

IceBreaker 1812

Technical Guide
Rev. 1.0



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Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the IceBreaker 812. Installation and maintenance should be performed by experienced technicians only.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the serverboard and the chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the server into a rack and check out the server configuration prior to powering up the system. If your server was ordered without processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer here for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: Standardized Warning Statements

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the Server IceBreaker 812.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X9DRFF-7TG+/X9DRFF-7G+ serverboard, including the locations and functions of connections, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC816LTS-655B server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SAS or peripheral drives and when replacing system power supply modules and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

Appendix A: BIOS Error Beep Codes

Appendix B: System Specifications

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Appendix A BIOS Error Beep Codes

Appendix B System Specifications

Chapter 1

Introduction

1-1 Overview

The IceBreaker 1812 is a high-end server comprised of two main subsystems: the SC816LTS-655B 1U server chassis and the X9DRFF-7TG+/X9DRFF-7G+ dual processor serverboard. Please refer to our web site for information on operating systems that have been certified for use with the system (www.penguincomputing.com).

In addition to the serverboard and chassis, various hardware components have been included with the IceBreaker 1812, as listed below:

- Four 4-cm fans (FAN-0065L4)
- Four 4-cm fans (FAN-0088L4)
- One air shroud (MCP-310-19012-0N)
- Two passive CPU heatsinks (SNK-P0047PS)
- Riser Card: (see Section 5-6 for details)
One RSC-R1UFF-E8R
- SAS/SATA Accessories
Three backplanes (BPN-SAS-816T-A2, BPN-SAS-816T-A4, BPN-SAS-816T-A6)
- One rackmount kit (MCP-290-00102-0N)

1-2 Serverboard Features

At the heart of the IceBreaker 1812 lies the X9DRFF-7TG+/X9DRFF-7G+, a dual processor serverboard based on the Intel® C602 chipset. Below are the main features of the serverboard. (See Figure 1-1 for a block diagram of the chipset.)

Processors

The X9DRFF-7TG+/X9DRFF-7G+ supports single or dual Intel® E5-2600 Series processors in LGA2011 sockets. Please refer to our web site for a complete listing of supported processors (www.penguincomputing.com).

Memory

The X9DRFF-7TG+/X9DRFF-7G+ has 16 memory sockets that can support up to 512 GB of ECC registered DDR3-1600/1333/1066/800 RDIMMs or up to 128 GB of unbuffered ECC/non-ECC DDR3-1600/1333/1066/800 UDIMMs. Please refer to Chapter 5 for installing memory.

Onboard SAS

An LSI 2308 SAS controller provides eight SAS2 ports. The SAS drives are connected to a backplane that provides power, bus termination and configuration settings. RAID 0, 1 and 10 are supported.

Onboard Serial ATA

A SATA controller is integrated into the chipset to provide a six-port SATA subsystem. Two of the ports support SATA 3.0 and four support SATA 2.0 (see Chapter 5 for details). RAID 0, 1, 5 and 10 are supported.

I/O Ports

The color-coded I/O ports located at the front of the server include a VGA (monitor) port, two USB 2.0 ports, two 1 Gb Ethernet ports (the X9DRFF-7TG+/6017R-73THDP+ features two 10 Gb Ethernet ports) and one dedicated IPMI LAN port.

Graphics Controller

The X9DRFF-7TG+/X9DRFF-7G+ features an integrated Matrox G200ew, 16 MB DDR2 graphics controller.

1-3 Server Chassis Features

The IceBreaker 1812 is built upon the SC816LTS-655B chassis. Details on the chassis and on servicing procedures can be found in Chapter 6. The following is a general outline of the main features of the chassis.

System Power

The SC816LTS-655B features a single 650W power supply consisting of a single power module. The system must be shut down when replacing or removing this power supply module.

Hard Drives

The SC816LTS-655B chassis was designed to support 12 SAS/SATA fixed hard drives, which are mounted inside the chassis.

PCI Expansion Slots

One riser card is included with the system. The RSC-R1UFF-E8R supports one standard size PCI-E 3.0 x8 add-on card. See section 5-6 of this manual for details.

Front Control Panel

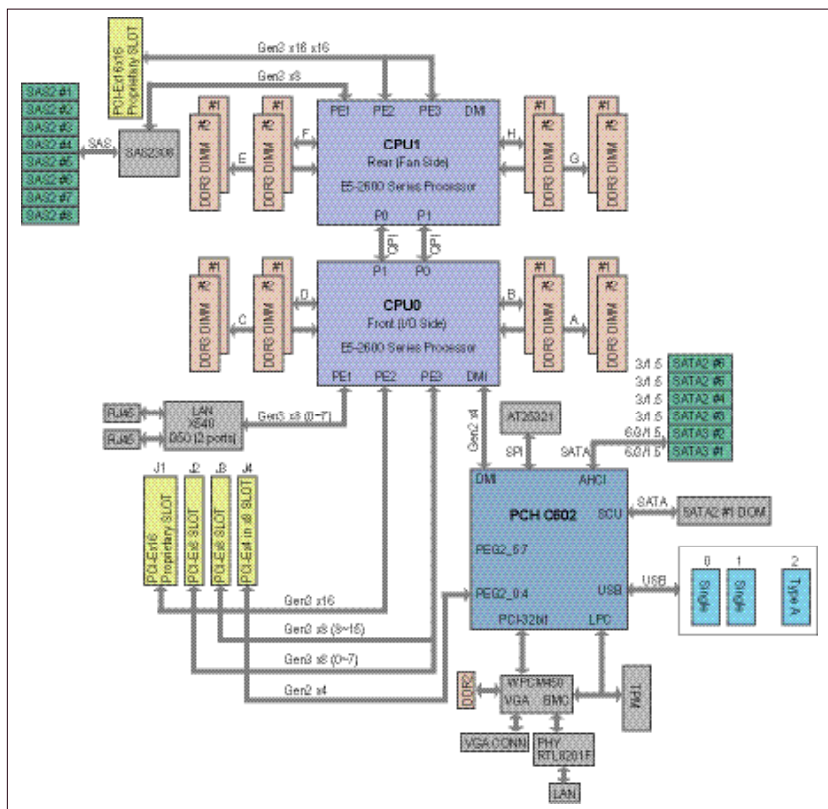
The chassis' control panel includes a single system power-on button, which also functions as a UID indicator.

Cooling System

The SC816LTS-655B has an innovative cooling design that features four 4-cm counter-rotating fans located in the middle section of the chassis and four 4-cm exhaust fans. The power supply module also includes a cooling fan.

**Figure 1-1. Intel C602 Chipset:
System Block Diagram**

Note: This is a general block diagram. Please see Chapter 5 for details.



1-4 Contacting Penguin Computing

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Web Site: www.penguincomputing.com

Notes

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your IceBreaker 1812 up and running. Following the steps in the order given should enable you to have the system operational within a minimal amount of time. This quick setup assumes that your system has come to you with the processor and memory preinstalled. If your system is not already fully integrated with a motherboard, processor, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the System

You should inspect the box the server was shipped in and note if it was damaged in any way. If the server itself shows damage, you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the IceBreaker 1812 was shipped in should include two sets of rail assemblies, six rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimal amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing. This product is for

installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- This product is not suitable for use with visual display work place devices according to §2 of the the German Ordinance for Work with Visual Display Units.

2-4 Warnings and Precautions

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SATA drives and power supply modules to cool before touching them.
- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).



Warning! To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

2-5 Rack Mounting Instructions

This section provides information on installing the chassis into a rack unit with the rails provided. There are a variety of rack units on the market, which may mean that the assembly procedure will differ slightly from the instructions provided. You should also refer to the installation instructions that came with the rack unit you are using. **NOTE:** This rail will fit a rack between 26.5" and 36.4" deep.

Identifying the Inner Rail and Inner Rail Extension

The SC816LT chassis includes mounting rails for installing the system into a rack. Each assembly consists of two sections: An inner rail which is pre-installed on the chassis, an inner rail extension, and an outer rail that secures to the rack. These assemblies are specifically designed for the left and right side of the chassis

Locking Tabs

Each inner rail has a locking tab. This tab locks the chassis into place when installed and pushed fully into the rack. These tabs also lock the chassis in place when fully extended from the rack. This prevents the server from coming completely out of the rack when the chassis is pulled out for servicing.

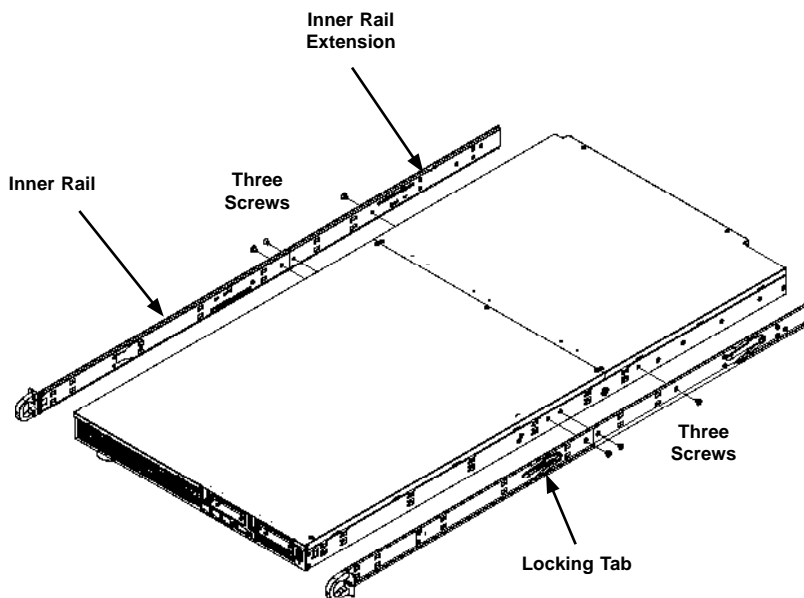


Figure 2-1. Identifying the Inner Rails and Inner Rail Extensions

Attaching the Inner Rail

The SC816LT chassis ships with the inner rails already installed. In most cases it is only necessary to install the inner rail extension.

Releasing Inner Rail from the Outer Rails

1. Identify the left and right inner rails and inner rail extensions as illustrated in Figure 6-1.
2. Place the inner rail and inner rail extension against the side of the chassis.
3. Slide the inner rail and inner rail extension forward toward the front of the chassis
4. Secure the inner rail and inner rail extension with three screws.
5. Repeat steps 1-4 with the remaining inner rail.

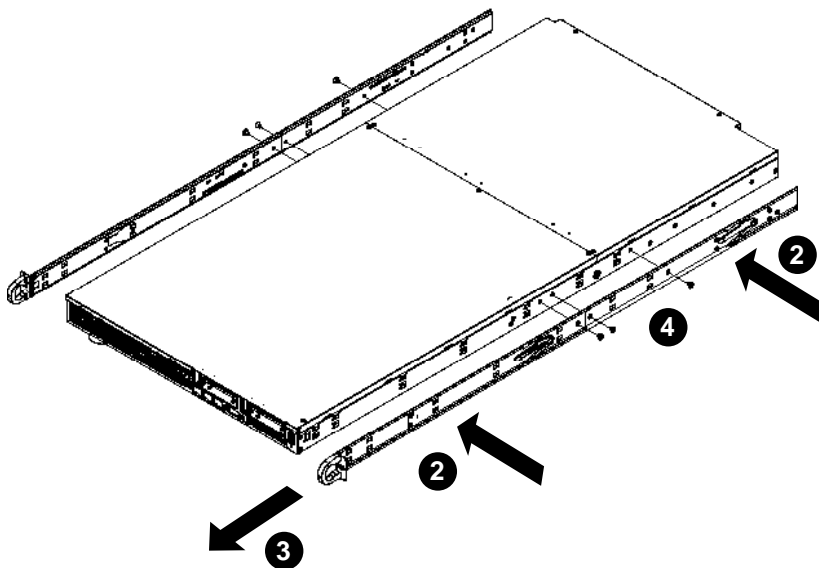


Figure 2-2. Attaching the Inner Rail and Inner Rail Extension



Warning: do not pick up the server with the front handles. They are designed to pull the system from a rack only.

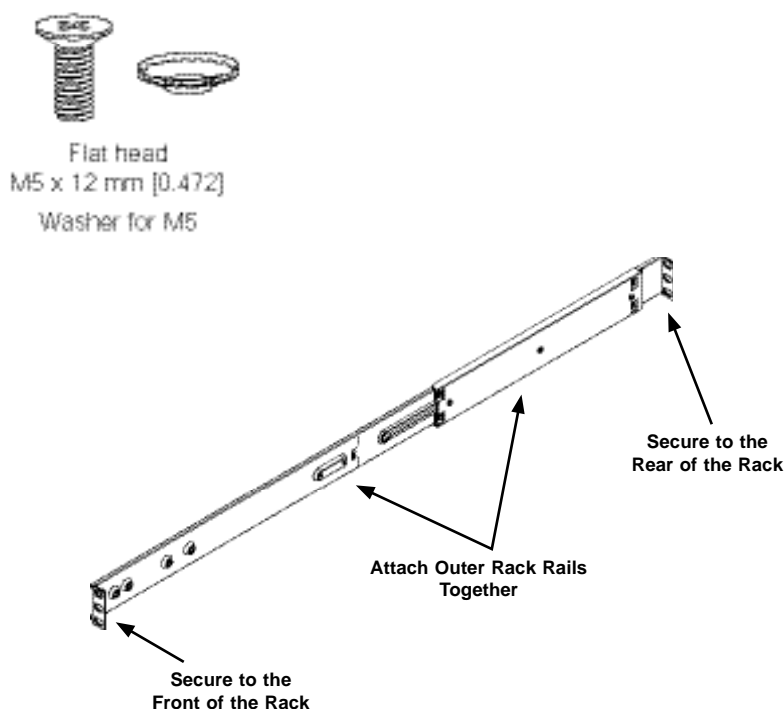


Figure 2-3. Assembling the Outer Rails

Installing the Outer Rails to the Rack

Installing the Outer Rails

1. Attach the short bracket to the outside of the long bracket. You must align the pins with the slides. Also, both bracket ends must face the same direction.

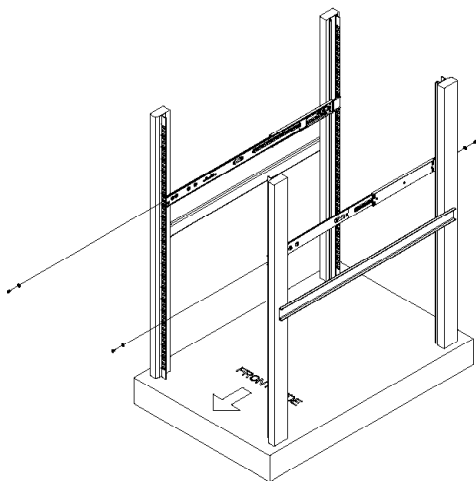


Figure 2-4. Attaching the Outer Rails to a Rack

2. Adjust both the short and long brackets to the proper distance so that the rail fits snugly into the rack.
3. Secure the long bracket to the front side of the outer rail with two M5 screws and the short bracket to the rear side of the outer rail with three M5 screws. Use a washer with each screw.
4. Repeat steps 1-4 for the remaining outer rail.



Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

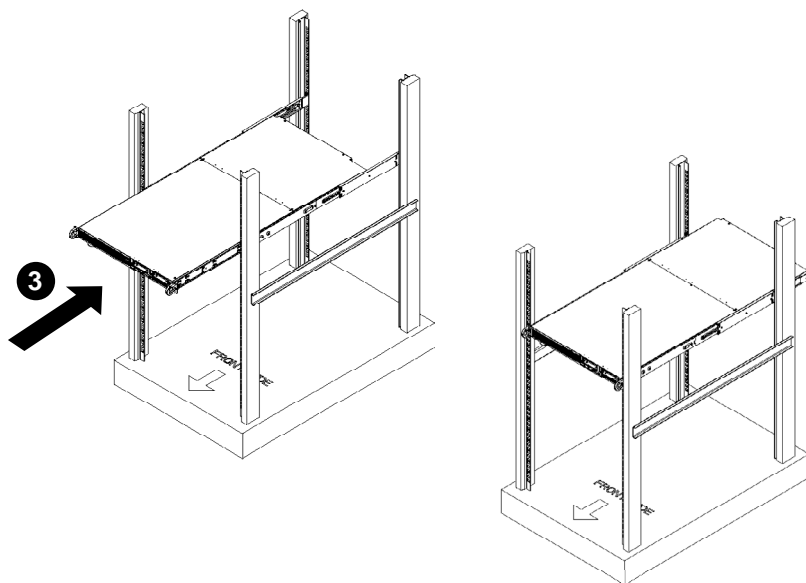


Figure 2-5. Installing the Chassis into a Rack

Note: figures are for illustrative purposes only. Always install servers into racks from the bottom up.

Chassis Installation

Installing the Chassis into a Rack

1. Confirm that the rails are correctly installed on the rack.
2. Align the guides on the chassis with the front of the rails.
3. Slide the guides of the chassis into the rails, keeping the pressure even on both sides, until the locking tabs click into place, securing chassis in a fully extended position.
4. Simultaneously depress the locking tabs of both rails at the same time and push the chassis all the way into the rack.
5. If necessary, use screws to secure the chassis handles to the front of the rack.

Chapter 3

System Interface

3-1 Overview

The server chassis has a single power on/off button. No other buttons or indicators are needed on the Hadoop server.

3-2 Control Panel Button

The power on/off button is located just to the right of the COM port on the front of the chassis.



Power

The main power button is used to apply or remove power from the power supply to the system. Turning off system power with this button removes the main power, but keeps standby power supplied to the system. For this reason, you should unplug the system before servicing. The power button has a built-in LED that will turn green when the power is on.

Notes

Chapter 4

Standardized Warning Statements for AC Systems

4-1 About Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. Should you have questions or experience difficulty, contact Penguin Computing's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this appendix in its entirety before installing or configuring components in the Penguin Computing chassis.

Warning Definition



Warning!

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

警告の定義

この警告サインは危険を意味します。

人身事故につながる可能性がありますので、いずれの機器でも動作させる前に、電気回路に含まれる危険性に注意して、標準的な事故防止策に精通して下さい。

此警告符号代表危險。

您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾的声明号码找到此设备的安全性警告说明的翻译文本。

此警告符號代表危險。

您正處於可能身體可能會受損傷的工作環境中。在您使用任何設備之前，請注意觸電的危險，並且要熟悉預防事故發生的標準工作程序。請依照每一注意事項後的號碼找到相關的翻譯說明內容。

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES.

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS.

חשובות הבהרות

סמל זה מזהיר על סכנת פציעות או נזק גוף. לפני שיטפל בציוד, יש להכיר את סכנות החשמל והאמצעים הסטנדרטיים למניעת תאונות. בסוף כל אזהרה, יש מספר שיסייע למצוא את התרגום המתאים. יש לשמור היטב על הנחיות אלו.

**تحذير! هذا الرمز يعني خطر اصابة في حالة يمكن ان تسبب في اصابة جسدية .
 قبل ان تعمل على أي معدات يمكن على خطر بالمخاطر الناجمة عن الدوائر
 الكهربائية
 وكن على دراية بالعملات الوقائية لمنع وقوع أي حوادث
 استخدم رقم البيان المتصوص في نهاية كل تحذير للتحقق من ترجمتها**

안전을 위한 주의사항

경고!

이 경고 기호는 위험이 있음을 알려 줍니다. 작업자의 신체에 부상을 야기 할 수 있는 상태에 있게 됩니다. 모든 장비에 대한 작업을 수행하기 전에 전기회로와 관련된 위험요소들을 확인하시고 사전에 사고를 방지할 수 있도록 표준 작업절차를 준수해 주시기 바랍니다.

해당 번역문을 찾기 위해 각 경고의 마지막 부분에 제공된 경고문 번호를 참조하십시오

BELANGRIJKE VEILIGHEIDSLINSTRUCTIES

Dit waarschuwings symbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij een elektrische installatie betrokken risico's en dient u op de hoogte te zijn van de standaard procedures om ongelukken te voorkomen. Gebruik de nummers aan het eind van elke waarschuwing om deze te herleiden naar de desbetreffende locatie.

BEWAAR DEZE INSTRUCTIES

Installation Instructions



Warning!

Read the installation instructions before connecting the system to the power source.

設置手順書

システムを電源に接続する前に、設置手順書をお読み下さい。

警告

将此系统连接电源前，请先阅读安装说明。

警告

將系統與電源連接前，請先閱讀安裝說明。

Warnung

Vor dem Anschließen des Systems an die Stromquelle die Installationsanweisungen lesen.

¡Advertencia!

Lea las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Attention

Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

הנחיות התקנה: קראו את ההנחיות לפני שתחברו את המערכת למקור האנרגיה.

قبل تركيب التركيب، قرا توصيل النظام إلى مصدر الطاقة

시스템을 전원 에 연결하기 전에 설치 안내를 읽어주시십시오.

Waarschuwing

Raadpleeg de installatie-instructies voordat u het systeem op de voedingsbron aansluit.

Circuit Breaker



Warning!

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 20 A.

サーキット・ブレーカー

この製品は、短絡(過電流)保護装置がある建物での設置を前提としています。

保護装置の定格が250 V、20 Aを超えないことを確認下さい。

警告

此产品的短路(过载电流)保护由建筑物的供电系统提供,确保短路保护设备的额定电流不大于250V,20A。

警告

此產品的短路(過載電流)保護由建築物的供電系統提供,確保短路保護設備的額定電流不大於250V,20A。

Warnung

Dieses Produkt ist darauf angewiesen, dass im Gebäude ein Kurzschluss- bzw. Überstromschutz installiert ist. Stellen Sie sicher, dass der Nennwert der Schutzvorrichtung nicht mehr als: 250 V, 20 A beträgt.

¡Advertencia!

Este equipo utiliza el sistema de protección contra cortocircuitos (o sobrecorrientes) del edificio. Asegúrese de que el dispositivo de protección no sea superior a: 250 V, 20 A.

Attention

Pour ce qui est de la protection contre les courts-circuits (surtension), ce produit dépend de l'installation électrique du local. Vérifiez que le courant nominal du dispositif de protection n'est pas supérieur à :250 V, 20 A.

התקן זה תלוי במערכת ההגנה מפני קצרות (או זרם יתר) המותקנת בבניין. ודאו כי הערך המצוי של ההגנה אינו גבוה מ: 250V, 20A.

هذا المنتج يعتمد على معدات الحماية من الدوائر القصيرة التي تم تثبيتها في المبنى
تأكد من أن تسمية للجهاز الوقائي ليس أكثر من: 250V, 20A

경고!

이 제품은 전원의 단락(과전류)방지에 대해서 전적으로 건물의 관련 설비에 의존합니다. 보호장치의 정격이 반드시 250V(볼트), 20A(암페어)를 초과하지 않도록 해야 합니다.

Waarschuwing

Dit product is afhankelijk van de kortsluitbeveiliging (overspanning) van uw elektrische installatie. Controleer of het beveiligde apparaat niet groter gedimensioneerd is dan 220V, 20A.

Power Disconnection Warning



Warning!

The system must be disconnected from all sources of power and the power cord removed from the power supply module(s) before accessing the chassis interior to install or remove system components.

電源切斷の警告

システムコンポーネントの取り付けまたは取り外しのために、シャーシ内部にアクセスするには、

システムの電源はすべてのソースから切斷され、電源コードは電源モジュールから取り外す必要があります。

警告

在你打开机箱并安装或移除内部器件前,必须将系统完全断电,并移除电源线。

警告

在您打開機殼安裝或移除內部元件前,必須將系統完全斷電,並移除電源線。

Warnung

Das System muss von allen Quellen der Energie und vom Netzanschlusskabel getrennt sein, das von den Spg.Versorgungsteilmodulen entfernt wird, bevor es auf den Chassisinnenraum zurückgreift, um Systemsbestandteile anzubringen oder zu entfernen.

¡Advertencia!

El sistema debe ser disconnected de todas las fuentes de energía y del cable eléctrico quitado de los módulos de fuente de alimentación antes de tener acceso el interior del chasis para instalar o para quitar componentes de sistema.

Attention

Le système doit être débranché de toutes les sources de puissance ainsi que de son cordon d'alimentation secteur avant d'accéder à l'intérieur du châssis pour installer ou enlever des composants de système.

אזהרה!
יש לנתק את המערכת מכל מקורות ההספק ויש להסיר את כבל ההספק מהמחשבים לפני גישה לחדק המערכת של המערכת למטרך המספק את המערכת והמחשבים.

يجب فصل النظام من جميع مصادر الطاقة وإزالة سلك الكهرباء من وحدة إمداد الطاقة قبل الوصول إلى المناطق الداخلية ليتم تثبيت أو إزالة مكونات الجهاز

경고!

시스템에 부품들을 장착하거나 제거하기 위해서는 새시 내부에 접근하기 전에 반드시 전원 공급장치로부터 연결되어있는 모든 전원과 전기코드를 분리해주어야 합니다.

Waarschuwing

Voordat u toegang neemt tot het binnenwerk van de behuizing voor het installeren of verwijderen van systeem onderdelen, dient u alle spanningsbronnen en alle stroomkabels aangesloten op de voeding(en) van de behuizing te verwijderen

Equipment Installation



Warning!

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

機器の設置

トレーニングを受け認定された人だけがこの装置の設置、交換、またはサービスを許可されています。

警告

只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。

警告

只有經過受訓且具資格人員才可安裝、更換與維修此設備。

Warnung

Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden.

¡Advertencia!

Solamente el personal calificado debe instalar, reemplazar o utilizar este equipo.

Attention

Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés.

אזהרה!
רק עובדי שירות מוסמכים או טכנאים מוסמכים יורשו להתקין, להחליף או לטפל במכשיר.

يجب أن يسمح فقط للموظفين المؤهلين والمدرسين تركيب واستبدال أو خدمة هذا الجهاز.

경고!

훈련을 받고 공인된 기술자만이 이 장비의 설치, 교체 또는 서비스를 수행할 수 있습니다.

Waarschuwing

Deze apparatuur mag alleen worden geïnstalleerd, vervangen of hersteld door geschoold en gekwalificeerd personeel.

Restricted Area



Warning!

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. (This warning does not apply to workstations).

アクセス制限区域

このユニットは、アクセス制限区域に設置されることを想定しています。

アクセス制限区域は、特別なツール、鍵と錠前、その他のセキュリティの手段を用いてのみ出入りが可能です。

警告

此部件应安装在限制进出的场所，限制进出的场所指只能通过使用特殊工具、锁和钥匙或其它安全手段进出的场所。

警告

此裝置僅限安裝於進出管制區域，進出管制區域係指僅能以特殊工具、鎖頭及鑰匙或其他安全方式才能進入的區域。

Warnung

Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Der Zutritt zu derartigen Bereichen ist nur mit einem Spezialwerkzeug, Schloss und Schlüssel oder einer sonstigen Sicherheitsvorkehrung möglich.

¡Advertencia!

Esta unidad ha sido diseñada para instalación en áreas de acceso restringido. Sólo puede obtenerse acceso a una de estas áreas mediante la utilización de una herramienta especial, cerradura con llave u otro medio de seguridad.

Attention

Cet appareil doit être installée dans des zones d'accès réservés. L'accès à une zone d'accès réservé n'est possible qu'en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité.

אזהרה: פניה בטיחות

אזהרה!

יש להחליף את הסוללה באזהרה: יש להחליף את הסוללה בזהירות. אל תשתמש בסוללה ישנה, פגומה, פגומה או חסרה.

**تم تخصيص هذه الوحدة تركيبها في مناطق معظورة .
يمكن الوصول إلى منطقة معظورة فقط من خلال استخدام أداة خاصة
فقط ومفتاح أو أي وسيلة أخرى للأمان**

경고!

이 장치는 접근이 제한된 구역에 설치하도록 되어있습니다. 특수도구, 잠금 장치 및 키, 또는 기타 보안 수단을 통해서만 접근 제한 구역에 들어갈 수 있습니다.

Waarschuwing

Dit apparaat is bedoeld voor installatie in gebieden met een beperkte toegang. Toegang tot dergelijke gebieden kunnen alleen verkregen worden door gebruik te maken van speciaal gereedschap, slot en sleutel of andere veiligheidsmaatregelen.

Battery Handling



Warning!

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

電池の取り扱い

電池交換が正しく行われなかった場合、破裂の危険性があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。

警告

電池更換不當會有爆炸危險。請只使用同類電池或製造商推薦的功能相當的電池更換原有電池。請按製造商的說明處理廢舊電池。

警告

電池更換不當會有爆炸危險。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

Warnung

Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

Attention

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

¡Advertencia!

Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

⚠️
קיימת סכנת פיצוץ של הסוללה במקרה החלפה בדרך לא נכונה. יש להחליף
את הסוללה בדרך הנכונה בלבד. יש להימנע מטיפול

בסוללה המוחלפת. יש להימנע מטיפול

هناك خطر من انفجار في حالة استبدال البطارية بطريقة غير صحيحة. يجب
استبدال البطارية
فقط بنفس النوع أو ما يماثلها كما أوصت به الشركة المصنعة
تخلص من البطاريات المستهلكة وفقاً لتعليمات الشركة المصنعة

경고!

