



# AdvancedMC® Quad Gigabit Ethernet Module

**SB-AMC59**

## Installation and Use Guide

March 2011

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# Preface

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## Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

The safety precautions listed below represent warnings of certain dangers of which SANBlaze is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

**GROUND THE INSTRUMENT.** To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. If the equipment is supplied with a three-conductor AC power cable, the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green/yellow) reliably connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards and local electrical regulatory codes.

**DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE.** Do not operate the equipment in any explosive atmosphere such as in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment could result in an explosion and cause injury or damage.

**KEEP AWAY FROM LIVE CIRCUITS INSIDE THE EQUIPMENT.** Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified service personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Service personnel should not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, such personnel should always disconnect power and discharge circuits before touching components.

**USE CAUTION WHEN EXPOSING OR HANDLING A CRT.** Breakage of a Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, do not handle the CRT, and avoid rough handling or jarring of the equipment. Handling of a CRT should be done only by qualified service personnel using approved safety mask and gloves.

**DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT.** Do not install substitute parts or perform any unauthorized modification of the equipment. Contact your local SANBlaze representative for service and repair to ensure that all safety features are maintained.

**OBSERVE WARNINGS IN MANUAL.** Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.



To prevent serious injury or death from dangerous voltages, use extreme caution when handling, testing, and adjusting this equipment and its components.

## Flammability

All SANBlaze PWBs (printed wiring boards) are manufactured with a flammability rating of 94V-0 by UL-recognized manufacturers.

## EMI Caution



This equipment generates, uses, and can radiate electromagnetic energy. It may cause or be susceptible to electromagnetic interference (EMI) if not installed and used with adequate EMI protection.

---

## Safety Statement

The SB-AMC59 is designed to comply with UL60950-1, and is intended to be used with similarly tested AdvancedTCA and MicroTCA products that have a user's guide detailing user installation of AMC module accessories.

## CE Notice (European Community)

SANBlaze Technology products with the CE marking comply with the EMC Directive (89/336/EEC). Compliance with this directive implies conformity to the following European Norms:

- EN55022 "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment"; this product tested to Equipment Class A
- EN50024-1:1998 "Information Technology Equipment - Immunity Characteristics -Limits and Methods of Measurement Amendment A1:2001, Amendment A2:2003

System products also fulfill EN60950 (product safety), which is essentially the requirement for the Low Voltage Directive (73/23/EEC).

Board products are tested in a representative system to show compliance with the above mentioned requirements. A proper installation in a CE-marked system will maintain the required EMC/safety performance.

In accordance with European Community directives, a "Declaration of Conformity" has been made and is on file within the European Union. The "Declaration of Conformity" is available on request. Please contact your sales representative.

## Notice

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# About This Manual

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The SB-AMC59 *AdvancedMC® Quad Gigabit Ethernet Module Installation and Use Guide* includes an explanation on how to configure and install the product, and also includes programming information. Readers will also find functional descriptions of the major components, pin assignments for the major connectors and headers on the SB-AMC59.

## How this manual is organized

This manual is divided into the following chapters and appendices:

[Chapter 1 SB-AMC59 Overview](#) includes a description of the product, a list of features, I/O interfaces, a block diagram, a list of other equipment required; dip switch settings, and installation instructions.

[Chapter 2 SB-AMC59 Installation](#) provides detailed instructions for installing the SB-AMC59.

[Chapter 3 Functional Description](#) describes the major functional features and capabilities of the AMC product. It includes a detailed list of features, I/O interfaces, a block diagram, and configuration options.

[Chapter 4 Connector Pin Assignments](#) includes pin out descriptions for all of the major headers and connectors on the SB-AMC59

[Chapter 5 Specifications](#) contains basic environmental and mechanical specifications for this product.

[Chapter 6 Front Panel Indicators](#) contains the descriptions of the Front Panel LED indicators

[Chapter 7 IPMI functions list](#) contains a listing of current IPMI functions supported by the carrier board and Standard and OEM commands.

[Chapter 8 IPMI Firmware Upgrade Procedure](#) describes the utility to upgrade the firmware.

## Conventions Used in This Manual

The following typographical conventions are used in this document:

**Table 1 Conventions Used In This Manual**

Convention	Is used for
<b>bold</b>	User input that you type just as it appears; it is also used for commands, options and arguments to commands, and names of programs, directories and files.
<i>italic</i>	Names of variables to which you assign values, for function parameters, and for structure names and fields. Italic is also used for comments in screen displays and examples, and to introduce new terms.
<code>courier</code>	System output (for example, screen displays and reports),



	examples, and system prompts.
< <b>Enter</b> >, < <b>Return</b> > or < <b>CR</b> >	The carriage return or Enter key.
CTRL	The Control key. Execute control characters by pressing the CTRL key and the letter simultaneously, for example, Ctrl+D.

# Hardware Preparation and Installation

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## Unpacking Instructions

If the shipping carton is damaged upon receipt, request that the carrier's agent be present during the unpacking and inspection of the equipment.



Unpack the equipment from the shipping carton. Refer to the packing list and verify that all items are present. Save the packing material for storing and reshipping of equipment.

Avoid touching areas of integrated circuitry. Static discharge can damage circuits.

After removing the product from the packaging:

- Check for obvious physical damage.
- Make sure that you disconnect the chassis from the main power supply before you continue.

## Antistatic Precautions



SANBlaze strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from its protective wrapper or from the system, place the component flat on a grounded, static-free surface (and, in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.



Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.



Avoid touching areas of integrated circuitry. Static discharge can damage these circuits.

# 1 SB-AMC59 Overview

---

The SB-AMC59 is a full or mid-height AMC module that features four (4) 10/100/1000Base-T ports. Each LAN port provides a fully independent Ethernet connection, with independent IP credentials; all ports can simultaneously achieve line-rate operation, supporting 10Base-T/100Base-Tx/1000Base-T link speeds.

The module conforms to the PCI-express signaling defined in AMC.1. It also includes an MMC to manage hot-swap control, monitor numerous on board voltage and temperature sensors, and is fully remotely manageable via IPMI v1.5x protocol.

## 1.1 Features of the AdvancedMC Module

The SB-AMC59 an AMC Module with the following major features:

- Four 1000Base-T ports (RJ45)
- Link/Speed/AMC LEDs
- Mid or Full height AMC form factor
- General Advanced Mezzanine Card Features
- Ejector switches for hot swap
- One blue hot swap LED
- OOS (Out-of-Service) LED
- ACT LED indicates in-service state

Refer to Chapter 5 “Specifications” for additional details regarding environmental, mechanical, power specifications, as well as reliability and compliance statements.

