take effect.   |
| Discard Changes and Reset               | This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select Yes to discard any changes and load the previously saved values. |
| Save Changes                            | Save your changes   |
| Discard Changes                         | Discard changes   |
| Restore Defaults                        | Restore to factory defaults   |
| Save as User Defaults                   | Save all of your changes as an user default setting.  |
| Restore User Defaults                   | Loads your saved user default setting.  |
| Boot Override                           | This section of the Boot Menu allows booting from a specific device immediately. Therefore you should see an entry for all bootable devices.  |
| Launch EFI Shell from filesystem device | This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.  |



### Appendix A: Programming Watchdog Timer

---

A watchdog timer is a piece of hardware that can be used to automatically detect system anomalies and reset the processor in case there are any problems. Generally speaking, a watchdog timer is based on a counter that counts down from an initial value to zero. The software selects the counter's initial value and periodically restarts it. Should the counter reach zero before the software restarts it, the software is presumed to be malfunctioning and the processor's reset signal is asserted. Thus, the processor will be restarted as if a human operator had cycled the power.

For sample watchdog code, see *watchdog* folder on the *Driver and Manual CD*



To execute the sample code: enter the number of seconds to start count down before the system can be reset. Press start to start the counter and stop to stop the counter..

`Dwd_tst --swt xxx` (Set Watchdog Timer 1-255 seconds)

`wd_tst[*] --start` (Start Watchdog Timer)

`wd_tst --stop` (Stop Watchdog Timer)

For sample watchdog code, see *watchdog* folder on the *Driver and Manual CD*



### Appendix B: Setting up Console Redirections

---

Console redirection lets you monitor and configure a system from a remote terminal computer by re-directing keyboard input and text output through the serial port. The following steps illustrate how to use this feature. The BIOS of the system allows the redirection of console I/O to a serial port. With this configured, you can remotely access the entire boot sequence through a console port.

1. Connect one end of the console cable to console port of the system and the other end to serial port of the Remote Client System.
2. Configure the following settings in the BIOS Setup menu:  
  
BIOS > Advanced > Remote Access Configuration > Serial Port Mode > [115200, 8, n, 1]
3. Configure Console Redirection on the client system. The following illustration is an example on Windows platform:
  - a. A. Click the start button, point to Programs > Accessories > Communications and select Hyper Terminal.
  - b. B. Enter any name for the new connection and select any icon.
  - c. Click OK.
  - d. From the "Connect to". Pull-down menu, select the appropriate Com port on the client system and click OK.
  - e. Select 115200 for the Baud Rate, None. for Flow control, 8 for the Data Bit, None for Parity Check, and 1 for the Stop Bit.



### Appendix C: Programming Generation 3 LAN Bypass

---

The bypass function is used to link two independent Ethernet ports when the system crashes or powers off. This means if your system is equipped with a LAN Bypass function, a condition in your system will not interrupt your network traffic. Different from the previous two generations (Gen1 and Gen2), the Lanner Bypass Gen 3 employs a programming method to control the bypass function by software. There are typically two communication status for the bypass function, one is "Normal" and another is "Bypass" status. Furthermore, the Lanner Bypass software is capable to control the bypass status in the following 3 instances.

1. When the system powers off, it can be forced to enable the LAN Bypass function .
2. When the system is in the just-on state which is a brief moment when it powers up .
3. When the system is running

Please refer to the LAN\_Bypass\_Watchdog folder on the Driver and Manual CD.

And the Lanner bypass possess the following features:

1. Communication through SMBUS (I2C)
2. Independent bypass status control for each pair up to a total of 4 pairs
3. Lanner Bypass Modules can bypass systems Ethernet ports on a host system during three instances: Just-on (Just-on is the brief moment when the internal power supply turns on and booting process starts), system off, or upon software request (during run-time).
4. Software programmable bypass or normal mode
5. Software programmable timer interval:
  - JUST-ON watchdog timer, used during JUST-ON, has timer setting of 5~1275 seconds of timer interval.
  - Run-Time watchdog timer, used during run-time, has setting of 1~255 seconds of timer interval.
6. Multiple Watchdog Timers:
  - Two for run-time: It is designed to give you a more variety of controls of the bypass on port basis. By using dedicated watchdogs for different pairs of bypass, you have the flexibility to manage the bypass status for them differently.
  - One for just-on: It is designed to give you the precise control of the bypass during this phase. You can use

this timer to delay enabling the bypass in just-on state.

For sample LAN bypass code and the Bypass Manual, see the LAN\_Bypass folder on the Driver and Manual CD or the Lanner Support Website at <http://www.lannerinc.com/download-center/>. And browse the download center and look for Lanner LAN Bypass Watchdog User Manual under the Accessories folder.