배터리가 올바르게 교체되지 않으면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

Waarschuwing

Er is ontplofingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

Redundant Power Supplies



Warning!

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.

冗長電源装置

このユニットは複数の電源装置が接続されている場合があります。
ユニットの電源を切るためには、すべての接続を取り外さなければなりません。

警告

此部件连接的电源可能不止一个，必须将所有电源断开才能停止给该部件供电。

警告

此裝置連接的電源可能不只一個，必須切斷所有電源才能停止對該裝置的供電。

Warnung

Dieses Gerät kann mehr als eine Stromzufuhr haben. Um sicherzustellen, dass der Einheit kein Strom zugeführt wird, müssen alle Verbindungen entfernt werden.

¡Advertencia!

Puede que esta unidad tenga más de una conexión para fuentes de alimentación. Para cortar por completo el suministro de energía, deben desconectarse todas las conexiones.

Attention

Cette unité peut avoir plus d'une connexion d'alimentation. Pour supprimer toute tension et tout courant électrique de l'unité, toutes les connexions d'alimentation doivent être débranchées.

אם קיים יותר מקשר אחד

אזהרה!
לדאגה יש יותר מקשר אחד של חשמל. יש להסיר את כל הקשרים על מנת לדאוג
ללא חשמל.

قد يكون لهذا الجهاز عدة اتصالات بوحدة امداد الطاقة.
يجب إزالة كافة الاتصالات لعزل الوحدة عن الكهرباء.

경고!

이 장치에는 한 개 이상의 전원 공급 단자가 연결되어 있을 수 있습니다. 이 장치에 전원을 차단하기 위해서는 모든 연결 단자를 제거해야만 합니다.

Waarschuwing

Deze eenheid kan meer dan één stroomtoevoeraansluiting bevatten. Alle aansluitingen dienen verwijderd te worden om het apparaat stroomloos te maken.

Backplane Voltage



Warning!

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

バックプレーンの電圧

システムの稼働中は危険な電圧または電力が、バックプレーン上にかかっています。

修理する際にはご注意ください。

警告

当系统正在进行时，背板上有很危险的电压或能量，进行维修时务必小心。

警告

當系統正在進行時，背板上有危險的電壓或能量，進行維修時務必小心。

Warnung

Wenn das System in Betrieb ist, treten auf der Rückwandplatine gefährliche Spannungen oder Energien auf. Vorsicht bei der Wartung.

¡Advertencia!

Cuando el sistema está en funcionamiento, el voltaje del plano trasero es peligroso. Tenga cuidado cuando lo revise.

Attention

Lorsque le système est en fonctionnement, des tensions électriques circulent sur le fond de panier. Prendre des précautions lors de la maintenance.

המחלקה לבריאות הציבור

! 注意

קיימת סכנת קריסה במהלך האסטרטגיה בזמן תשלום הקצו"ת. יש לזהות את הסיכונים והאמצעים.

هناك خطر من التلوث للكهربائي أو لظافة الموجودة على اللوحة عندما يكون النظام يعمل كن حذرا عند خدمة هذا الجهاز

경고!

시스템이 동작 중일 때 후면판 (Backplane)에는 위험한 전압이나 에너지가 발생합니다. 서비스 작업 시 주의하십시오.

Waarschuwing

Een gevaarlijke spanning of energie is aanwezig op de backplane wanneer het systeem in gebruik is. Voorzichtigheid is geboden tijdens het onderhoud.

Comply with Local and National Electrical Codes



Warning!

Installation of the equipment must comply with local and national electrical codes.

地方および国の電気規格に準拠

機器の取り付けはその地方および国の電気規格に準拠する必要があります。

警告

设备安装必须符合本地与本国电气法规。

敬告

設備安裝必須符合本地與本國電氣法規。

Warnung

Die Installation der Geräte muss den Sicherheitsstandards entsprechen.

¡Advertencia!

La instalacion del equipo debe cumplir con las normas de electricidad locales y nacionales.

Attention

L'équipement doit être installé conformément aux normes électriques nationales et locales.

תשומת לב! התקנת המוצר חייבת להיות בהתאמה לנורמות החשמל הלאומיות והמקומיות.

אזהרה!

התקנת המוצר חייבת להיות בהתאמה לנורמות החשמל הלאומיות והמקומיות.

تركيب المعدات الكهربائية يجب أن يمثل القوانين المحلية والوطنية المتعلقة بالكهرباء

경고!

현 지역 및 국가의 전기 규정에 따라 장비를 설치해야 합니다.

Waarschuwing

Bij installatie van de apparatuur moet worden voldaan aan de lokale en nationale elektriciteitsvoorschriften.

Product Disposal**Warning!**

Ultimate disposal of this product should be handled according to all national laws and regulations.

製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

תשומת לב!

אזהרה!

תהליך סופי של סיום זה חייב להיות בהתאם להוראות המצויים המצויים

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القوانين واللوائح الوطنية

경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.

Hot Swap Fan Warning



Warning!

The fans might still be turning when you remove the fan assembly from the chassis. Keep fingers, screwdrivers, and other objects away from the openings in the fan assembly's housing.

ファン・ホットスワップの警告

シャーシから冷却ファン装置を取り外した際、ファンがまだ回転している可能性があります。ファンの開口部に、指、ドライバー、およびその他のものを近づけないで下さい。

警告

当您从机架移除风扇装置，风扇可能仍在转动。小心不要将手指、螺丝起子和其他物品太靠近风扇

Power Cable and AC Adapter



Warning!

When installing the product, use the provided or designated connection cables, power cables and AC adaptors. Using any other cables and adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL or CSA -certified cables (that have UL/CSA shown on the code) for any other electrical devices than products designated by Penguin Computing only.

電源コードとACアダプター

製品を設置する場合、提供または指定された接続ケーブル、電源コードとACアダプターを使用下さい。他のケーブルやアダプタを使用すると故障や火災の原因になることがあります。電気用品安全法は、ULまたはCSA認定のケーブル(UL/CSEマークがコードに表記)を Penguin Computingが指定する製品以外に使用することを禁止しています。

警告

安裝此產品時，請使用本身提供的或指定的連接線，電源線和電源適配器。使用其它線材或適配器可能會引起故障或火災。除了Penguin Computing所指定的產品，電氣用品和材料安全法律規定禁止使用未經UL或CSA認證的線材。（線材上會顯示UL/CSA符號）。

警告

安裝此產品時，請使用本身提供的或指定的連接線，電源線和電源適配器。使用其它線材或適配器可能會引起故障或火災。除了Penguin Computing所指定的產品，電氣用

Warnung

Bei der Installation des Produkts, die zur Verfügung gestellten oder benannt Anschlusskabel, Stromkabel und Netzteile. Verwendung anderer Kabel und Adapter kann zu einer Fehlfunktion oder ein Brand entstehen. Elektrische Geräte und Material Safety Law verbietet die Verwendung von UL-oder CSA-zertifizierte Kabel, UL oder CSA auf der Code für alle anderen elektrischen Geräte als Produkte von Penguin Computing nur bezeichnet gezeigt haben.

¡Advertencia!

Al instalar el producto, utilice los cables de conexión previstos o designados, los cables y adaptadores de CA. La utilización de otros cables y adaptadores podría ocasionar un mal funcionamiento o un incendio. Aparatos Eléctricos y la Ley de Seguridad del Material prohíbe el uso de UL o CSA cables certificados que tienen UL o CSA se muestra en el código de otros dispositivos eléctricos que los productos designados por Penguin Computing solamente.

Attention

Lors de l'installation du produit, utilisez les bables de connection fournis ou désigné. L'utilisation d'autres cables et adaptateurs peut provoquer un dysfonctionnement ou un incendie. Appareils électroménagers et de loi sur la sécurité Matériel interdit l'utilisation de UL ou CSA cables certifiés qui ont UL ou CSA indiqué sur le code pour tous les autres appareils électriques que les produits désignés par Penguin Computing seulement.

התקנת כבלים (קונקטור) AC

חשוב!

באופן ספציפי זה המצור, יש להשתמש בכבלים ספקטור והתקנת AC ממשל
מיוחד ומותאם לשם כך. שימוש בכל סוג אחר תגובה אחר יכול לגרום לתקלה או
קצר והתחמם. כל פי חוקי חשמל בסיסיים והתקל וחוקי בטיחות, קיים איסור
להשתמש בכבלים והתקנתם ב-UL או ב- CSA תצטרך להיות עליהם קוד של
UL/CSA עבור כל תוצר והתקלי אחר שלא ניתן על ידי המפקחים בלבד.

حدد تركيب الجهاز يجب استخدام كبلات التوصيل والكبلات للكهرباء
ومحولات التيار المتردد
التي - أن استخدام أي كبلات ومحولات أخرى يتسبب في حدوث صطل أو حريق.
تم توفيرها لك مع المنتج
الأجهزة للكهرباء ومواد قانون السلامة يحظر استخدام الكبلات CSA أو UL
مستند من قبل
لأي أجهزة كهربائية أخرى غير المنتجات المسجلة من قبل Supermicro
(التي تحمل علامة UL/CSA)

경고!

제품을 설치할 때에는 제공되거나 지정된 연결케이블과 전원케이블, AC 어댑터를 사용해야 합니다. 그 밖의 다른 케이블들이나 어댑터들은 고장 또는 화재의 원인이 될 수 있습니다. 전기용품안전법 (Electrical Appliance and Material Safety Law)은 슈퍼마이크로에서 지정한 제품들 외에는 그 밖의 다른 전기 장치들을 위한 UL 또는 CSA에서 인증한 케이블(전선 위에 UL/CSA가 표시)들의 사용을 금지합니다.

Waarschuwing

Bij het installeren van het product, gebruik de meegeleverde of aangewezen kabels, stroomkabels en adapters. Het gebruik van andere kabels en adapters kan leiden tot een storing of een brand. Elektrisch apparaat en veiligheidsinformatiebladen wet verbiedt het gebruik van UL of CSA gecertificeerde kabels die UL of CSA die op de code voor andere elektrische apparaten dan de producten die door Penguin Computing alleen.

Notes

Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install processors and heatsinks to the X9DRFF-7TG+/X9DRFF-7G+ serverboard, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are described and a layout and quick reference chart are included in this chapter. Remember to close the chassis completely when you have finished working on the serverboard to protect and cool the system sufficiently.

5-1 Handling the Serverboard

Static electrical discharge can damage electronic components. To prevent damage to printed circuit boards, it is important to handle them very carefully (see Chapter 4). Also note that the size and weight of the serverboard can cause it to bend if handled improperly, which may result in damage. To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling.

The following measures are generally sufficient to protect your equipment from static discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.

Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

5-2 Installing the Processor and Heatsink

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

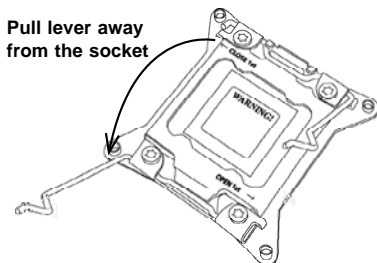
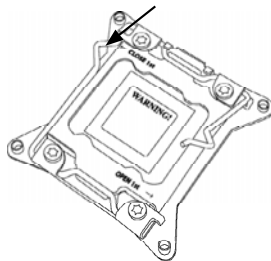
Notes:

- Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the serverboard into the chassis before you install the CPU heatsinks.
- When receiving a serverboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- Refer to the Penguin Computing web site for updates on CPU support.

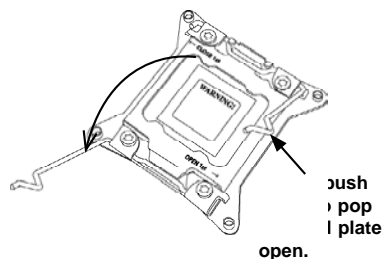
Installing an LGA2011 Processor

1. There are two levers on the LGA2011 socket. First press and release the load lever labeled 'Open 1st' on CPU Socket #1.
2. Press the second load lever labeled 'Close 1st' to release the load plate from its locked position.

Press down on the lever labeled
'Close 1st'

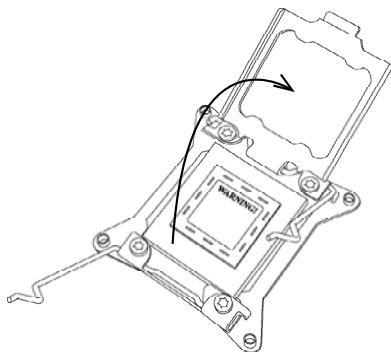


3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

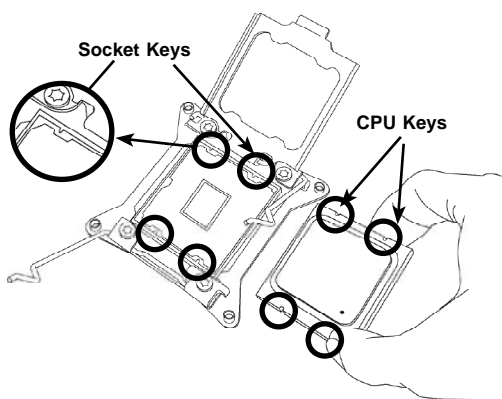


4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.

5. Use your thumb and index finger to hold the CPU by its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys.

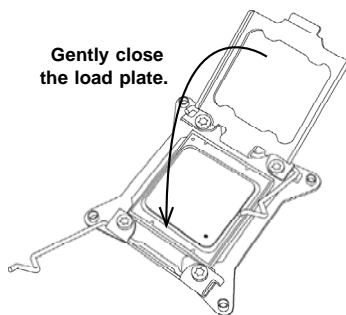


6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically and do not rub the CPU against any pins of the socket, which may damage the CPU or the socket.)

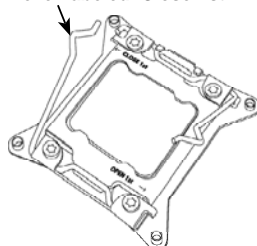


Warning: You can only install the CPU to the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is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

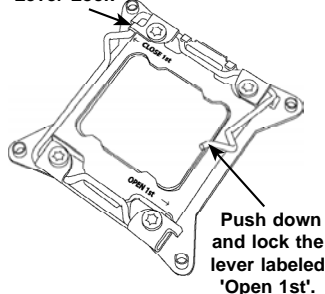
7. With the CPU in the socket, inspect the four corners of the CPU to make sure that they are flush with the socket.
8. Close the load plate. Lock the lever labeled 'Close 1st', then lock the lever labeled 'Open 1st'. Use your thumb to gently push the load levers down until the lever locks.
9. Repeat steps to install a CPU to CPU Socket #2 if needed.



Push down and lock the lever labeled 'Close 1st'.