## 1.2 PICMG Standards Compliance

The SB-AMC59 is fully compliant with the following PCI Industrial Computer Manufacturers Group (PICMG) specifications:

- PICMG AMC.0 Rev2.0
- AMC.1 PCI express x4 (Gen2, 5GT/s)

1.3 Products Supported by this Manual

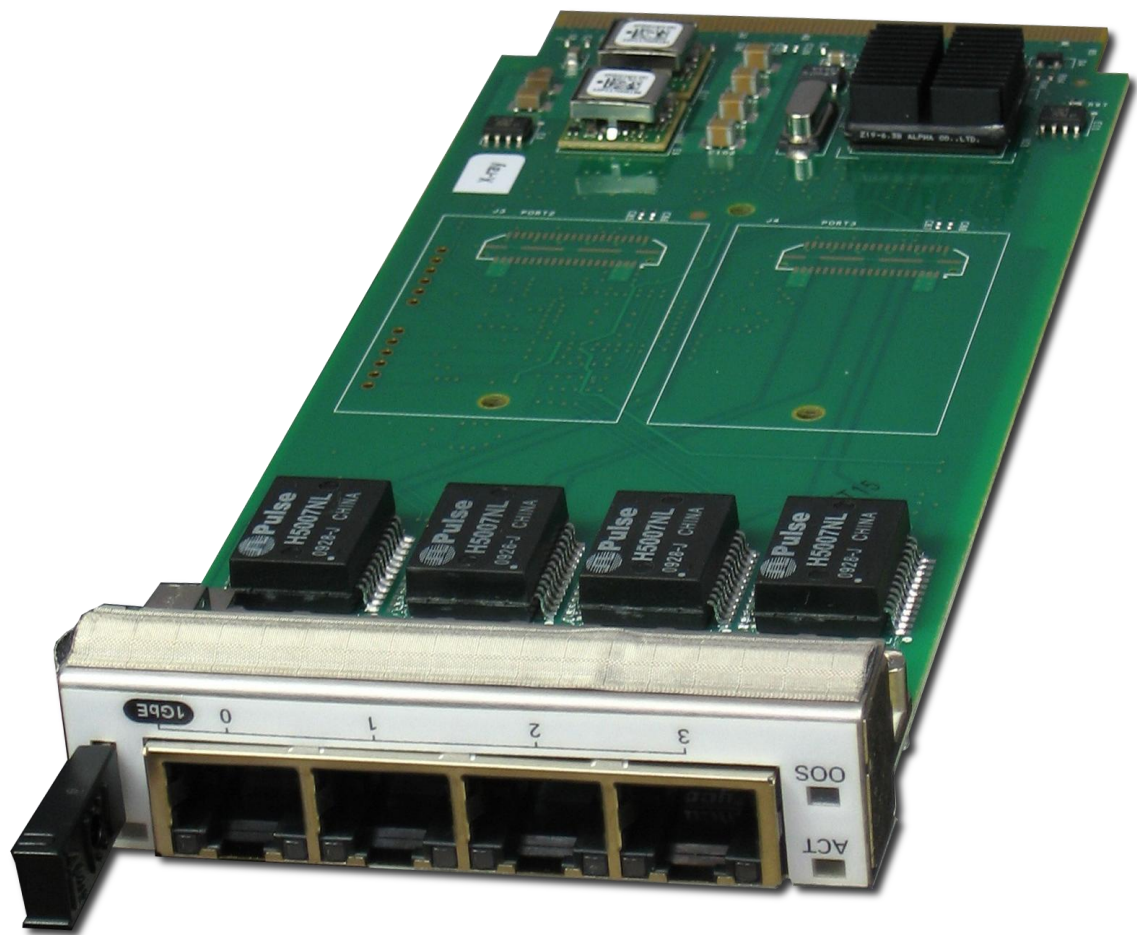
The information in this manual applies to the following SANBlaze products:

- SB-AMC59p

Table 2 Products That Apply To This Manual – Format SB-AMC59p

Base Part Number	Description
SB-AMC59M	Module with mid height AMC panel
SB-AMC59F	Module with mid height AMC panel

Figure 1. SB-AMC59 Module Top View, Front Panel



## Overview

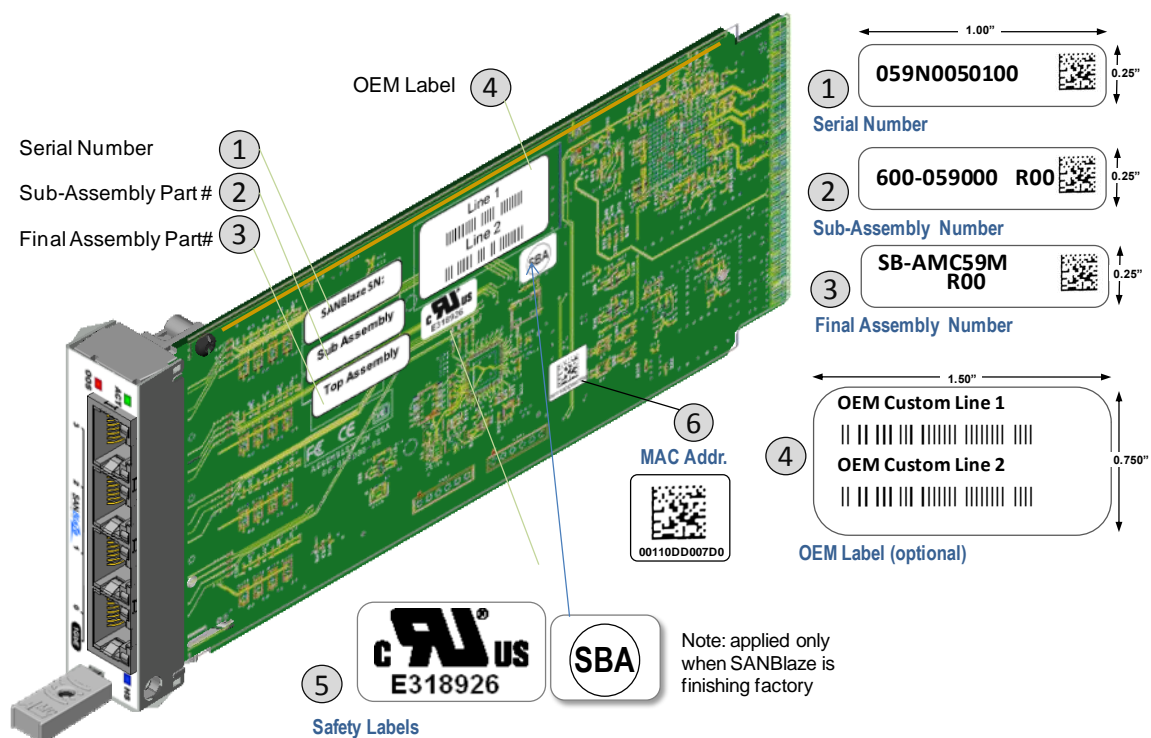
## 1.4 Part Number, Serial Number Labels

At manufacturing time, three labels consisting of serial number, part numbers, are affixed to the SB-AMC59 as shown below. For proper identification of the AMC module, use these barcode labels to accurately determine the module identity. The barcode labels provide the following information:

**Table 3 SB-AMC59 Identification Labels**

Label	Description
Label 1: Serial number:AAALYYSSSS	S/N Format :AAA = Assembly Number (059) L =Location of manufacturer Y = Calendar year of manufacturer (2010 = 0, 2011=1) MM = Calendar month of manufacturer (March = 03) SSSS = Sequence number (reset each month) (1234)
Label 2: Sub Assembly Part Number	P/N = sub assembly Part Number 60005900x Rev = Assembly Revision (Refer to Bill Of Material)
Label 3: Final Assembly Part number-- -	P/N = sub assembly Part Number SB-AMC59p (‘p’ denotes panel height) Rev = Assembly Revision (Refer to Bill Of Material)
Label 4: OEM part label	Custom label varies with OEM.
Label 5: UL recognition Label	Reviewed to 60950-1, (File E318926)

**Figure 2. SB-AMC59 Identification Labels**



## 2 SB-AMC59 Installation

This chapter contains the procedures for installing and removing the SB-AMC59 AMC module.

### 2.1 Installation and Removal of the SB-AMC59 Module

The SB-AMC59 AMC Module can be installed into an ATCA shelf (chassis) with slots designed to accept AMC.1 installations. The module slot height must properly match the panel height fitted to the AMC.

### 2.2 Important Information about Your Chassis

The SB-AMC59 is designed to PICMG specifications and is a general-purpose Advanced Mezzanine Card. Before using this board, review the specifications of the chassis and backplane that will house the module to determine the presence of, and any limitations of, chassis, IPMI bus, and user defined pin outs. For example, some chassis backplanes route certain I/O pins to internal resources such as alarm cards and drive resources. The SB-AMC59 is intended for an Advanced TCA AMC carrier card or MicroTCA chassis/backplanes/slots that are AMC.1 compliant. It is your responsibility to verify this system compatibility. Failure to do so could result in improper operation or equipment damage.

#### 2.2.1 Safety Statement

The SB-AMC59 is designed to comply with UL60950-1, and is intended to be used with similarly tested AdvancedTCA and MicroTCA products that have a user's guide detailing user installation of AMC module accessories.

#### 2.2.2 Observe Maximum Module Current Requirements

Be sure to validate the host chassis, and the intended AMC slot is able to meet the following maximum current requirements

**Table 4 Max AMC Module Current Requirements (Preliminary)**

Part number(s)	SB-AMC59M SB-AMC59F
Management Power (MP)	100mA
+12V (spin up < 8secs)	Not applicable
+12v normal operating	0.3A (3.6W)
+12v (idle)	0.2A (2.4W)
OFF STATE	LESS THAN 0.4W

## 2.3 Before You Install or Remove the AMC

Boards may be damaged if improperly installed or handled. Please read and follow the guidelines in this section to protect your equipment.

### 2.3.1 Observe ESD Precautions

SANBlaze strongly recommends that you use an antistatic wrist strap and a conductive foam pad when installing or upgrading a system. Electronic components, such as disk drives, computer boards, and memory modules, can be extremely sensitive to electrostatic discharge (ESD). After removing the component from its protective wrapper or from the system, place the component flat on a grounded, static-free surface (and, in the case of a board, component side up). Do not slide the component over any surface.

If an ESD station is not available, you can avoid damage resulting from ESD by wearing an antistatic wrist strap (available at electronics stores) that is attached to an active electrical ground. Note that a system chassis may not be grounded if it is unplugged.

### 2.3.2 Watch for Bent Pins or Other Damage

Bent pins or loose components can cause damage to the board, the backplane, or other system components. Carefully inspect your board and the backplane for both pin and component integrity before installation. Our suppliers take significant steps to ensure there are no bent pins on the backplane or connector damage to the boards prior to leaving our factory. Bent pins caused by improper installation or by boards with damaged connectors could void the warranty for the backplane or boards.

If a system contains one or more crushed pins, power off the system and contact your local sales representative to schedule delivery of a replacement chassis assembly.

## 2.4 Use Caution When Installing or Removing AMC



When first installing boards in an empty chassis or onto a carrier card, we recommend that you start at the left of the card cage and work to the right.

When inserting or removing a board in a slot adjacent to other boards, use extra caution to avoid damage to the pins and components located on the primary or secondary sides of the boards.

---

### 2.4.1 Preserve EMI Compliance

To preserve compliance with applicable standards and regulations for electromagnetic interference (EMI), during operation all front and rear openings on the chassis or board faceplates must be filled with an appropriate card or covered with a filler panel. If the EMI barrier is open, devices may cause or be susceptible to excessive interference.

## 2.4.2 Understand Hot Swap

Your SB-AMC59 is electrically designed for hot swap within a fully powered chassis. To facilitate hot swap, there is a blue LED on the front faceplate. This LED is under software control.

If your system is using software that provides full hot swap capabilities, the software will illuminate the blue hot swap LED on the AMC faceplate when software has stopped and it is safe to remove the AMC module.

If your system does not have hot-swap aware software running, behavior of the blue LED is indeterminate. In this case, you may need to manually shut down applications or operating systems running on the board prior to board removal, even if the blue LED is lit.

Powering down or removing a board before the operating system or other software running on the board has been properly shut down may cause corruption of data or file systems.

## 2.5 Verify Slot Usage



Prevent possible damage to module components by verifying the proper slot usage for your configuration.

In most cases, electronic keying (E-keying) will prevent power on of a board into an incompatible slot. However, as an extra precaution, you should be familiar with the slot purpose.

---

## 2.6 Module Hot-Swap

This section describes a recommended procedure for installing a board module in a chassis. The SB-AMC59 module has a latching mechanism. The Latch Mechanism includes the module handle with an integrated multi-position shaft and micro-switch.

The module handle is held in place by the faceplate, while the micro-switch is mounted on the module printed circuit board. The module handle is used to activate the micro-switch, which allows for Hot Swap switch as well as for extracting the module out of the connector and the AMC bay.

There are 3 positions of the Module Handle:

1. Pushed all the way in (IN) - When IN the module sends a signal to the Shelf Manager that the module is not in the Hot Swap state and the Shelf Manager will communicate with the MMC. This is the position that the Module Handle should be in during normal operation.
2. Half Way ( HW) - When the Module Handle is in the HW position, the Hot Swap switch is open and the MMC will send a Hot Swap event to the Shelf manager.
3. Out (OUT) - When the Module Handle is in the OUT position the latching mechanism is released and the module can be extracted.

The use of the Module Handle is used in conjunction with the Blue LED. Please refer to the text and table below for more detailed instructions on insertion and extraction.