For a description of the physical LAN ports equipped with this function, refer to Front Panel Features in Chapter 1 Introduction.



## Appendix D: Programming the LCM

The LCD panel module (LCM) is designed to provide real-time operating status and configuration information for the system. For sample LCM code, see *LCM* folder in the *Driver and Manual CD*. The driver and the program library can also be found in the folder.

The system supports the following 2 kinds of LCM:

- Parallel Text-based LCM: The LCM connects to the motherboard's parallel port. The LCD screen can display 2 lines, 16 (or 20) characters per line.
- USB and Serial Text or Graphic-based LCM: Our next generation LCM. Lanner engineers design a common source code to be deployed on these two differently interfaced LCM modules. Jumpers are used to select between text and graphic types. See next section.

### For Parallel Text-based LCM

#### Build

To build program source code on Linux platform, use the following steps as a guideline:

1. Copy the proper makefile from the Driver and Manual CD to your system: `Makefile.linux`
2. Type `make` to build source code:  
`make Makefile` (Note: omit the file extensions)

After compiled, the executable programs (`plcm_test`, `plcm_cursor_char`, `Test`) and the driver (`plcm_drv.ko` or `plcm_drv.o`) will appear in the program's folder.



**Note:** The OS supported by Lanner Bypass function include platforms based on Linux Kernel series 2.4.x and Linux Kernel series 2.6.x.

#### Install

Install the driver and create a node in the `/dev` directory by:

```
#insmod plcm_drv.ko
#mknod /dev/plcm_drv c 241 0
```



**Note:** If you cannot install the driver, check whether you have enabled the parallel port in the BIOS setting .

#### Execution

This section contains sample executable programs that you could test on your platform. It demonstrates some useful functionality that the LCM provides.

To execute, type:

`#!/plcm_test`

**Plcm\_cursor\_char.** This program provides a menu to demonstrate the following functions:

**Insert line** (set the starting line to either line 1 or line 2)

**Move Cursor right** (select to move the cursor to the right)

**Move Cursor Left** (select to move the cursor to the left)

**Add a char** (select to display a character on the LCM screen)

**Clear** (select to clear the LCM display)

**Leave** (select to leave the program)

To execute, type:

`#!/plcm_cursor_char`



**Note:** For descriptions of the command, refer to the Readme file contained within the program's folder.



### For USB and Serial Text or Graphic-based LCM

#### Jumper selection between text and graphic mode

|             |       |   |    |
|-------------|-------|---|----|
| TEXT LCM    | 1 1 0 |  | J6 |
|             |       |  | J7 |
|             |       |  | J8 |
| Graphic LCM | 1 1 1 |  | J6 |
|             |       |  | J7 |
|             |       |  | J8 |

#### Build

To build program source code on Linux platform, use the following steps as a guideline:

1. Extract source file:
 

```
#tar -xzvf lanner-serial-usb-lcm-version.tgz
```
2. Change directory to the extracted folder:
 

```
#cd lanner-serial-usb-lcm-vx
```
3. Type make to build source code:
 

```
#make
```

After compilation, the executable programs (usb\_disp, usb\_key, ser\_disp, ser\_key) where disp denotes display control and key denotes the keypad input function and usb and ser denote USB and serial interfaces respectively will appear in the program's folder.



#### Note:

1. The OS supported by Lanner LCM function include platforms based on Linux Kernel series 2.4.x and Linux Kernel series 2.6.x, FreeBSD 8.0, and DOS.
2. For information on installation on platforms other than Linux, see \lanner-serial-usb-lcm-v0.5\README and \lanner-serial-usb-lcm-v0.5\ dos-example\README

#### Install

To install, type the following command:

```
#mknod /dev/usb/hiddev0 c 180 96
```

#### Execution

This section contains sample executable programs that you could test on your platform. It demonstrates some useful functionality that the LCM provides.

Type the execution command:

```
# ./ser_disp or ./usb_disp
```

Options:

```
[-l] | [-o XXXXX] | [[-b YYYY] | [-f ttyS_No] | [-d filename] |
  [-g filename] | [-c cmd] | [-0 arg0] [-1 arg1]... [-h]
[-l]: Identify LCM information and get flash setting
[-o XXXXX]: to override default baud rate
valid values are: 9600, 19200, 38400, 57600, 115200
[-f ttyS_No]: assign the keypad device used as ttySNO
[-d filename]: to display the specified file on Text LCD
[-g filename]: to display the specified file on Graphic LCD
```

```
[-c cmd]: specify the command to be used.
```

```
[-0 arg0]: data[0]
```

```
[-1 arg1]: data[1]
```

```
[-2 arg2]: data[2]
```

```
[-3 arg3]: data[3]
```

```
[-4 arg4]: data[4]
```

```
[-v]: be verbose
```

```
[-h]: this help
```

```
#./ser_key or ./usb_key
```

The keypad function test program will not detect the keypad device; therefore, you should assign it with the [-f] option (the default is /dev/ttyS0 or /dev/usb/hiddev0)



### Appendix E: Driver Installation

#### Intel Chipset Driver Installation

This section provides the instructions on how to install Intel® chipset drivers.