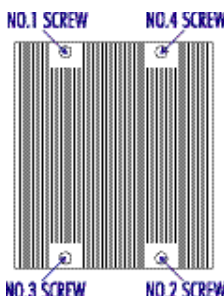


Lever Lock



Installing a CPU Heatsink

1. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the retention mechanism.
2. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug (do not over-tighten the screws, which may damage the CPU.)
3. Finish the installation by fully tightening all four screws.



Removing the Heatsink

1. Unplug the power cord from the power supply.
2. Unscrew and remove the heatsink screws in the sequence shown in the picture below.
3. Hold the heatsink and gently wiggle it to loosen it from the CPU. (Do not use excessive force when doing this!)
4. Once the heatsink is loosened, remove it from the CPU.
5. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease before you re-install the heatsink.

Warning: We do not recommend removing the CPU or the heatsink. If you do need to remove the heatsink, please follow the instructions below to prevent damage to the CPU or other components.

5-3 Connecting Cables

With the processors are installed, the next step is to connect the cables to the serverboard.

Connecting Data Cables

The cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. When disconnecting any of these cables, take care to reroute them as they were originally.

Up to 12 hard drives may be installed in the chassis using any combination of the SAS and SATA ports below. See the serverboard layout diagram in this chapter for connector locations.

- SAS (SAS0-SAS7) or SATA (SATA0-5) cables

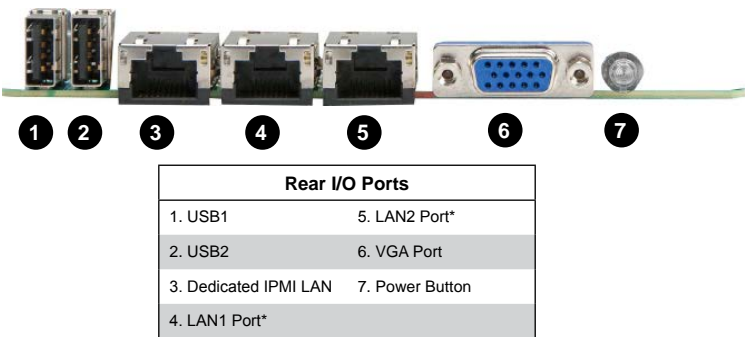
Connecting Power Cables

The X9DRFF-7TG+/X9DRFF-7G+ has two 8-pin primary power supply connectors designated JPW1 and JPW2 for connection to the ATX power supply. Connect the appropriate connector from the power supply to JPW1/JPW2 to supply power to the serverboard. See the Connector Definitions section in this chapter for power connector pin definitions. In addition, your power supply must be connected to the 4-pin processor power connector at JPW3.

5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-1 below for the colors and locations of the various I/O ports.

Figure 5-1. I/O Ports



* 1 Gb ports on the 6017R-73HDP+ and 10 Gb ports on the 6017R-73THDP+

5-5 Installing Memory

Note: Check the Penguin Computing web site for recommended memory modules.

CAUTION

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

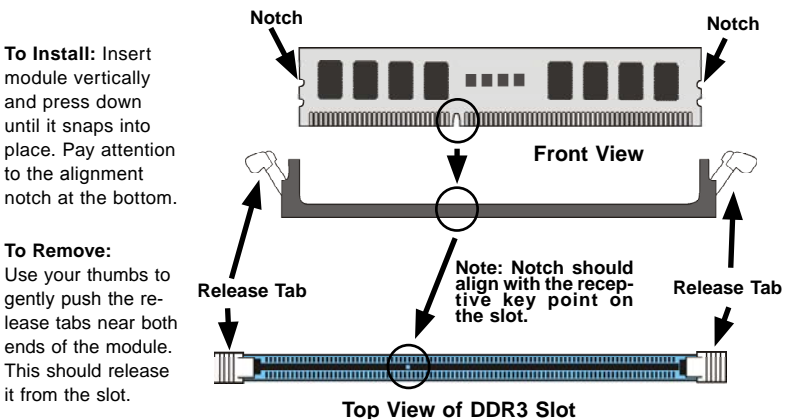
Installing DIMMs

1. Insert the desired number of DIMMs into the memory slots, starting with slot P1-DIMMA1. For best performance, install memory modules of the same type and same speed in the slots as indicated in the tables below.
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it. Insert each DIMM vertically into its slot. Pay attention to the notch along the bottom of the module to prevent inserting the DIMM module incorrectly (see Figure 5-2).
3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules

Memory Support

The X9DRFF-7TG+/X9DRFF-7G+ has 16 memory sockets that can support up to 512 GB of ECC registered DDR3-1600/1333/1066/800 RDIMMs or up to 128 GB

Figure 5-2. Installing DIMM into Slot



Processor & Memory Module Population Configuration

For memory to work properly, follow the tables below for memory installation.

Processors and their Corresponding Memory Modules								
CPU#	Corresponding DIMM Modules							
CPU 1	P1-DIMMA1	P1-DIMMB1	P1-DIMMC1	P1-DIMMD1	P1-DIMMA2	P1-DIMMB2	P1-DIMMC2	P1-DIMMD2
CPU2	P2-DIMME1	P2-DIMMF1	P2-DIMMG1	P2-DIMMH1	P2-DIMME2	P2-DIMMF2	P2-DIMMG2	P2-DIMMH2

Processor and Memory Module Population for Optimal Performance	
Number of CPUs+DIMMs	CPU and Memory Population Configuration Table (For memory to work properly, please follow the tables below.)
1 CPU & 2 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1
1 CPU & 4 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1
1 CPU & 5-8 DIMMs	CPU1 P1-DIMMA1/P1-DIMMB1, P1-DIMMC1/P1-DIMMD1 + Any memory pairs in P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2 slots
2 CPUs & 4 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1, P2-DIMME1/P2-DIMMF1
2 CPUs & 6 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1
2 CPUs & 8 DIMMs	CPU1 + CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1
2 CPUs & 10-16 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1 + Any memory pairs in P1, P2 DIMM slots
2 CPUs & 16 DIMMs	CPU1/CPU2 P1-DIMMA1/P1-DIMMB1/P1-DIMMC1/P1-DIMMD1, P2-DIMME1/P2-DIMMF1/P2-DIMMG1/P2-DIMMH1, P1-DIMMA2/P1-DIMMB2/P1-DIMMC2/P1-DIMMD2, P2-DIMME2/P2-DIMMF2/P2-DIMMG2/P2-DIMMH2

Installing UDIMM (ECC/Non-ECC) Memory

Intel E5-2600 Series Processor UDIMM Memory Support									
Ranks Per DIMM & Data Width	Memory Capacity Per DIMM (See the Note below)			Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)					
				1 Slot Per Channel		2 Slots Per Channel			
				1DPC		1DPC		2DPC	
				1.35V	1.5V	1.35V	1.5V	1.35V	1.5V
SRx8 Non-ECC	1GB	2GB	4GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
DRx8 Non-ECC	2GB	4GB	8GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
SRx16 Non-ECC	512MB	1GB	2GB	NA	1066, 1333, 1600	NA	1066, 1333	NA	1066, 1333
SRx8 ECC	1GB	2GB	4GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333	1066	1066, 1333
DRx8 ECC	2GB	4GB	8GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333	1066	1066, 1333

Installing RDIMM (ECC) Memory

Intel E5-2600 Series Processor RDIMM Memory Support									
Ranks Per DIMM & Data Width	Memory Capacity Per DIMM (See the Note Below)			Speed (MT/s) and Voltage Validated by Slot per Channel (SPC) and DIMM Per Channel (DPC)					
				1 Slot Per Channel		2 Slots Per Channel			
				1DPC		1DPC		2DPC	
				1.35V	1.5V	1.35V	1.5V	1.35V	1.5V
SRx8	1GB	2GB	4GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
DRx8	2GB	4GB	8GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
SRx4	2GB	4GB	8GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
DRx4	4GB	8GB	16GB	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600	1066, 1333	1066, 1333, 1600
QRx4	8GB	16GB	32GB	800	1066	800	1066	800	800
QRx8	4GB	8GB	16GB	800	1066	800	1066	800	800

5-6 Adding PCI Cards

PCI Expansion Slots

A riser card (RSC-R1UFF-E8R) installed to the system allow you to add a PCI expansion card. The 6017R-73THDP+/6017R-73HDP+ can support the use of one half-height, full-length) expansion card with the pre-installed riser card.

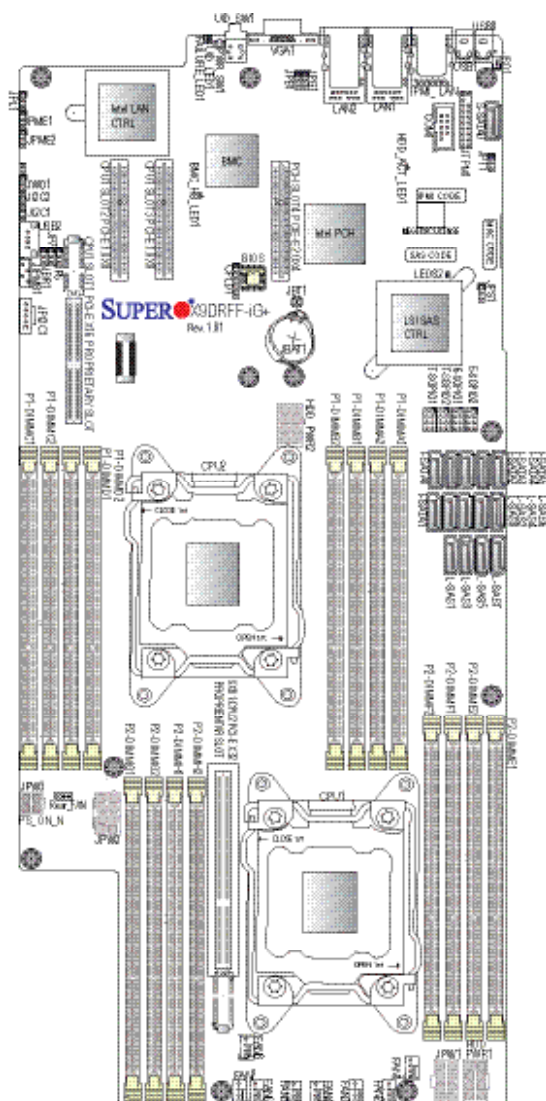
PCI Card Installation

Before installing a PCI add-on card, make sure you power off the system first and remove the AC power cord from the power supply.

1. Begin by removing the top chassis cover.
2. Remove the latch from the expansion card slot at the rear of the chassis then lift the riser card from the chassis.
3. Insert the PCI card into the riser card slot, pushing down with your thumbs evenly on both sides of the card - note that the add-on card attaches to the riser card with a single screw.
4. After the card has been installed, reinstall the riser card then reinsert the latch back into the expansion card slot.
5. Replace the chassis cover.
6. Plug the AC power cord back in and restore power to the system.

5-7 Serverboard Details

Figure 5-3. SUPER X9DRFF-7TG+/X9DRFF-7G+ Layout



Notes

Jumpers not indicated are for test purposes only.

The X9DRFF-7TG+ includes 10 GB Ethernet ports (only change from the -7G+)

X9DRFF-7TG+/X9DRFF-7G+ Quick Reference

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Section 5-9
JI ² C1/JI ² C2	SMB to PCI-E Slots	Open (Disabled)
JPB1	BMC Enable	Pins 1-2 (Enabled)
JPG1	VGA Enable	Pins 1-2 (Enabled)
JPL1	LAN1/LAN2 Enable	Pins 1-2 (Enabled)
JPS1	SAS Enable	Pins 1-2 (Enabled)
JWD1	Watch Dog Timer Enable	Pins 1-2 (Reset)

Connector	Description
FAN1-FAN8, Rear_FAN1	CPU/System/Cooling Fan Headers
HDD_PWR1/HDD_PWR2	8-pin Power Supply Connectors for HDD Device Use
I-SATA 0/1	SATA 3.0 Connectors 0/1 from Intel AHCI
I-SATA 2-5	SATA 2.0 Connectors 2/3/4/5 from Intel AHCI
JIPMB1	4-pin External BMC I ² C Header (for IPMI Card)
JPI ² C1	Power Supply SMBbus I ² C Header
JPW1/JPW2	8-pin Power Connectors
JPW3	4-pin Power Connector
JSD1	SATA Device Power Connector
JTPM1	TPM (Trusted Platform Module)/Port 80 Connector
(J) USB2	Internal USB 2 Port
L-SAS 0-7	SAS Ports 0-7 from LSI 2308 SAS Controller
6-SGPIO 1/2	Serial Link General Purpose I/O Headers for SAS
T-SGPIO 1/2	Serial Link General Purpose I/O Headers for SATA
PWR_SW1	Power Switch (Button)
UID_SW1	UID (Unit Identifier) Switch (SW1)
USB0/USB1	Front Panel USB 0/ USB1 Ports

LED	Description	State: Status
BMC_HB_LED1	BMC Heartbeat LED	Blinking Green: BMC Normal
HDD_ACT LED1	HDD Activity LED	Blinking Green: HDD Active
Failure_LED1	Failure LED	Blinking On: Power Failure; Blinking: Fan Failure
LEDS2	SAS Heartbeat LED	On (Green): SAS Normal
UID_LED1	UID LED	On (Blue): Unit Identified

5-8 Connector Definitions

ATX Power Connector

Two 8-pin power connectors (JPW1/JPW2) and a 4-pin power connector (JPW3) are used to provide power to the serverboard. In addition, two 8-pin power connectors (HDD_PWR1/2) are also located onboard to provide power from the serverboard to the HDD back-plane for HDD device use. *Do not* use these connectors for other purposes. All power connectors mentioned above meet the SSI EPS 12V specification. See the tables on the right for pin definitions.

12V 8-pin PWR Pin Definitions	
Pins	Definition
1-4	Ground
5-8	+12V

HDD PWR Pin Definitions	
Pins	Definition
1-4	Ground
5-6	+12V
7-8	+5V

12V 4-pin PWR Pin Definitions	
Pins	Definition
1	Ground
2	Ground
3	5V SB
4	PS_ON_N

Universal Serial Bus (USB)

Two Universal Serial Bus ports (USB0, USB1), located on the I/O front panel, provide front-accessible USB support. In addition, a Type A USB connector (JUSB2), located next to the 4-pin JIPMB1 connector, also provides front-accessible USB support.

Front Panel USB 0/1 & Type A USB 2 Pin Definitions	
Pin#	Definition
1	+5V
2	PO-
3	PO+
4	Ground

Ethernet Ports

Two Ethernet ports (LAN1, LAN2) are located on the I/O front panel. These Ethernet ports support 10G LAN connections on the X9DRFF-7TG+, and 1G LAN connections on the X9DRFF-7G+. In addition, an IPMI LAN port is also located on the front panel. All these ports accept RJ45 cables. Please refer to the LED Indicator Section for LAN LED information.