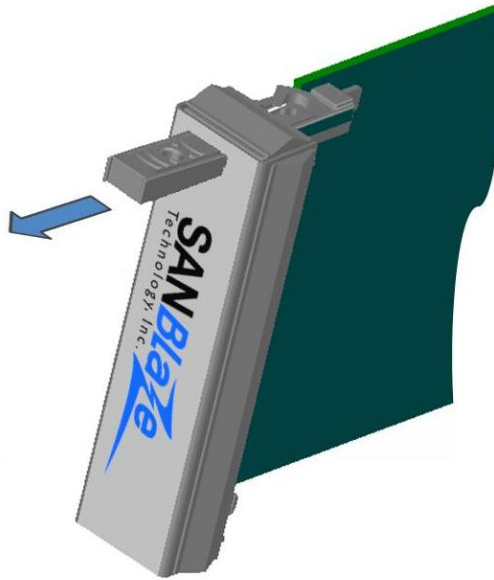


Figure 3. AMC Module Injector / Ejector Latch

## 2.7 Installing the AMC Module

### Use ESD



### Wrist Strap

This section describes a recommended procedure for installing a board module in a chassis.

Before you install your module, please read all cautions, warnings, and instructions presented in this section.

Handling modules and peripherals can result in static damage. Use a grounded wrist strap, static-dissipating work surface, and antistatic containers when handling and storing components.



### Caution

Insert the board by holding the Module Handle—do not exert unnecessary pressure on the faceplate.

Hot swap compliant modules may be installed while the system is powered on. If a module is not hot swap compliant, you should remove power to the slot or system before installing the module.

1. Verify that you have taken the necessary antistatic precautions.
2. Inspect the ATCA carrier board or MicroTCA chassis, and locate the desired AMC slot.
3. Remove the slot filler panel from the selected AMC slot, if necessary.
4. Carefully align the edges of the module with the rail guides in the appropriate slot or carrier card.
5. Taking care to keep the module aligned in the guides, apply equal and steady pressure and slide the module in until the fingers of the module snap into the internal AMC connector.

**DO NOT FORCE THE BOARD INTO THE SLOT.**

6. Push the Module Handle to the IN position.
7. Power on the system, if necessary. Refer to your system manual for instructions on correctly powering on the system. Once power is applied to the chassis, the internal MMC controller runs a self-test that runs for approximately 10 seconds. Upon a successful power up self-test, the blue hot swap LED will blink and then turn off, indicating that the module has been placed in operation.

## 2.8 Removing the AMC Module



The SB-AMC59 AMC is hot-swappable and can be removed from the chassis without powering down the associated host carrier or chassis. This section describes the recommended procedure for removing an AMC module.

Before you remove your module, please read all cautions, warnings, and instructions presented in this section. Hot swap compliant modules may be removed while the system is powered on. If the chassis is not hot swap compliant, you should remove power to the slot or system before removing the module.

To remove the AMC module, follow these steps:

1. Begin to remove your module by pulling the Module Handle to the half way (HW) position. Do not remove the module immediately.
2. Powering down or removing a board before the operating system or other software running on the board has been properly shut down may cause corruption of data or file systems.
3. If your module is hot swap compliant and you are running fully functional hot swap-aware software, unlatching this ejector lever will start the shutdown process on the board. The software will slowly blink the blue hot swap LED indicating the module is in the process of being de-activated.
4. Once the module has been de-activated, the Blue LED will solidly illuminate. Once this is done you can extract the module by pulling on the module handle.
5. If your board or system is not running hot swap-aware software, the blue LED may illuminate without regard to software processes still running on the board. Be sure to manually shut down applications or operating systems running on the board prior to board removal.
6. Carefully pull the module from the chassis. If the card slot is to remain empty, install a filler panel in the slot.

## 3 Functional Description

This chapter provides a functional description of the major components and devices on the SB-AMC59.

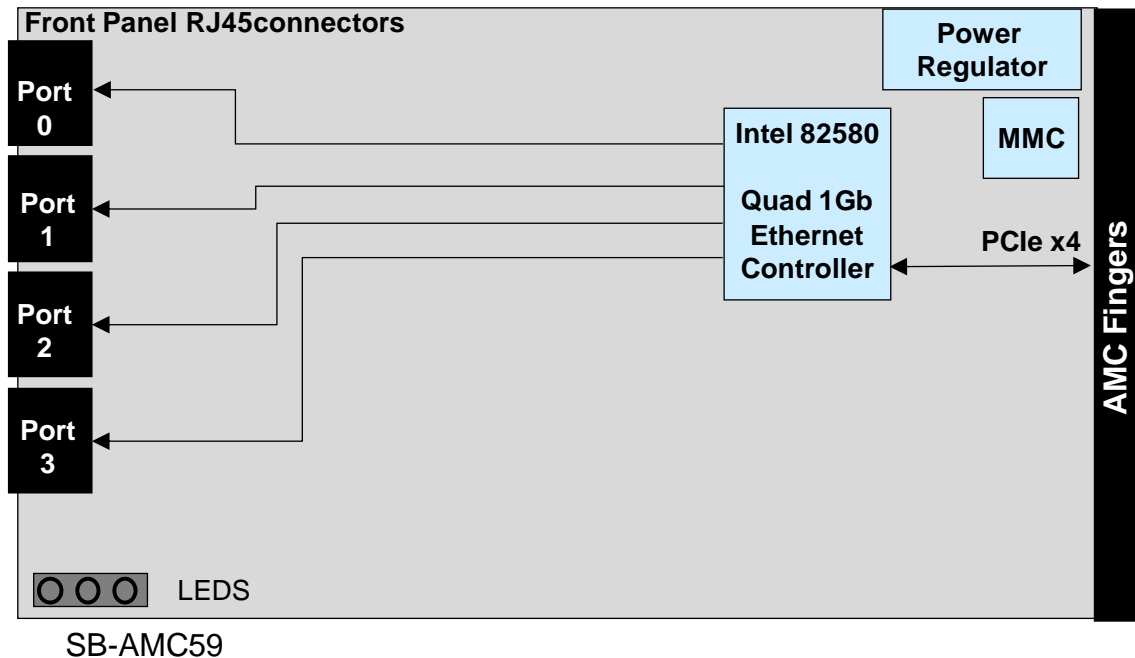
### 3.1 Overview

The SB-AMC59 contains four major functional blocks. These are:

1. Quad Gbit Ethernet controller, Intel 82580
2. The Power Regulator
3. The IPMI subsystem (MMC- module management controller), with voltage and temperature sensors)

The following block diagram illustrates the major components and their circuitry on the SB-AMC59.

Figure 4. SB-AMC59 Functional Blocks



### 3.2 SB-AMC59, AMC Top Level Board Layout

The SB-AMC59 board layout is shown in the figure below, and provides approximate physical location of major components.