The Intel Chipset Device Software installs the Windows\* INF files. The INF files inform the operating system how to properly configure the chipset for specific functionality, such as AGP, USB, Core PCI, and ISAPNP services.

To install the Intel® Chipset driver on a Windows Operating System:

1. Restart the computer, and then log on with Administrator privileges.
2. Insert the Drivers and User's Manual CD to the USB-optical drive.
3. Browse the contents of the support CD to locate the file `infinst_autol.exe` from the \Driver folder. Double-click the Executable file.
4. The program starts by extracting the file. Click Next to continue the installation process.
5. Click **Next** when the Intel® Chipset InstallShield Wizard window appears.



6. Click Next when the Readme File Information screen appears.



7. Click Yes when the Software License Agreement screen appears.



8. Click Finish when the Setup Complete screen appears.



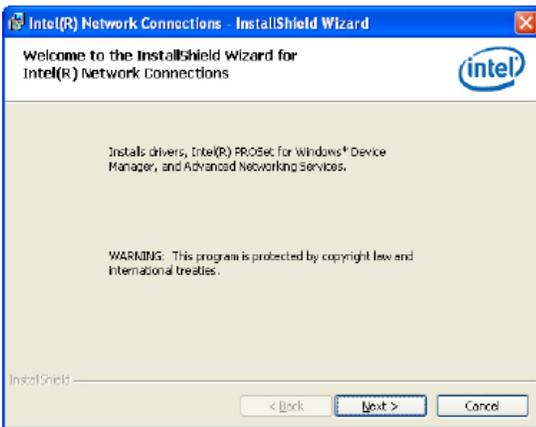
### LAN Adapters Driver Installation

This section provides the instructions on how to install Intel® Gigabit LAN adapter drivers.

#### On the Windows OS

To install the Intel® Gigabit LAN controller driver on a Windows Operating System:

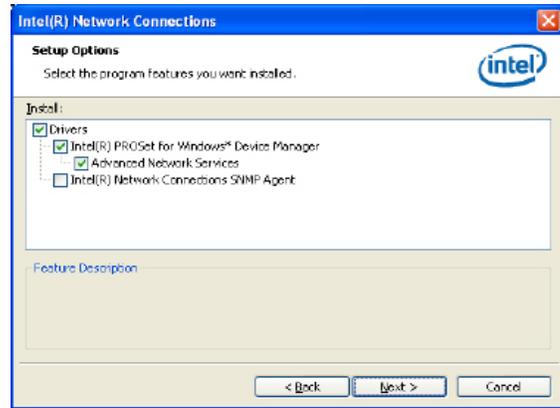
1. Restart the computer, and then log on with Administrator privileges.
2. Insert the Drivers and User's Manual CD to the USB-optical drive.
3. Browse the contents of the support CD to locate the file PRO2KXP.EXE from the \Driver\LAN folder. Double-click the Executable file.
4. The program starts by extracting the file. Click Next to continue the installation process.
5. Click **Next** when the Intel® PRO Network Connections –InstallShield Wizard window appears.



6. Select the "I accept the terms in the license agreement" and then click Next.



7. Select the programs that you wish to install. Make sure that you have selected the drivers.



8. Click Next and then **Install** to proceed the installation.
9. Click **Finish** to close the installation program.

To verify the LAN controller driver installation, do the following steps:

1. Right-click on the My Computer icon, and then select Properties from the menu.

Click the Hardware tab, then click the Device Manager button.

Click the + sign next to the Network adapters, then the Intel Pro/1000 [.....] adapter should be listed.



Note: The system uses Intel 82574L Ethernet controllers, you could obtain the latest drivers at the Intel download center: <http://downloadcenter.intel.com/>  
You could also use the web based utility to detect the needed drivers automatically by visiting the following website: <http://www.intel.com/support/network/detect.htm>



### On Linux

Follow these instructions when installing the Intel® LAN controller base driver for the in Red Hat® and Linux operating system.