LAN Ports Pin Definition			
Pin#	Definition	Pin#	Definition
1	P2V5SB	10	SGND
2	TD0+	11	Act LED
3	TD0-	12	P3V3SB
4	TD1+	13	Link 100 LED (Yellow, +3V3SB)
5	TD1-	14	Link 1000 LED (Yellow, +3V3SB)
6	TD2+	15	Ground
7	TD2-	16	Ground
8	TD3+	17	Ground
9	TD3-	18	Ground

Power Button/Unit Identifier Switch

A Unit Identifier switch (SW1) and a UID LED Indicator are located on the serverboard. In addition, a power button (PWR_SW1) is located next to the UID switch on the front panel. When you press the UID switch, the UID LED Indicator will be turned on. Press the UID switch again to turn off the UID LED. The UID Indicator provides easy identification of a system unit that may be in need of service.

UID Switch	
Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Ground

UID LED Status		
Color/State	OS	Status
Blue: On	Windows OS	Unit Identified
Blue: Blinking	Linux OS	Unit Identified

Fan Headers

This serverboard has eight 4-pin (Fan1~Fan8), and one 3-pin (Rear_Fan1) system/CPU/cooling fan headers on the serverboard. The 4-pin fan headers are backward compatible with traditional 3-pin fans. However, fan speed control is only available on 4-pin fans via IPMI firmware management. See the table on the right for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	PWR Modulation (for 4-pin fans only)

IPMB

A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect the appropriate cable here to use the IPMB I²C connection on your system.

IPMB Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

SATA Device Power Connector

A power connector for SATA DOM (Disk_On_Module) devices is located at JSD1. Connect an appropriate cable here to provide power support for your SATA DOM devices.

DOM PWR Pin Definitions	
Pin#	Definition
1	+5V
2	Ground
3	Ground

T-SGPIO 1/2 & 6-SGPIO 1/2 Headers

Four SGPIO (Serial-Link General Purpose Input/Output) headers (T-SGPIO 1/2 & 6-SGPIO 1/2) are located on the serverboard. These headers support on-board Serial_Link interface connections.

Note: T-SGPIO 1/2 support onboard SATA connections. 6-SGPIO 1/2 support the SAS interface.

T-SGPIO/6-SGPIO Pin Definitions			
Pin#	Definition	Pin	Definition
2	NC	1	NC
4	Ground	3	Data
6	Load	5	Ground
8	Clock	7	NC

Note: NC=No Connection

Power SMB (I2C) Connector

Power System Management Bus (I²C) Connector (JPI²C1) monitors power supply, fan and system temperatures. See the table on the right for pin definitions.

PWR SMB Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	+3.3V

Power Switch

A power switch is located next to the UID switch on the serverboard. Refer to the layout below for the location.

Unit Identification Switch/LED

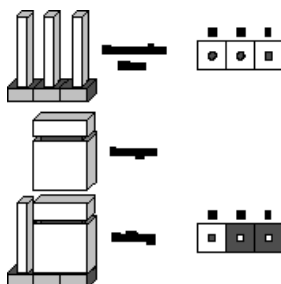
A Unit Identifier switch (UID) and a UID LED indicator (UID_LED1) are located next to the power switch on the front panel. When the user pushes the UID switch, the UID LED (UID_LED1) will be turned on. Push the UID switch again to turn off the LED indicator. The UID switch provides easy identification of a system unit that may be in need of service. See the tables on the right for more information.

UID Switch (UID) Pin Definitions	
Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Ground

5-9 Jumper Settings

Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the serverboard layout page for jumper locations.



Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

CMOS Clear

JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

Note: Do not use the PW_ON connector to clear CMOS.

GLAN Enable/Disable

JPL1 enables or disables LAN Port1/ LAN Port2 on the serverboard. See the table on the right for jumper settings. The default setting is Enabled.

LAN Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled (default)
Pins 2-3	Disabled

Watch Dog Enable/Disable

JWD1 controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application “hangs”. Pins 1-2 will cause WD to reset the system if an application hangs. Pins 2-3 will generate a non-maskable interrupt signal for the application that has hung. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

Watch Dog Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset
Pins 2-3	NMI
Open	Disabled

VGA Enable

Jumper JPG1 allows the user to enable onboard VGA support. The default setting is on pins 1-2 to enable VGA support. See the table on the right for jumper settings.

VGA Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled (Default)
Pins 2-3	Disabled

BMC Enable

Jumper JPB1 allows you to enable the embedded BMC (Baseboard Management) Controller to provide IPMI 2.0 support on the serverboard. See the table on the right for jumper settings.

BMC Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	BMC Enable
Pins 2-3	Normal (Default)

I2C Bus to PCI-Exp. Slots

Jumpers JI²C1 and JI²C2 allow you to connect the System Management Bus (I²C) to PCI-Express slots. The default setting is Open to disable the connection.

I ² C to PCI-Exp Jumper Settings	
Jumper Setting	Definition
Closed	Enabled
Open	Disabled (Default)

SAS Enable

Use Jumper JPS1 to enable onboard SAS support to enhance system performance. The default setting is enabled.

SAS Support Enable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	SAS Enabled (Default)
Pins 2-3	SAS Disabled

5-10 Onboard Indicators

LAN LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gigabit LAN port, one LED indicates activity when blinking while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for details on the connection speed LED.



GLAN Activity Indicator (Right) LED Settings		
Color	Status	Definition
Off	No Connections	
Yellow	Flashing	Active

IPMI Dedicated LAN LEDs

In addition to LAN Ports 1/2, an IPMI Dedicated LAN is also located on the I/O front panel. The amber LED on the right indicates connection and activity; while the green LED on the left indicates the speed of the connection. See the table at right for more information.



IPMI LAN Link Speed LED (Left) & Connection Activity LED (Right)		
LED	Color/State	Definition
Off	Off	No Connection
Activity	Amber: Blinking	Active
Speed	Green: Solid	100 Mbps

HDD Activity LED

An HDD Activity LED is located at HDD_ACT LED1 on the serverboard. When the HDD LED is blinking, an HDD device is active. See the table at right for more information.

HDD Activity LED Status	
Color or State	Definition
Green: Blinking	HDD: Active
Off	HDD Disabled, or Failed

BMC Heartbeat LED

A BMC Heartbeat LED is located at BMC_HB_LED1 on the serverboard. When this LED indicator is blinking, BMC is normal. See the table at right for more information.

BMC Heartbeat LED Status	
Color or State	Definition
Green	BMC: Normal
Off	BMC Disabled, or Failed

SAS Heartbeat LED

A SAS Heartbeat LED is located at LEDS2 on the serverboard. When LEDS2 is blinking, SAS is working properly.

SAS Heartbeat LED Status	
Color/State	Definition
Green: Blinking	SAS: Normal
Off or Red	SAS: Disabled or Failed

Failure LED

A Failure LED is located at Failure_LED1 on the serverboard. When Failure_LED1 is on, power failure has occurred. When it is blinking, it indicates a fan failure. See the table at right for more information.

Failure LED Status	
State	Definition
On	PWR Failure
Blinking	Fan Failure

UID LED

The Unit Identifier (UID) LED is located at UID_LED1 on the serverboard. When this LED is on, the unit that might be in need of service is identified. See the table at right for more information.

UID LED Status	
Color/State	Definition
Blue: On	Unit Identified

5-11 SAS/SATA Port Connections

SATA Ports

There are six Serial ATA Ports provided on the serverboard. I-SATA0-1 are SATA3 ports and I-SATA2-5 are SATA2 ports. See the table on the right for pin definitions.

SATA Port Pin Definitions	
Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

SAS Ports

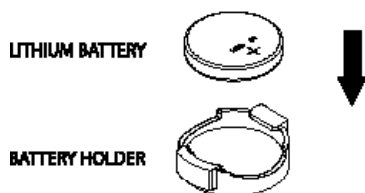
Eight Serial Attached SCSI Ports (SAS 0-7) are provided on the serverboard to provide serial link connections. These ports are supported by an LSI 2308 controller. See the table on the right for pin definitions.

SAS Port Pin Definitions	
Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

5-13 Onboard Battery

Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

Figure 5-7. Installing the Onboard Battery



Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC816LTS-655B chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required: The only tool you will need to install components and perform maintenance is a Philips screwdriver.

6-1 Static-Sensitive Devices

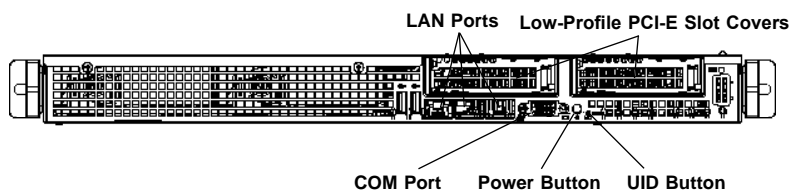
Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD discharge.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Unpacking

The serverboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

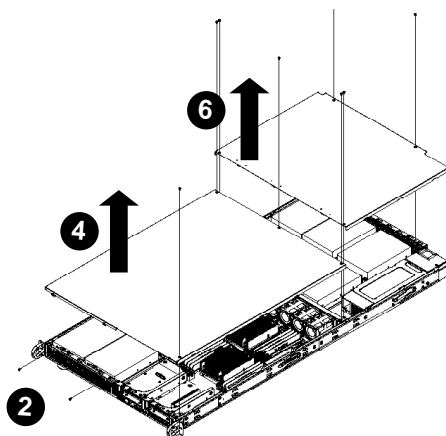
Figure 6-1. Chassis Front View

6-2 Removing the Covers

The SC816LT chassis features both a front and a rear cover, which allow access to the interior of the chassis.

Removing the Chassis Covers

1. Remove the power cord from the rear of the chassis.
2. Remove the two screws securing the front cover to the front of the chassis.
3. Remove the four screws on the side and back edges of the front cover.
4. Lift the front cover up and off the chassis.
5. Remove the four screws on the front and back edges of the rear cover.
6. Lift the rear cover up and off the chassis.

Figure 6-2. Removing the Chassis Covers

6-3 System Fans

Eight internal system fans in two separate fan housings provide cooling for the system. The system fans are easily removed from the chassis with a screwdriver.

Replacing a System Fan

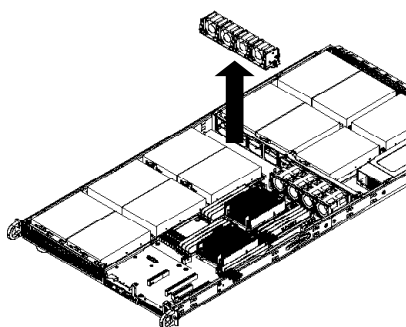
1. Determine the location of the failed fan. If necessary, briefly remove the chassis cover while the system is running in order to locate the failed fan.
2. Power down the chassis with the operating system, remove the power cord from the rear of the power supply and remove the cover as described previously.
3. Disconnect the fan wiring.
4. Remove the two screws securing the fan housing to the floor of the chassis.
5. Lift the fan housing up and out of the chassis.
6. **To remove the fans in the left system fan housing:**
Grasp the top of the failed fan. Lift it up and out of the housing.

To remove the fans in the right system fan housing:

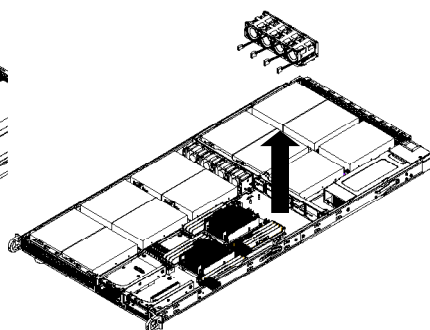
Remove the four rubber plugs securing the fan into the housing.

Push upward on the underside of the failed fan, pushing it up and out of the housing.

7. Insert a replacement fan into the fan housing. Confirm that the replacement fan is aligned in the same direction as the fan it replaces. If this is a right side system fan, replace the four rubber plugs.
8. Replace the chassis cover, plug the power cord into the rear of the power supply and power up the system.

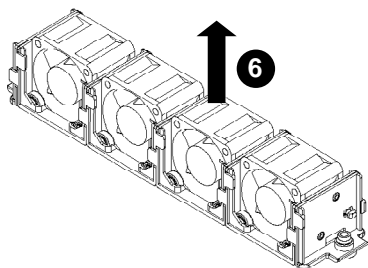


Left Side Fan Housing

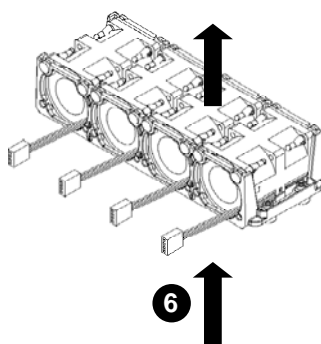


Right Side Fan Housing

Figure 6-3. Replacing the Left and Right Fan Housings



Left Side Fan Housing



Right Side Fan Housing

Figure 6-4. Left and Right Fan Housings

6-4 Drive Bay Installation/Removal

The SC816LT chassis contains twelve fixed hard drives. Each hard drive and its position in the chassis are labeled with a number that corresponds to the SATA port on the serverboard.

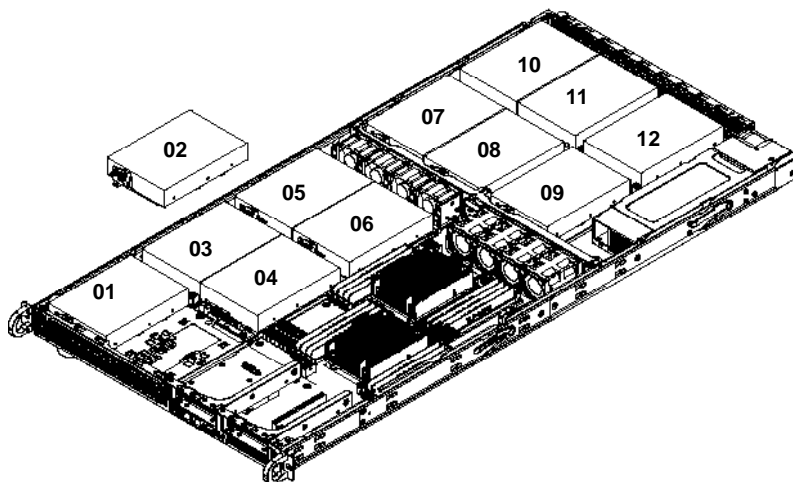


Figure 6-5. Hard Drive Positions and their Corresponding SATA Ports

Replacing Hard Drives

Replacing a 3.5" Hard Drive

1. Power down the chassis with the operating system, remove the cord from the rear of the power supply as described in Section 5-3 and remove the front and rear covers as described in Section 5-4.
2. Locate the latch on the HDD you wish to remove from the chassis.
3. Press down on the latch to release the HDD from the floor of the chassis.
4. Slide the HDD forward to release it from the mounting bracket that secures it to the floor of the chassis.