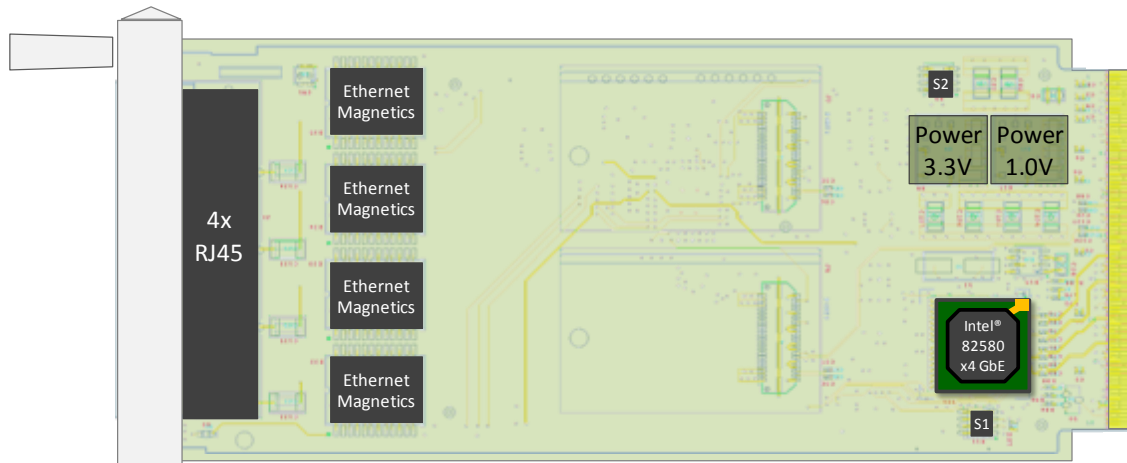


Figure 5. SB-AMC59 Top Level Board Layout

### 3.3 Four Ethernet 1000Base-T ports (RJ-45)

Four Ethernet ports are located on front AMC panel; each of these ports route to the Intel® 82580 Ethernet controller, which is accessed by the front blade via PCI express signaling. These ports employ an RJ-45 connector, with integrated LED for Link (green) and activity (amber). Each port auto negotiates to 10/100/1000BASE-T.

#### 3.3.1 Ethernet Magnetics

These components contain transformers to electrically receive and transmit signals over the copper Ethernet media.

### 3.4 Power Regulator

The **Power Regulators** are the part of the module that generate the required power from the payload power (+12V) that is delivered to the module through the AMC connector.

This power is current limited by these onboard regulators.

### 3.5 IPMI Subsystem (MMC)

The **IPMI subsystem** provides module management control (MMC) for the board. It is based on an Atmel microcontroller, and mounted on the back-side of the PCB. Its function is to monitor module functions such as power, temperature, and hot swap requests via the ejector handle and report these to the base controller in the enclosure. It also stores information about the module including serial number and E-Keying. 'S1' marks inlet temperature sensor. 'S2' marks board temperature sensor.

## 3.6 Operating System Support

The SB-AMC59 requires no special software to operate beyond the driver distributed by Intel for the 82580 Ethernet controllers. Available d major operating system drivers are as shown in Table 5.

**Table 5. Operating System Support**

<b>Operating System</b>	<b>Versions (both IA32 and X64)</b>
FreeBSD	7.2, 8.0
Windows®	Vista® SP2, Server 2003 SP2, Server 2008 SP2, Windows 7
Red Hat® Enterprise Linux (RHEL)	4.8, 5.4
Linux SLES	10 SP3, 11
Linux Stable Kernel	2.6

## 4 Connector Pin Assignments

This chapter provides connector pin assignments for SB-AMC59. This module is AMC.1 compliant and uses ports defined in these specifications.

### 4.1 SB-AMC59 Port Assignments

The SB-AMC59 AMC modules plug into ATCA carrier blades and uTCA backplanes that support AMC.1 (PCI Express) signaling.

**Table 6 I/O Ports Available On AMC Connector**

AMC I/O	Description
Port 4	5.0 or 2.5 Gb PCI Express, Receive and transmit pairs
Port 5	5.0 or 2.5 Gb PCI Express, Receive and transmit pairs
Port 6	5.0 or 2.5 Gb PCI Express, Receive and transmit pairs
Port 7	5.0 or 2.5 Gb PCI Express, Receive and transmit pairs
MMC device	Serial IPMI management bus

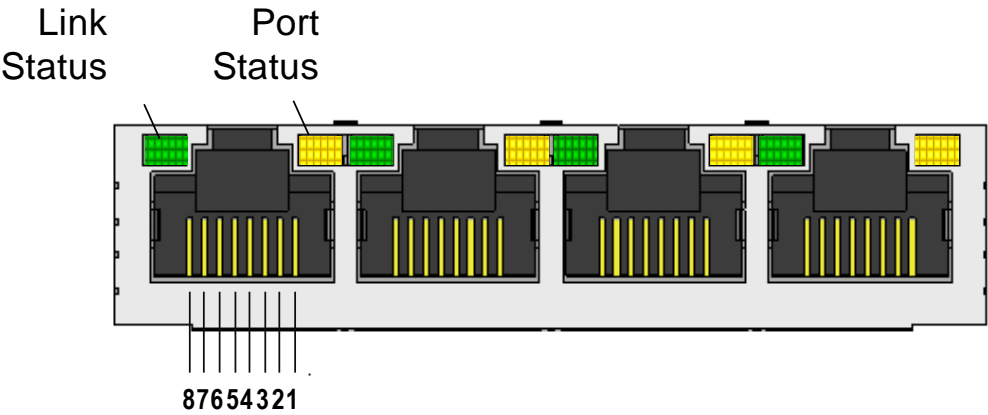
### 4.2 1000Base-T Ethernet Ports

Four Ethernet ports are provided on the front panel of the AMC that offer an RJ-45 style shielded connector (ganged 4x MAG45 Tyco 6610068-6) with embedded magnetics, power protection circuits and LEDs. Each of these ports route to an Intel® 82580 Ethernet controller, and accessed by the front blade via PCI express signaling. Each port auto negotiates to 10/100/1000BASE-T.

**Table 7 10/100/1000 Management Port Connector Pin Assignments**

Pin	Signal Name	Pin	Signal Name
1	LAN0_A+	5	LAN0_C-
2	LAN0_A-	6	LAN0_B-
3	LAN0_B+	7	LAN0_D+
4	LAN0_C+	8	LAN0_D-

Connector Pin Assignments



### 4.3 AMC Connector, “Finger” Assignments

The SB-AMC59 includes an AMC connector, which conforms to the single slot B+ extended connector, with 170 signal contacts.