1. Insert the motherboard/system support CD to the optical drive and mount the optional drive in the Linux platform.
2. Copy the base driver tar file from the motherboard/system support CD to the directory of your local hard disk. The Intel® LAN driver for Linux OS is located in the following directory:

`\Driver\LAN_Driver\PRO1000\LINUX`. The name format of driver file is "e1000-<Version>.tar.gz". For example: the file name of driver version 7.0.38 is "e1000-7.0.38.tar.gz".

3. Untar/unzip the archive, where <x.x.x> is the version number for the driver tar file:

```
tar xzf e1000-<x.x.x>.tar.gz
```

4. Change to the driver src directory on your system, where <x.x.x> is the version number for the driver tar:

```
cd e1000-<x.x.x>/src/
```

5. Compile the driver module by typing the following command:

```
make install
```

6. The binary will be installed as:

```
/lib/modules/<kernel_version>/kernel/drivers/net/  
e1000.o
```

The install locations listed above are the default locations. They might not be correct for certain Linux distributions.

7. Load the module using either the `insmod` or `modprobe` command:

```
modprobe igb
```

```
insmod igb
```

Note that for 2.6 kernels the `insmod` command can be used if the full path to the driver module is specified. For example:

```
insmod /lib/modules/<KERNEL_VERSION>/kernel/  
drivers/net/igb/igb.ko
```

With 2.6 based kernels also make sure that older `igb` drivers are removed from the kernel, before loading the new module:

```
rmmod igb; modprobe igb
```

8. Assign an IP address to the interface by entering the following, where <x> is the interface number:

```
ifconfig eth<x> <IP_address>
```

9. Verify that the interface works. Enter the following, where <IP\_address> is the IP address for another machine on the same subnet as the interface that is being tested:

```
ping <IP_address>
```



Note: The system uses Intel 82574L Ethernet controllers, you could obtain the latest drivers at the Intel download center: <http://downloadcenter.intel.com/>



### Intel Rapid Storage Technology Software Installation

1. Insert the Drivers and User's Manual CD to the optical drive. Or you can download this software from Intel website too.
2. Browse the contents of the support CD under the directory: \Driver\ for RAID software.
3. Follow the on-screen instructions to install the software.



4. Restart the computer. You will find the "Intel Rapid Storage Technology" icon on the Windows task bar.



### Appendix F: Terms and Conditions

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#### Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:

Improper or inadequate maintenance by the customer  
Unauthorized modification, misuse, or reversed engineering of the product  
Operation outside of the environmental specifications for the product.

#### RMA Service

Requesting a RMA#

6. To obtain a RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
7. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
8. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
9. Mark the RMA# clearly on the box.



**Note:** Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

# Appendix F

## Terms and Conditions

### RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

|  |  |
|--|--|
| <b>RMA No.:</b>  | <b>Reasons to Return:</b> <input type="checkbox"/> Repair (Please include failure details)<br><input type="checkbox"/> Testing Purpose |
| <b>Company:</b>  | <b>Contact Person:</b>   |
| <b>Phone No.:</b>  | <b>Purchased Date:</b>   |
| <b>Fax No.:</b>  | <b>Applied Date:</b>   |
| <b>Return Shipping Address:</b> _____  |  |
| <b>Shipping by:</b> <input type="checkbox"/> Air Freight <input type="checkbox"/> Sea <input type="checkbox"/> Express _____ |  |
| <input type="checkbox"/> Others: _____   |  |

| Item | Model Name | Serial Number | Configuration |
|------|------------|---------------|---------------|
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |
|      |            |               |               |

| Item | Problem Code | Failure Status |
|------|--------------|----------------|
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |

- \*Problem Code:**
- |                        |                              |                    |                          |
|------------------------|------------------------------|--------------------|--------------------------|
| 01: D.O.A.             | 07: BIOS Problem             | 13: SCSI           | 19: DIO                  |
| 02: Second Time R.M.A. | 08: Keyboard Controller Fail | 14: LPT Port       | 20: Buzzer               |
| 03: CMOS Data Lost     | 09: Cache RMA Problem        | 15: PS2            | 21: Shut Down            |
| 04: FDC Fail           | 10: Memory Socket Bad        | 16: LAN            | 22: Panel Fail           |
| 05: HDC Fail           | 11: Hang Up Software         | 17: COM Port       | 23: CRT Fail             |
| 06: Bad Slot           | 12: Out Lock Damage          | 18: Watchdog Timer | 24: Others (Pls specify) |

*Request Party*

*Confirmed by Supplier*

\_\_\_\_\_  
Authorized Signature / Date

\_\_\_\_\_  
Authorized Signature / Date