Warning! Enterprise level hard disk drives are recommended for use in Penguin Computing chassis and servers. For more information on recommended HDDs, contact Penguin Computing at support@penguincomputing.com.

5. Lift the HDD up and out of the chassis, noting that the number on the floor of the chassis and the corresponding number on the hard drive.
6. Transfer the number on the failed hard drive to the replacement hard drive.
7. Align the bracket on the underside of the replacement hard drive with the mounting bracket on the floor of the chassis.
8. Slide the hard drive into the mounting bracket until it clicks in the locked position on the chassis floor.

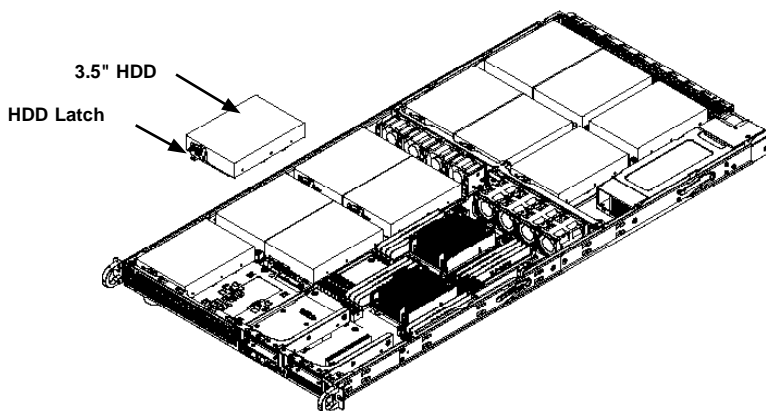


Figure 6-6. Installing 3.5" Hard Drives

6-5 Installing Expansion Cards

The SC816LT chassis supports two low-profile expansion cards. Each expansion card connects to the serverboard with a riser card. To install expansion cards, follow the instructions below.

Installing a Low-Profile Expansion Card

1. Power down the system, remove the cord from the rear of the power supply and remove the chassis covers as described previously.
2. Remove the six screws securing the riser card bracket to the chassis and set them aside for later use.
3. Lift the riser card bracket up and out of the chassis.
4. Open the latch which secures the PCI-E slot cover to the riser card bracket.
5. Remove the PCI-E slot cover by sliding it sideways out of the PCIE slot.
6. Insert the expansion card into the riser card, simultaneously sliding the PCI-E slot cover of the expansion card into the PCI-E slot.
7. Insert the riser card into the serverboard and secure the riser card bracket to the chassis with the screws previously set aside.
8. Place the chassis covers on top of the chassis and secure them with the screws previously used for this purpose.
9. Plug the power cord into the rear of the power supply and power up the system.

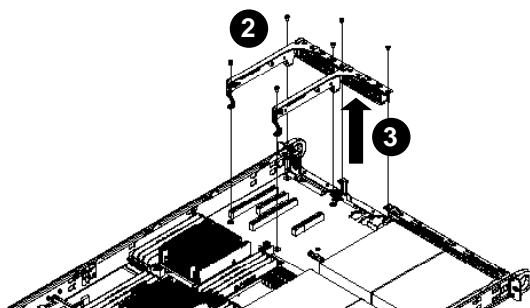


Figure 6-7. Removing the Riser Card Bracket from the Chassis

6-6 Replacing the Power Supply

The IceBreaker 1812 includes a 655W power supply. This power supply is auto-switching capable, which enables it to automatically sense and operate at a 100 to 240 input voltage. An amber light will be illuminated on the power supply when the power is off. An illuminated green light indicates that the power supply is operating.

Power Supply Replacement

The system must be powered down to replace the power supply. Replacement units can be ordered directly from Penguin Computing.

Changing the Power Supply

1. Power down the system and disconnect the AC power cord from the power supply. Remove the chassis cover.
2. Remove the two screws that secure the power supply to the chassis, as illustrated below.
3. Press the release tab on the back of the power supply and pull the power supply out using the handle provided.
4. Push the replacement power supply module into the power bay until it clicks into the locked position. Secure with the screws previously removed.
5. Replace the chassis cover, then plug the AC power cord back into the power supply and restore power to the system.

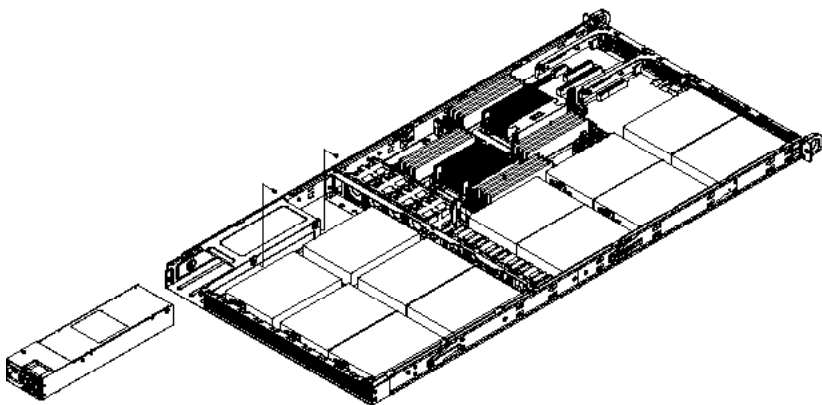


Figure 6-8. Replacing the Power Supply

Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup utility for the X9DRFF-7G+. It also provides the instructions on how to navigate the AMI BIOS Setup utility screens. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated.

Starting BIOS Setup Utility

To enter the AMI BIOS Setup utility screens, press the key while the system is booting up.

Note: In most cases, the key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F3>, <F4>, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for informational text related to the option currently selected in the left frame.

Note: The AMI BIOS has default informational messages built in. The manufacturer retains the option to include, omit, or change any of these informational messages.

The AMI BIOS Setup utility uses a key-based navigation system called "hot keys." Most of the AMI BIOS setup utility "hot keys" can be used at any time during setup navigation. These keys include <F3>, <F4>, <Enter>, <ESC>, arrow keys, etc.

Note 1: In this section, options printed in **Bold** are default settings.

Note 2: <F3> is used to load optimal default settings. <F4> is used to save the settings and exit the setup utility.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing <Delete> at the appropriate time during system boot.

Starting the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS Setup utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

Warning! Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall the manufacturer be liable for direct, indirect, special, incidental, or consequential damage arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is being updated to avoid possible boot failure.

7-2 Main Setup

When you first enter the AMI BIOS Setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.

The AMI BIOS main menu displays the following information:

System Date



This item displays the system date in Day MM/DD/YY format (e.g. Sat 10/20/2012).

System Time

This item displays the system time in HH:MM:SS format (e.g. 15:32:52).

Version

This item displays the SMC version of the BIOS ROM used in this system.

Build Date

This item displays the date that the BIOS ROM was built.

Memory Information**Total Memory**

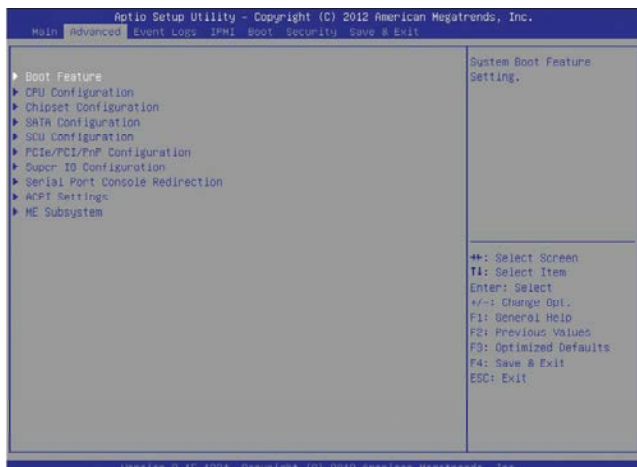
This displays the amount of memory available in the system.

7-3 Advanced Setup Configurations

Use the arrow keys to select the Advanced Setup submenu and press <Enter> to access the following items.

Boot Feature

Quiet Boot



Use this item to select bootup screen display between POST messages and the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

AddOn ROM Display Mode

Use this item to set the AddOn Option ROM display mode. Select Keep Current to use the current Option ROM display mode. Select Force BIOS to use the Option ROM display mode set by the system BIOS. The options are **Force BIOS** and Keep Current.

Bootup Num-Lock

Use this feature to set the Power-on state for the Num Lock key on the keyboard. The options are Off and **On**.

Wait For 'F1' If Error

Select Enabled to force the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and **Enabled**.

Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19

at bootup and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

Re-try Boot

When the feature is set to Enabled, the BIOS will continuously retry to boot from the selected boot type. The options are **Disabled**, Legacy Boot, and EFI Boot.

Power Configuration

Watch Dog Function

If enabled, the Watch Dog timer will set the system to automatically reboot when a non-recoverable error occurs, and this error lasts for more than five minutes. The options are Enabled and **Disabled**.

Power Button Function

If this feature is set to Instant Off, the system will power off immediately as soon as the user presses the power button. If this feature is set to 4 Seconds Override, the system will power off when the user presses the power button for 4 seconds or longer. The options are **Instant Off** and 4 Seconds Override.

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Stay Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before a power loss. The options are Power On, Stay Off, and **Last State**.

CPU Configuration

This submenu displays CPU information as detected by the BIOS. It also allows the user to configure CPU settings.

►Socket 1 CPU Information, Socket 2 CPU Information

This submenu displays the following information on the CPUs installed in Socket 1 and Socket 2.

- Type of CPU
- CPU Signature
- Microcode Patch
- CPU Stepping
- Maximum CPU Speed
- Minimum CPU Speed
- Processor Cores
- Intel HT (Hyper-Threading) Technology
- Intel VT-x Technology
- Intel SMX Technology
- L1 Data Cache
- L1 Code Cache
- L2 Cache
- L3 Cache

CPU Speed

This item displays the speed of the CPU installed in the Socket specified.

64-bit

This item indicates if 64-bit technology is supported by the CPU installed in the Socket selected.

Clock Spread Spectrum

Select Enable to enable Clock Spectrum support, which will allow the BIOS to monitor and attempt to reduce Electromagnetic Interference level caused by the components whenever needed. The options are **Disabled** and Enabled.

RTID (Record Types IDs)

This feature displays the total number of Record Type IDs for local and remote pools. The options are **Optimal** and Alternate.

Hyper-threading

Select Enabled to support Intel Hyper-threading Technology to enhance CPU performance. The options are **Enabled** and Disabled.

Active Processor Cores

Set to Enabled to use the processor's second core and above. (Please refer to Intel's website for more information.) The options are **All**, 1, 2, 4, and 6.

Limit CPUID Maximum

Use this feature to set the maximum CPU ID value. Enable this function to boot legacy operating systems that do not support processors with extended CPUID functions. The options are Enabled and **Disabled** (for the Windows OS).

Execute Disable Bit (Available if supported by the OS & the CPU)

Select Enabled to enable the Execute Disable Bit which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is **Enabled**. (Refer to Intel and Microsoft Web sites for more information.)

Intel® AES-NI

Select Enable to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are **Enabled** and Disabled.

MLC Streamer Prefetcher (Available when supported by the CPU)

If set to Enabled, the MLC (Mid-Level Cache) streamer prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache in the CPU to improve CPU performance. The options are Disabled and **Enabled**.

MLC Spatial Prefetcher (Available when supported by the CPU)

If this feature is set to Disabled, the MLC spatial prefetcher will prefetch the cache line for 64 bytes. If this Enabled, the MLC spatial prefetcher will prefetch both cache lines for 128 bytes as comprised. The options are Disabled and **Enabled**.

DCU Streamer Prefetcher (Available when supported by the CPU)

If this item is set to Enabled, the Data Cache Unit (DCU) streamer prefetcher will prefetch L1 data to speed up data accessing and processing to enhance CPU performance. The options are Disabled and **Enabled**.

DCU IP Prefetcher

Select Enabled for DCU (Data Cache Unit) IP Prefetcher support, which will prefetch IP addresses to improve network connectivity and system performance. The options are **Enabled** and Disabled.

Intel® Virtualization Technology (Available when supported by the CPU)

Select Enabled for Intel Virtualization Technology support, which will allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and Disabled.

Note: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's website for detailed information.)

► CPU Power Management Configuration

This submenu allows the user to configure the following CPU Power Management settings.

Power Technology

Select Energy Efficiency to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disabled, **Energy Efficient**, and Custom. If the option is set to Custom, the following items will display:

EIST (Available when Power Technology is set to Custom)

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency to reduce power consumption and heat dissipation. The options are Disabled and **Enabled**.

C1E Support (Available when Power Technology is set to Custom)

Select Enabled to enable Enhanced C1 Power State to boost system performance. The options are **Enabled** and Disabled.

CPU C3 Report (Available when Power Technology is set to Custom)

Select Enabled to allow the BIOS to report the CPU C3 State (ACPI C2) to the operating system. During the CPU C3 State, the CPU clock generator is turned off. The options are Enabled and **Disabled**.

CPU C6 Report (Available when Power Technology is set to Custom)

Select Enabled to allow the BIOS to report the CPU C6 State (ACPI C3) to the operating system. During the CPU C6 State, the power to all cache is turned off. The options are **Enabled** and Disabled.

CPU C7 Report (Available when Power Technology is set to Custom)

Select Enabled to allow the BIOS to report the CPU C7 State (ACPI C3) to the operating system. CPU C7 State is a processor-specific low C-State. The options are **Enabled** and Disabled.

Package C-State limit (Available when Power Technology is set to Custom)

Use this feature to set the limit on the C-State package register. The options are C0, C2, **C6**, and No Limit.

Energy Performance Bias

Use this feature to select an appropriate fan setting to maximize system performance (with maximum cooling) or to maximize energy efficiency with maximum power saving). The fan speeds are controlled by firmware management via IPMI 2.0. The options are Performance, **Balanced Performance**, Balanced Energy, and Energy Efficient.

Factory Long Duration Power Limit

This item displays the power limit (in watts) set by the manufacturer during which long duration power is maintained.

Long Duration Power Limit

This item displays the power limit (in watts) set by the user during which long duration power is maintained. The default setting is **0**.

Factory Long Duration Maintained

This item displays the period of time (in seconds) set by the manufacturer during which long duration power is maintained.

Long Duration Maintained

This item displays the period of time (in seconds) during which long duration power is maintained. The default setting is **0**.