**Table 8 SB-AMC59 Module Edge, Pin Assignments**

Pin#	Signal Name	Pin#	Signal Name	Pin#	Signal Name	Pin#	Signal Name
1	GND	44	'PCle_TX0_P'	86	GND	129	No Connect
2	12V	45	'PCle_TX0_N'	87	No Connect	130	No Connect
3	'PRSNT1_L'	46	GND	88	No Connect	131	GND
4	'AMC_VCC3'	47	'PCle_RX0_P'	89	GND	132	No Connect
5	GA0	48	'PCle_RX0_N'	90	No Connect	133	No Connect
6	No Connect	49	GND	91	No Connect	134	GND
7	GND	50	'PCle_TX1_P'	92	GND	135	No Connect
8	No Connect	51	'PCle_TX1_N'	93	No Connect	136	No Connect
9	12V	52	GND	94	No Connect	137	GND
10	GND	53	'PCle_RX1_P'	95	GND	138	No Connect
11	No Connect	54	'PCle_RX1_N'	96	No Connect	139	No Connect
12	No Connect	55	GND	97	No Connect	140	GND
13	GND	56	'IPMI_SCL_L'	98	GND	141	No Connect
14	No Connect	57	12V	99	No Connect	142	No Connect
15	No Connect	58	GND	100	No Connect	143	GND
16	GND	59	'PCle_TX2_P'	101	GND	144	No Connect
17	GA1	60	'PCle_TX2_N'	102	No Connect	145	No Connect
18	12V	61	GND	103	No Connect	146	GND
19	GND	62	'PCle_RX2_P'	104	GND	147	No Connect
20	No Connect	63	'PCle_RX2_N'	105	No Connect	148	No Connect
21	No Connect	64	GND	106	No Connect	149	GND
22	GND	65	'PCle_TX3_P'	107	GND	150	No Connect
23	No Connect	66	'PCle_TX3_N'	108	No Connect	151	No Connect
24	No Connect	67	GND	109	No Connect	152	GND
25	GND	68	'PCle_RX3_P'	110	GND	153	No Connect
26	GA2	69	'PCle_RX3_N'	111	No Connect	154	No Connect
27	12V	70	GND	112	No Connect	155	GND
28	GND	71	'IPMI_SDA_L'	113	GND	156	No Connect
29	No Connect	72	12V	114	No Connect	157	No Connect
30	No Connect	73	GND	115	No Connect	158	GND
31	GND	74	No Connect	116	GND	159	No Connect
32	No Connect	75	No Connect	117	No Connect	160	No Connect
33	No Connect	76	GND	118	No Connect	161	GND
34	GND	77	No Connect	119	GND	162	No Connect
35	No Connect	78	No Connect	120	No Connect	163	No Connect
36	No Connect	79	GND	121	No Connect	164	GND
37	GND	80	PREFCLKP	122	GND	165	No Connect
38	No Connect	81	PREFCLKN	123	No Connect	166	No Connect
39	No Connect	82	GND	124	No Connect	167	No Connect
40	GND	83	'PRSNT0_L'	125	GND	168	No Connect
41	'AMC_ENABLE_L'	84	12V	126	No Connect	169	No Connect
42	12V	85	GND	127	No Connect	170	GND
43	GND			128	GND		



## 5 Specifications

This chapter contains the environmental and mechanical specifications for the SB-AMC59.

### 5.1 Physical Dimensions

The SB-AMC59 module board is 7.11 inches x 2.89 inches and conforms to the component height requirements of a Mid size module and can also be configured as a Full size module. PCI Express x4 connections are made through the AMC edge fingers. (See section 1.3 Products Supported by this Manual).

#### 5.1.1 Weight

The weight of the SB-AMC59 baseboard is **145g (5.1 oz)**. The weight of the board with packaging is 355g kg (12.5 oz).

#### 5.1.2 Power Requirements **(need update)**

The SB-AMC59 shall consume no more than the following from the system supplies under normal operating conditions.

**Table 9 Power Requirements**

Part number(s)	SB-AMC59M SB-AMC59F
Management Power (MP)	100mA
+12V (spin up < 8secs)	Not applicable
+12v normal operating	0.3A (3.6W)
+12v (idle)	0.2A (2.4W)
OFF STATE	LESS THAN 0.4W

### 5.2 EMC Compliance

This product was tested in an EMC-compliant chassis and meets the requirements for EN55022 Class A equipment. Compliance was achieved under the following conditions:

- Conductive chassis rails connected to earth ground, providing the path for connecting shields to earth ground
- Front panel screws properly tightened

For minimum RF emissions, it is essential that the conditions above be implemented. Failure to do so could compromise the EMC compliance of the equipment containing the module.

**Table 10 EMC Emission Compliancy**

<b>Description</b>	<b>Description</b>
US: FCC 47 CFR Part 15 Class A	FCC Class A emissions requirements (United States)
ICES-003 2004 Class A	Class A Interference-causing Equipment standard (Canada)
VCCI V-3/2007.04 Class A	Class A ITE emissions requirements (Japan)
Europe Commercial: EN5022:2006 Class A, ITE	Class A ITE emissions requirements (EU, Europe)
AS/NZS CISPR 22:2005 Class A, ITE	Class A ITE emissions requirements (Australia)
Europe Commercial: EN 55022:1998/A1:2000/A2:2003	Immunity for ITE equipment
Europe Commercial: EN 55024:1998A1:2001/A2:2003	Immunity for ITE equipment
Europe Commercial: EN 61000-4-2,3,4,5,6 ,11: 2001	EMC Electrostatic discharge immunity
Europe Commercial: EN6100-3-2, 2000 Section 2	With A2 (2005) Limits for harmonic current emissions
Europe Commercial: EN6100-3-3, 2000 Section 3	With A2 (2005) limits for voltage fluctuations and flicker

### 5.2.1 Reliability (MTBF)

The MTBF (Mean time between failures) for the SB-AMC59 was calculated using Telcordia SR-332, Issue 2, parts count method.

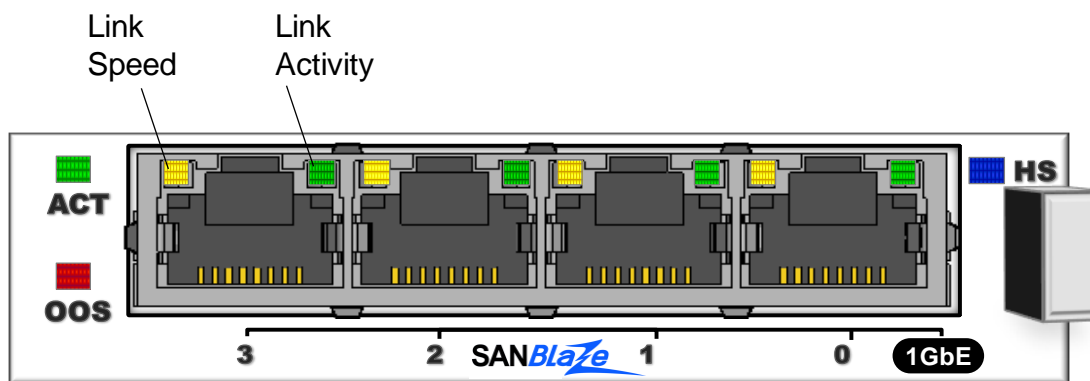
**Table 11 MTBF**

<b>Part number(s)</b>	<b>SB-AMC59M SB-AMC59F</b>
MTBF	1,710,972 hrs @25C.