Recommended Short Duration Power Limit

This item displays the short duration power settings (in watts) recommended by the manufacturer.

Short Duration Power Limit

This item displays the time period during which short duration power (in watts) is maintained. The default setting is **0**.

► Chipset Configuration

► North Bridge

This feature allows the user to configure the settings for the Intel North Bridge.

► Integrated IO Configuration

Intel® VT-d

Select **Enabled** to enable Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) through the DMAR ACPI tables. This feature offers fully-protected I/O -resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enabled** and **Disabled**.

Aging Timer Rollover

Use this feature to configure Aging Timer Rollover settings. Select **Default** to allow the BIOS to configure Aging Timer Rollover settings. The options are **Default**, **Disabled**, 32us, 128 us and 512 us.

Intel® I/OAT

Select **Enabled** to enable Intel I/OAT (I/O Acceleration Technology), which significantly reduces CPU overhead by leveraging CPU architectural demands, freeing up the system resource for other tasks. The options are **Disabled** and **Enabled**.

DCA Support

Select **Enabled** to use Intel's DCA (Direct Cache Access) Technology to improve data transfer efficiency. The default setting is **Enabled**.

MMCFG BASE

This feature determines the lowest base address that can be assigned to PCI devices. The lower the address, the less system memory is available (for 32-bit OS). The higher the address, the less resources are allocated to PCI devices. The options are **0x80000000**, **0xA0000000**, and **0xC0000000**.

I/O 1 PCIe Port Bifurcation Control

This submenu configures the following IO PCIe Port Bifurcation Control settings for the PCIe ports. It also determines how the available PCI-Express lanes are distributed between the PCI-Exp. Root ports.

CPU 1 Slot J1 PCI-E 3.0 x16 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot J1. Select GEN2 to enable PCI-Exp Generation 2 support for Slot J1. Select GEN3 to enable PCI-Exp Generation 3 support for Slot J1. The options are GEN1, GEN2, and **GEN3**.

CPU 1 Slot J2 PCI-E 3.0 x8 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot J2. Select GEN2 to enable PCI-Exp Generation 2 support for Slot J2. Select GEN3 to enable PCI-Exp Generation 3 support for Slot J2. The options are GEN1, GEN2, and **GEN3**.

CPU 1 Slot J3 PCI-E 3.0 x8 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot J3. Select GEN2 to enable PCI-Exp Generation 2 support for Slot J3. Select GEN3 to enable PCI-Exp Generation 3 support for Slot J3. The options are GEN1, GEN2, and **GEN3**.

I/O 2 PCIe Port Bifurcation Control

This submenu configures the following IO PCIe Port Bifurcation Control settings for the PCIe ports. It also determines how the available PCI-Express lanes are distributed between the PCI-Exp. Root Ports.

CPU 2 Slot SXB1A PCI-E 3.0 x16 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot SXB1A. Select GEN2 to enable PCI-Exp Generation 2 support for Slot SXB1A. Select GEN3 to enable PCI-Exp Generation 3 support for Slot SXB1A. The options are GEN1, GEN2, and **GEN3**.

CPU 2 Slot SXB1B PCI-E 3.0 x16 Link Speed

Select GEN1 to enable PCI-Exp Generation 1 support for Slot SXB1B. Select GEN2 to enable PCI-Exp Generation 2 support for Slot SXB1B. Select GEN3 to enable PCI-Exp Generation 3 support for Slot SXB1B. The options are GEN1, GEN2, and **GEN3**.

►QPI Configuration

Current QPI Link Speed

This item displays the current speed of the QPI Link.

Current QPI Link Frequency

This item displays the frequency of the QPI Link.

Isoc

Select Enabled to enable Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for virtualization technology. The options are Enabled and **Disabled**.

QPI (Quick Path Interconnect) Link Speed Mode

Use this feature to select data transfer speed for QPI Link connections. The options are **Fast** and Slow.

QPI Link Frequency Select

Use this feature to select the desired QPI frequency. The options are **Auto**, 6.4 GT/s, 7.2 GT/s, and 8.0 GT/s.

►DIMM Configuration

This section displays the following DIMM information.

Current Memory Mode

This item displays the current memory mode.

Current Memory Speed

This item displays the current memory speed.

Mirroring

This item displays if memory mirroring is supported by the motherboard. Memory mirroring creates a duplicate copy of the data stored in the memory to enhance data security.

Sparing

This item displays if memory sparing is supported by the motherboard. Memory sparing enhances system performance.

►DIMM Information

The submenu displays the status of a DIMM module detected by the BIOS.

CPU Socket 1 DIMM Information/CPU Socket 2 DIMM Information

Memory Mode

When Independent is selected, all DIMMs are available to the operating system. When Mirroring is selected, the motherboard maintains two identical copies of all data in memory for data backup. When Lockstep is selected, the motherboard

uses two areas of memory to run the same set of operations in parallel. The options are **Independent**, Mirroring, and Lockstep.

DRAM RAPL Mode

RAPL (Running Average Power Limit) provides mechanisms to enforce power consumption limits on supported processors. The options are DRAM RAPL MODE0, **DRAM RAPL MODE1**, and Disabled.

DDR Speed

Use this feature to force a DDR3 memory module to run at a frequency other than what is specified by the manufacturer. The options are **Auto**, Force DDR3-800, Force DDR3-1066, Force DDR3-1333, Force DDR3-1600 and Force SPD.

Channel Interleaving

This feature selects from the different channel interleaving methods. The options are **Auto**, 1 Way, 2 Way, 3, Way, and 4 Way.

Rank Interleaving

This feature allows the user to select a rank memory interleaving method. The options are **Auto**, 1 Way, 2 Way, 4, Way, and 8 Way.

Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this item is set to Enabled, the IO hub will read and write back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are **Enabled** and Disabled.

Demand Scrub

Demand Scrubbing is a process that allows the CPU to correct correctable memory errors found on a memory module. When the CPU or I/O issues a demand-read command, and the read data from memory turns out to be a correctable error, the error is corrected and sent to the requestor (the original source). Memory is updated as well. Select Enabled to use Demand Scrubbing for ECC memory correction. The options are Enabled and **Disabled**.

Data Scrambling

Select Enabled to enable data scrambling to ensure data security and integrity. The options are Disabled and **Enabled**.

Device Tagging

Select Enabled to support device tagging. The options are **Disabled** and **Enabled**.

Thermal Throttling

Throttling improves CPU reliability and reduces power consumption via automatic voltage control during processor idle states. The options are **Disabled** and **CLTT** (Closed Loop Thermal Throttling).

► South Bridge Configuration

This feature displays PCH information and allows the user to configure PCH settings.

PCH Information

The following PCH information will be displayed.

- Name: This item displays the name of the PCH chip.
- Stepping: This item displays the PCH stepping.
- USB Devices: This item displays the USB devices detected by the BIOS.

All USB Devices

Select Enabled to enable all USB ports/devices. The options are **Disabled** and **Enabled**.

EHCI Controller 1/EHCI Controller 2 (Available when All USB Devices is set to Enabled)

Select Enabled to enable EHCI (Enhanced Host Controller Interface) Controller 1 or Controller 2. The options are **Disabled** and **Enabled**.

Legacy USB Support (Available when USB Functions is not Disabled)

Select Enabled to support legacy USB devices. Select Auto to disable legacy support if USB devices are not present. Select Disabled to have USB devices available for EFI (Extensive Firmware Interface) applications only. The settings are **Disabled**, **Enabled** and **Auto**.

Port 60/64 Emulation

Select Enabled to enable I/O port 60h/64h emulation support for the legacy USB keyboard so that it can be fully supported by the operating systems that does not recognize a USB device. The options are **Disabled** and **Enabled**.

EHCI Hand-Off

This item is for operating systems that do not support Enhanced Host Controller Interface (EHCI) hand-off. When this feature is enabled, EHCI ownership will be changed by the EHCI driver. The options are **Disabled** and Enabled.

►SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of IDE or SATA devices and displays the following items.

SATA Port0~SATA Port5: The AMI BIOS displays the status of each SATA port as detected by the BIOS.

SATA Mode

Use this feature to configure SATA mode for a selected SATA port. The options are Disabled, IDE Mode, **AHCI Mode** and RAID Mode. The following are displayed depending on your selection:

IDE Mode

The following items are displayed when IDE Mode is selected:

Serial-ATA (SATA) Controller 0~1

Use this feature to activate or deactivate the SATA controller, and set the compatibility mode. The options are Disabled, Enhanced, and Compatible. The default for SATA Controller 0 is **Compatible**. The default of SATA Controller 1 is **Enhanced**.

AHCI Mode

The following items are displayed when the AHCI Mode is selected.

Aggressive Link Power Management

When Enabled, the SATA AHCI controller manages the power usage of the components installed on the SATA link. The controller will put the link in a low power mode during extended periods of I/O inactivity, and will return the link to an active state when I/O activity resumes. The options are **Enabled** and Disabled.

Port 0~5 Hot Plug

Select Enabled to enable hot-plug support for a particular port, which will allow the user to change a hardware component or device without shutting down the system. The options are **Enabled** and Disabled.

Port 0~5 Staggered Spin-Up

Select Enabled to enable Staggered Spin-up support to prevent excessive power consumption caused by multiple HDDs spinning-up simultaneously. The options are Enabled and **Disabled**.

RAID Mode

The following items are displayed when RAID Mode is selected:

SATA RAID Option ROM/UEFI Driver

Use this feature to enable the onboard SATA Option ROM or EFI driver. The options are Enabled and Disabled.

Port 0~5 Hot Plug

Select Enabled to enable hot-plug support for the particular port. The options are Disabled and **Enabled**.

►PCIe/PCI/PnP Configuration

Launch Storage Add-on Card OpROM Priority

Use this feature to select the Option ROM you want to use to boot the system when there are multiple Option ROMs available in the system. The options are UEFI only and **Legacy only**.

PCI Latency Timer

Use this feature to set the latency timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

PERR# Generation

Select Enabled to allow a PCI device to generate a PERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

SERR# Generation

Select Enabled to allow a PCI device to generate an SERR number for a PCI Bus Signal Error Event. The options are Enabled and **Disabled**.

Maximum Payload

Select Auto to allow the system BIOS to automatically set the maximum payload value for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes and 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

Maximum Read Request

Select Auto to allow the system BIOS to automatically set the maximum Read Request size for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

ASPM Support

Use this feature to set the Active State Power Management (ASPM) level for a PCI-E device. Select Auto to allow the system BIOS to automatically set the ASPM level for the system. Select Disabled to disable ASPM support. The options are **Disabled**, and Auto.

Warning: Enabling ASPM support may cause some PCI-E devices to fail!

Above 4G Decoding (Available if the system supports 64-bit PCI decoding)

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. The options are Enabled and **Disabled**.

CPU1 Slot J1 PCI-E 3.0 x16 OPROM

Select Enabled to enable Option ROM support to boot the computer using a device installed on the slot specified above. The options are **Enabled** and Disabled.

CPU1 Slot J2/Slot J3 PCI-E 3.0 x8 OPROM

Select Enabled to enable Option ROM support to boot the computer using a device installed on the slot specified above. The options are **Enabled** and Disabled.

PCH Slot J4 PCI-E 2.0 x4 OPROM

Select Enabled to enable Option ROM support to boot the computer using a device installed on the slot specified above. The options are **Enabled** and Disabled.

CPU2 Slot SXB1A/Slot SXB1B PCI-E 3.0 x16 OPROM

Select Enabled to enable Option ROM support to boot the computer using a device installed on the slot specified above. The options are **Enabled** and Disabled.

Onboard LAN Option ROM Select

Select iSCSI to use the iSCSI Option ROM to boot the computer using a network device. Select PXE (Preboot Execution Environment) to use an PXE Option ROM to boot the computer using a network device. The options are **PXE**, iSCSI and FCoE.

Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM

Select Enabled to enable the onboard LAN1 or LAN2 Option ROM. This is to boot the computer using a network device. The default setting for LAN1 Option ROM is **Enabled**, and for LAN2 Option ROM is **Disabled**.

Load Onboard SAS OPRM

Select Enabled for onboard SAS Option ROM support. This is to boot the computer using a SAS device. The options are Disabled and **Enabled**.

VGA Priority

This feature allows the user to select the graphics adapter to be used as the primary boot device. The options are **Onboard**, and Offboard.

Network Stack

Select Enabled enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are Enabled and **Disabled**.

IPv4 PXE Support (Available when Network Stack is set to Enabled)

Set this item to Enabled to activate IPv4 PXE Support. The options are **Enabled** and Disabled.

IPv6 PXE Support (Available when Network Stack is set to Enabled)

Set this item to Enabled to activate IPv6 PXE Support. The options are Enabled and **Disabled**.

►Serial Port Console Redirection

COM 1/SOL

These two submenus allow the user to configure the following Console Redirection settings for a COM port specified by the user.

COM1/SOL (Serial Over LAN) Console Redirection

Select Enabled to use COM1 or SOL (Serial_Over_LAN) port selected by the user for Console Redirection. The options are Enabled and Disabled. The default setting for COM1 is **Disabled**, and for SOL is **Enabled**.

►Console Redirection Settings

Use this feature to specify how the host computer will communicate with the client computer, which is the remote computer used by the user.

Terminal Type

This feature allows the user to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Char-

acter Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

Bits Per second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600 and **115200** (bits per second).

Data Bits

Use this feature to set the data transmission size for Console Redirection. The options are 7 Bits and **8 Bits**.

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark and Space.

Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

Flow Control

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

VT-UTF8 Combo Key Support

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled.

Recorder Mode

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

Legacy OS Redirection Resolution

Use this feature to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

Putty KeyPad

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

Redirection After BIOS Post

Use this feature to enable or disable Legacy Console Redirection after BIOS POST (Power On Self Test). When this feature is set to Bootloader, Legacy Console Redirection is disabled before booting the OS. When this feature is set to Always Enable, Legacy Console Redirection remains enabled during OS bootup. The options are **Always Enable** and Bootloader.

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

The submenu allows the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

EMS Console Redirection

Select Enabled to select a COM Port for Console Redirection. The options are Enabled and **Disabled**.

►Console Redirection Settings (for EMS)

This feature allows the user to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

Out-of-Band Management Port

The feature selects a serial port used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote server. The options are **COM1** and SOL.

Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color

and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

Bits Per Second

This item sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

Flow Control

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a Stop signal to stop sending data when the receiving buffer is full. Send a Start signal to start sending data when the receiving buffer is empty. The options are **None**, Hardware RTS/CTS, and Software Xon/Xoff.

Data Bits, Parity, Stop Bits

The setting for each of these items is displayed.