## 6 Front Panel Indicators

The faceplate of the SB-AMC59 module has 11 LED indicators. The figure and table that follows describes the function of each.

**Figure 6. AMC Front Panel Indicators**



**Table 12 Led Function**

Indicator	Color	State	Function
Hot Swap (HS)	BLUE	On	Management power available to the module and the module can safely be extracted
		Off	The module is operational and is unsafe for extraction
		Long Blink	Delay before module is activated
		Short Blink	Delay before module is de-activated
Fault or “Out of Service” (OOS)	RED	On	Module Fault set by Shelf manager or 12V payload power not detected.
		Off	No module fault 12V payload power is being supplied to board
Module Active(ACT) and “in service”	GREEN	On	12V payload power is being supplied to board
		Off	12V payload power is not detected
1000BASE-T			
Ethernet Link Activity	GREEN	On	Port is enabled, idle
	BLINK	On	Port Activity
	NONE	Off	No Link (port Disabled)
Ethernet Link Speed	AMBER	On/Blink	Indicates negotiated Link speed is 1000Mb
	GREEN	On/Blink	Indicates negotiated Link speed is 100Mb
	None	OFF	Indicates negotiated Link speed is 10Mb

## 7 IPMI functions list

The SB-AMC59 module employs a Module Management Controller (MMC) as specified in the AMC.0 specification. The MMC provides an Intelligent Platform Management Interface (IPMI) which will communicate with the AdvancedTCA and uTCA shelf managers. This MMC controls and monitors the following:

- Hot Swap communication with the shelf manager
- Inlet air temperature
- Voltage monitoring
- Electronic Keying as described in the AMC.0 specification
- FRU information
- Drives LED indicators for Hot Swap. OOS (out of service)

### 7.1 IPMI and Management Controller (IPMC)

The design features an IPMI controller consisting of a 16-bit microcontroller, flash and SRAM. The microcontroller uses I<sup>2</sup>C interface to communicate the shelf management controller (ShMC), and sensors and MMC devices on AdvancedMC modules.

- Support hot-swap operation as defined for AMC modules in PICMG AMC.0 specification “Fail-safe flash update” - if interrupted at anytime, the MMC firmware is still able to respond and re-flash.
- “I2C hang recovery” - able to detect and recover from an I2C bus hang.

### 7.2 Sensor Data Records

The MMC monitors the status of the module and provides this data so the shelf manager can read it. Below are the SDRs that the SB-AMC59 module creates.

**Table 13 Sensor Data Records (Preliminary)**

Sensor	UNR	UC	UNC	LNC	LC	LNR	ID String
1.0	1.1	1.07	1.05	0.95	0.93	0.90	+1.0V
1.8	1.98	1.926	1.89	1.71	1.674	1.62	+1.8V
2.5	2.901	2.806	2.711	2.306	2.211	2.104	+2.5V
3.3V	3.605	3.505	3.462	3.162	3.105	3.005	+3.3V
5.0V	5.514	5.367	5.269	4.754	4.656	4.509	+5V
12V	13.603	13.438	13.053	11.018	10.633	10.412	+12V
Board Temp (LM75)	60.740	70.160	81.150	N/A	N/A	N/A	Board Temp
Inlet Temp (LM60)	50.000	60.000	70.000	N/A	N/A	N/A	Inlet Temp

The SB-AMC59 includes the standard FRU data records per the IPMI Platform Management FRU Information Storage Definition, Board Info Area. The SB-AMC59 includes additional FRU records as defined in the PICMG 2.9 specification.

**Table 14 Standard FRU Data Records**

Board Information	SB-AMC59
Version	1
Language Code	0 (EN-English)
MFG date.time	See note *1
Manufacturer Name	SANBlaze Technology, Inc.
Product Name	SB-AMC59
Product Serial Number	059LYMMSSSS (See note *2)
Product Part / Model#	SB-AMC59
Product Version	00

\*1. Manufacturing time is defined as 'minutes since 1/1/96' in the IPMI FRU spec.

\*2. Serial Number format: 059LYMMSSSS

059 = part code (denotes SB-AMC59)

L= manufacturing location

Y=year (decimal, 0=2010, 1=2011)

MM=month (decimal: 01=JAN, 10=OCT)

SSSS=sequence number (0-9999)

## 7.2.1 AMC Port Assignments

The SB-AMC59 provides connections on the AMC connector. These conform to the AMC.1 specification for PCI Express. The link type and link type extension are defined in the table below.

**Table 15 SB-AMC59 E-Key Port Assignments (Preliminary)**

Port #	Port Name	Link type	AMC port map region
0-3	unused		
4-7	Channel 2	Link type 2 = AMC.1 PCI express type=4	Common Options
4	Channel 3	Like type 2 = AMC.1 PCI express type 1	
8-20	unused		

## 7.3 Supported IPMI Commands

The MMC communicates with the carrier controller through the local IPMB-L bus of the carrier and responds to all mandatory commands for AMC Module Management Controllers (as defined in the AMC Specification), as well as some optional ones.

**Table 16 Supported IPMI Commands**

Command	IPMI/PICMG /AMC Spec	NetFn	CMD	MMC Req
<b>IPM Device “Global” Commands</b>				
Get Device ID	17.1	App	01h	Mandatory
Broadcast “Get Device ID”	17.9	App	01h	Mandatory
<b>Messaging Commands</b>				
Send Message	18.7	App	34h	Optional
<b>Event Commands</b>				
Platform Event	23.3	S/E	02h	Mandatory
<b>Sensor Device Commands</b>				
Get Device SDR Info	29.2	S/E	20h	Mandatory
Get Device SDR	29.3	S/E	21h	Mandatory
Reserve Device SDR Repository	29.4	S/E	22h	Mandatory
Get Sensor Reading Factors	29.5	S/E	23h	Optional
Set Sensor Hysteresis	29.6	S/E	24h	Optional
Get Sensor Hysteresis	29.7	S/E	25h	Optional
Set Sensor Threshold	29.8	S/E	26h	Optional
Get Sensor Threshold	29.9	S/E	27h	Optional
Set Sensor Event Enable	29.10	S/E	28h	Optional
Get Sensor Event Enable	29.11	S/E	29h	Optional
Rearm Sensor Events	29.12	S/E	2Ah	Optional
Get Sensor Event Status	29.13	S/E	2Bh	Optional
Get Sensor Reading	29.14	S/E	2Dh	Mandatory
<b>FRU Device Commands</b>				
Get FRU Inventory Area Info	28.1	Storage	10h	Mandatory
Read FRU Data	28.2	Storage	11h	Mandatory
Write FRU Data	28.3	Storage	12h	Mandatory
<b>AdvancedTCA™ Commands</b>				
Get PICMG Properties	3-9	PICMG	00h	Mandatory
FRU Control	3-22	PICMG	04h	Mandatory
Get FRU LED Properties	3-24	PICMG	05h	Mandatory
Get LED Color Capabilities	3-25	PICMG	06h	Mandatory
Set FRU LED State	3-26	PICMG	07h	Mandatory
Get FRU LED State	3-27	PICMG	08h	Mandatory
Get Device Locator Record ID	3-29	PICMG	0Dh	Mandatory
<b>AMC® Commands</b>				
Set AMC Port State	3-27	PICMG	19h	Mandatory
Get AMC Port State	3-28	PICMG	1Ah	Mandatory

## 8 IPMI Firmware Upgrade Procedure

This chapter provides the instruction for upgrading the IPMC (Intelligent Platform Management controller) firmware. If the SB-AMC59 requires new firmware, an upgrade can be performed remotely using a LAN connection to the self manager.