►ACPI Settings

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

ACPI Sleep State

Use this feature to select the ACPI State when the system is in sleep mode. Select S1 (CPU Stop Clock) to erase all CPU caches and stop executing instructions. In this setting, power to the CPU(s) and RAM is maintained, but RAM is refreshed. Select Suspend Disabled to use power-reduced mode. Power will only be supplied to limited components (such as RAMs) to maintain the most critical functions of the system. The options are **S1 (CPU Stop Clock)**, and Suspend Disabled.

NUMA (NON-Uniform Memory Access)

Select Enabled to enable the Non-Uniform Memory Access ACPI support. The options are **Enabled** and Disabled.

High Precision Event Timer

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback, reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruc-

tion embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are **Enabled** and Disabled.

► Trusted Computing (Available when a TPM device is detected by the BIOS)

Configuration

TPM Support

When this feature is set to Enabled, and the onboard TPM is also set to Enabled, you can use TPM support to improve data integrity and network security for your system. The options are **Enabled** and Disabled.

TPM State

Select Enabled to enable TPM security settings to improve data integrity and network security. The options are Disabled and **Enabled**.

Pending Operation

Use this item to schedule an operation for the security device. The options are **None**, Enable Take Ownership, Disable Take Ownership, and TPM Clear.

Note: Upon system reset, the computer will reboot in order to execute the pending operation and change the state of the security device.

Current Status Information: This item displays current TPM status.

TPM Enable Status

This item indicates if TPM is currently enabled or disabled.

TPM Active Status

This item indicates if TPM is currently active or not.

TPM Owner Status

This item displays the status of TPM Ownership.

► ME Subsystem

Intel ME Subsystem Configuration

This feature displays information on the Intel Management Engine subsystem:

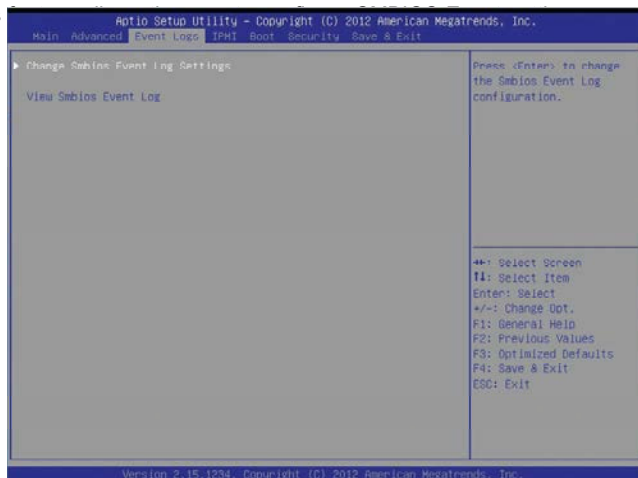
- ME BIOS Interface Version
- ME Version

7-4 Event Logs

This submenu allows the user to configure Event Log settings.

► Change SMBIOS Event Log Settings

This



Enabling/Disabling Options

SMBIOS Event Log

Select Enabled to enable SMBIOS (System Management BIOS) event logging during system boot. The options are **Enabled** and Disabled.

Runtime Error Logging Support

Select Enabled to support runtime error logging. The options are **Enabled** and Disabled.

Memory Correctable Error Threshold

Use this feature to enter the threshold value for correctable memory errors. The default setting is **10**.

PCI Error Logging Support

Select Enabled to support error event logging for PCI slots. The options are Enabled and **Disabled**.

Erasing Settings

Erase Event Log

Select Enabled to erase the SMBIOS (System Management BIOS) Event Log, which is completed before an event logging is initialized upon system reboot. The options are **No**, Yes, next reset, and Yes, every reset.

When Log is Full

Select Erase Immediately to immediately erase SMBIOS error event logs that exceed the limit when the SMBIOS event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

SMBIOS Event Log Standard Settings

Log System Boot Event

Select Enabled to log system boot events. The options are **Disabled** and Enabled.

MECI (Multiple Event Count Increment)

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is **1**.

METW (Multiple Event Count Time Window)

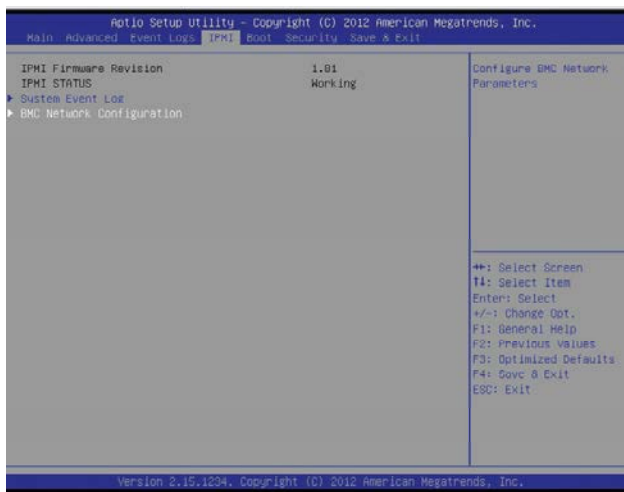
This item allows the user to decide how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.

View SMBIOS Event Log

This item displays SMBIOS event log.

7-5 IPMI

Use this feature to configure Intelligent Platform Management Interface (IPMI) settings.



IPMI Firmware Revision

This item indicates the IPMI firmware revision used in your system.

IPMI Status

This item indicates the status of the IPMI firmware installed in your system.

► System Event Log

Enabling/Disabling Options

SEL Components

Select Enabled for all system event logging at bootup. The options are **Enabled** and Disabled.

Erasing Settings

Erase SEL

Select Yes, On next reset to erase all system event logs upon next system reboot.
 Select Yes, On every reset to erase all system event logs upon each system reboot.
 Select No to keep all system event logs after each system reboot. The options are **No**, Yes, On next reset, and Yes, On every reset.

When SEL is Full

This feature allows the user to decide what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

►BMC Network Configuration

LAN Channel 1: This feature is used to configure the settings for LAN1 Port.

IPMI LAN Selection: This item displays the current IPMI Selection setting.

IPMI Network Line Status: This item displays the status of the current IPMI network connection line.

Update IPMI LAN Configuration

This feature allows the BIOS to implement any IP/MAC address changes at the next system boot. If the option is set to Yes, any changes made to the settings below will take effect at the next system reboot. The options are **No** and Yes.

Configuration Address Source

Use this feature to select the source of the IP address for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server in the network that it is attached to and request the next available IP address for this computer. The options for are **DHCP** and Static. The following items are assigned IP addresses automatically if DHCP is selected, or can be configured manually if Static is selected.

Station IP Address

This item displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

Subnet Mask

This item displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.

Station MAC Address

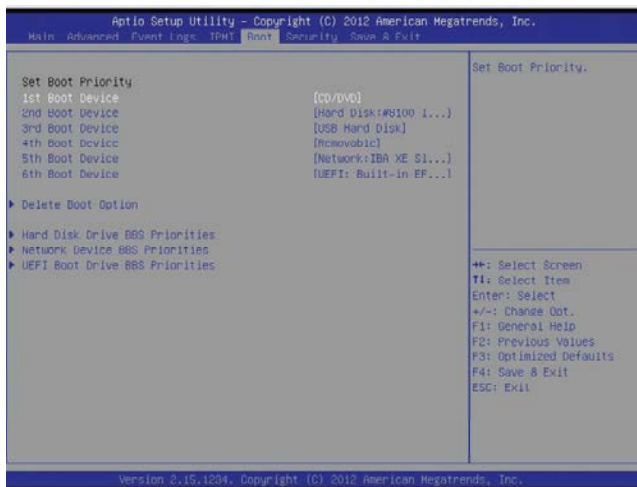
This item displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

Gateway IP Address

This item displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

7-6 Boot

This submenu allows the user to configure the following boot settings for the system.



Set Boot Priority

1st Boot Device, 2nd Boot Device, 3rd Boot Device, etc.

Use these items to specify the sequence of boot device priority.

►Delete Boot Option

Use this feature to select a boot device to delete from the boot priority list.

Delete Boot Option

Use this feature to select a boot device to delete.

►Hard Disk Drive BBS Priorities

This item is used to select the boot device priority sequence from available hard drives.

►Network Device BBS Priorities

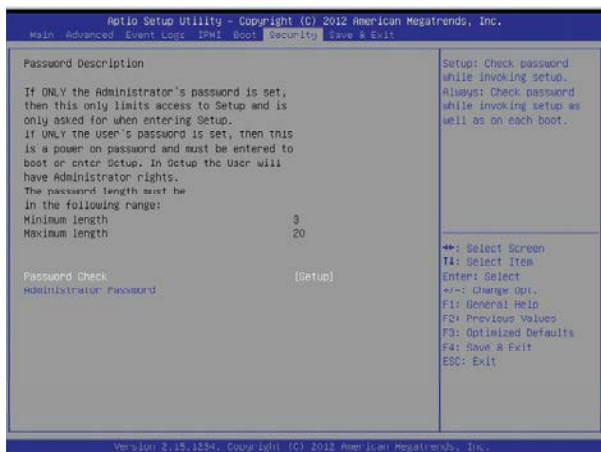
This item is used to select the boot device priority sequence from available network devices.

►UEFI Boot Drive BBS Priorities

This item is used to select the boot device priority sequence from available UEFI devices.

7-7 Security

This menu is used to configure the following security settings for the system.



Password Check

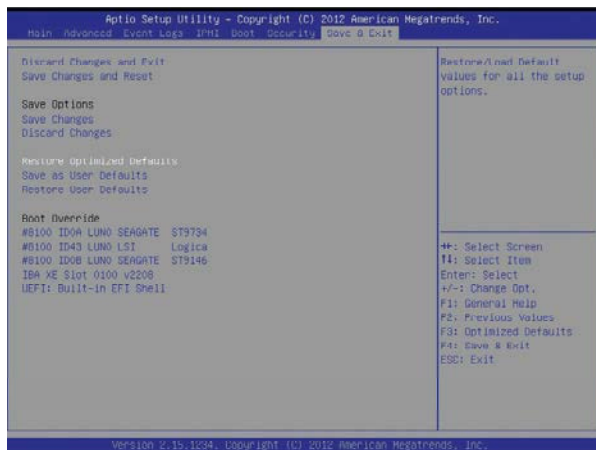
This feature determines when a password entry is required. If Setup is selected, the user is required to enter a password upon entering the BIOS setup utility. If Always is selected, the user is required to enter a password upon entering the BIOS setup utility and upon each system boot. The options are **Setup** and Always.

Administrator Password

Use this item to set the Administrator Password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

7-8 Save & Exit

This submenu allows the user to configure the Save and Exit settings for the system.



Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, select **Yes** to quit BIOS without saving the changes, or select No to quit the BIOS and save changes.

Save Changes and Reset

When you have completed the system configuration changes, select this option to save the changes and reboot the computer so that the new system configuration settings can take effect. Select Save Changes and Exit, and press <Enter>. When the dialog box appears, asking you if you want to exit the BIOS setup without saving, select **Yes** to quit BIOS without saving the changes, or select No to quit the BIOS and save changes.

Save Options

Save Changes

Select this option and press <Enter> to save all changes you've done so far and return to the AMI BIOS utility. When the dialog box appears, asking you if you want to save configuration, select **Yes** to save the changes, or select No to return to the BIOS without making changes.

Discard Changes

Select this feature and press <Enter> to discard all the changes and return to the BIOS setup. When the dialog box appears, asking you if you want to load previous values, select **Yes** to load the values previous saved, or select No to keep the changes you've made so far.

Restore Optimized Defaults

Select this feature and press <Enter> to load the optimized default settings that will help optimize system performance. When the dialog box appears, asking you if you want to load optimized defaults, select **Yes** to load the optimized default settings, or select No to abandon optimized defaults.

Save as User Defaults

Select this feature and press <Enter> to save the current settings as the user's defaults. When the dialog box appears, asking you if you want to save values as user's defaults, click **Yes** to save the current values as user's default settings, or click No to keep the defaults previously saved as the user's defaults.

Restore User Defaults

Select this feature and press <Enter> to load the user's defaults previously saved in the system. When the dialog box appears, asking you if you want to restore user's defaults, select **Yes** to restore the user's defaults previously saved in the system, or select No to abandon the user's defaults that were previously saved.

Boot Override

Use this item to override the boot device priority sequence as listed in the Boot submenu, and select one of the devices listed below to boot the system instead. This is a one-time override.

#8100 ID0A LUN0 SEAGAGE ST9734,

#8100 ID43 LUN0 LSI LSI Logica,

#8100 ID0B LUN0 SEAGAGE ST9146,

IBA XE Slot 0100 v2208,

UEFI Built-in EFI Shell

Appendix A

BIOS Error Beep Codes

BIOS Error Beep Codes are not available for this motherboard.

Notes

Appendix B

System Specifications

Processors

One or two Intel® E5-2600 Series processors in LGA2011 sockets

Note: refer to our web site for details on supported processors and operating systems.

Chipset

Intel PCH C602

BIOS

16MB SPI AMI BIOS® SM Flash BIOS

Memory Capacity

Sixteen memory slots that support up to 512 GB of ECC registered DDR3-1600/1333/1066/800 RDIMMs or up to 128 GB of unbuffered ECC/non-ECC DDR3-1600/1333/1066/800 UDIMMs

Note: refer to Chapter 5 for details and to our web site for updates to supported memory.

SAS Controller

LSI 2308 SAS controller for eight-port SAS2, which supports RAID 0, 1 and 10

SATA Controller

Intel chipset-based SATA controller for six-port SATA, which supports RAID 0, 1, 5 and 10 (two SATA 3.0 and four SATA 2.0 ports)

Hard Drives

Twelve fixed 3.5" hard drives housed within the chassis

PCI Expansion

One low-profile PCI-Express 3.0 x8 card in a riser card

Note: refer to Chapter 6 for details.

Serverboard

IceBreaker 812

Dimensions: 8.54 x 18.72 in (217 x 475 mm)

Chassis

SC816LTS-655BP (1U Rackmount)

Dimensions: (WxHxD) 17.2 x 1.7 x 36 in. (437 x 43 x 914 mm)

Weight

Gross Weight: 38 lbs. (17.3 kg.)

System Cooling

Eight 4-cm high performance fans

System Input Requirements

AC Input Voltage: 100-240VAC auto-range

Rated Input Current: 8.5A max.

Rated Input Frequency: 50 to 60 Hz

Power Supply

Rated Output Power: 650W (Part# PWS-655P-1HS)

Rated Output Voltages: +12V (54.1A), +5Vsb (3A)

Operating Environment

Operating Temperature: 10° to 35° C (50° to 95° F)

Non-operating Temperature: -40° to 70° C (-40° to 158° F)

Operating Relative Humidity: 8% to 90% (non-condensing)

Non-operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate"

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