### 8.1 The `ipmitool` utility

Firmware upgrades are accomplished with **ipmitool**, a utility for managing IPMI-enabled devices. The utility is an open source derivative which is modified by the shelf management supplier.

The SB-AMC59 keeps a redundant copy of the firmware in the FLASH. Upgrades are reliable and reversible. A failure in the download (error or interruption) does not disturb the IPMC's ability to continue using the "old" firmware or its ability to restart the download process. The IPMC automatically fails back to the previous firmware if there is a problem when first running new code.

#### SYNOPSIS

The minimum information to complete a firmware upgrade is documented here.

```
$ ipmitool [-I|-H|-T|-B|-t|-b] hpm upgrade <firmware_file>
$ ipmitool [-I|-H|-T|-B|-t|-b] hpm activate
```

#### DESCRIPTION

**ipmitool** lets you manage Intelligent Platform Management Interface (IPMI) functions of either a local or remote system using IPMI V1.5 and IPMI v2.0. Capabilities include printing FRU information, LAN configuration, sensor readings, and remote chassis power control.

#### OPTIONS

Table 17 `ipmitool` options relevant to firmware upgrades

Option	Description
<b>-I</b> <interface>	Selects IPMI interface to use. Supported interfaces that are compiled in are visible in the usage help output. Use <b>lan</b> to designate Ethernet.
<b>-H</b> <address>	Remote server address, can be IP address or hostname. This option is required for <i>lan</i> interfaces.
<b>-T</b> <address>	If updating an AMC, use to specify the address and Bus ID of the carrier that holds the AMC. These entries are not needed when updating the carrier alone.
<b>-B</b> <bus id>	
<b>-t</b> <address>	IPMB-L address of the target MMC or Carrier
<b>-b</b> <bus id>	Bus ID of the target MMC or Carrier (use 0 for a carrier, 7 for an AMC/RTM)

## COMMAND SYNTAX EXAMPLES

**EXAMPLE 1.** The following example shows the command sequence for firmware upgrade of an AMC installed on a carrier:

```
$ ipmitool -I lan -H 192.168.0.2 -T 0x82 -B 0 -t 0x74 -b 7 hpm upgrade  
hpm1fw.img  
$ ipmitool -I lan -H 192.168.0.2 -T 0x82 -B 0 -t 0x74 -b 7 hpm activate
```

Line 1 puts the new firmware in the flash device, where **hpm1fw.img** is the image.  
Line 2 is used to dynamically load and activate the new firmware.

**EXAMPLE 2.** The following example shows the command performing firmware upgrade on the carrier itself:

```
$ ipmitool -I lan -H 192.168.0.2 -t 0x82 -b 0 hpm upgrade hpm1fw.img  
$ ipmitool -I lan -H 192.168.0.2 -t 0x82 -b 0 hpm activate
```

Line 1 puts the new firmware in the flash device, where **hpm1fw.img** is the image.  
Line 2 is used to dynamically load and activate the new firmware.



## 9 End-User License Agreement for Software

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SOFTWARE PRODUCT and the upgrades any transfer must include all prior versions of the SOFTWARE PRODUCT and the upgrade.

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# 10 PRODUCT WARRANTY

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## 10.1 Limited Software Warranty

SANBlaze Technology, Inc. (“SANBlaze”) warrants to only the original licensee that the Software, when properly installed in conjunction with the SANBlaze product, will perform substantially in accordance with SANBlaze’s specifications contained in SANBlaze’s documentation provided with the Software (“SANBlaze’s Documentation”) for a period of 60 days from the date of the original licensing. Furthermore, SANBLAZE warrants that the media upon which the software is stored is free from defects of material or workmanship for a period of 60 days. If the software should fail to perform substantially in accordance with SANBlaze’s Documentation or if there is a defect on the media during the warranty period, SANBLAZE will use reasonable commercial efforts to correct any failure of the software to perform substantially in accordance with SANBlaze’s Documentation and will replace any defective media when the defective media is returned to SANBLAZE by the original licensee. The remedy for breach of this warranty shall not cover any other damages, including but not limited to the loss of data, profit, special, incidental, consequential, and other similar claims.

## 10.2 Limited Hardware Warranty

SANBLAZE warrants to only the original licensee that the SANBlaze product is free of defects in materials and workmanship under normal use for a period of one year from the date of purchase. In the event of a defect in SANBlaze product material or workmanship during such warranty period, SANBLAZE, at its discretion, will repair or replace the defective product when the defective product is returned to SANBLAZE by the original licensee. The remedy for this breach of warranty is limited to replacement only and shall not cover any other damages, including but not limited to the loss of data, profit, special, incidental, consequential, and other similar claims.

If the SANBlaze product is found to be defective, SANBLAZE, at its option, agrees to replace or repair the SANBlaze product at no charge except as stated below, provided that the original licensee delivers the SANBlaze product with a return material authorization (RMA) number and a dated proof of purchase. The original licensee assumes the risk of damage or loss in transit. The original licensee must use the original container (or equivalent) and pay the shipping charge.

SANBLAZE may replace or repair the product with new or reconditioned parts, and the replacement parts or product become the property of SANBLAZE. SANBLAZE warrants the repaired or replaced parts or product to be free from defects in material or workmanship for a period of the greater of (i) ninety (90) days from the return shipping date of the repaired or replaced product, or (ii) the period of time remaining on the original three year warranty.

Before returning any product, contact SANBlaze’s Technical Support (for telephone numbers and addresses, see the Technical Support section of this document). If SANBlaze’s Technical Support verifies that the product is defective, the Return Authorization Department will issue an RMA number to place on the package containing the SANBlaze product. SANBLAZE will not accept any SANBlaze product that does not include an RMA number on the package.

### 10.3 Limitations

**EXCEPT FOR THE WARRANTIES STATED IN THIS LIMITED PRODUCT WARRANTY, SANBLAZE SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESSED OR IMPLIED INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SANBLAZE BE LIABLE FOR ANY LOSS OF DATA, PROFIT OR ANY COMMERCIAL DAMAGE, INCLUDING BUT NOT LIMITED TO SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES. SOME STATES/COUNTRIES DO NOT ALLOW THE LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, IN WHICH CASE THE ABOVE LIMITATION MAY NOT APPLY TO YOU.**