



LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

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BIOS Settings for aLIGO Front-end Computers

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LIGO Scientific Collaboration

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1 Introduction

This document details how to set the BIOS settings correctly for computers used on front-end systems in aLIGO.

2 Scope

This document will only cover the SuperMicro computers used for the installation of aLIGO from 2010 through 2013.

3 Overview

The aLIGO front-end systems for real-time control of interferometer elements utilize a commercially-available computer from SuperMicro. These computers were chosen because they had sufficient PCIe adapter ports and a BIOS that supported the large number of PCIe ports on the IO Expansion Chassis that houses the ADC, DAC and Binary I/O adapters. Currently these computers have a SuperMicro X8DTU motherboard.

The control software for each real-time model on a front-end computer runs in a separate core. To minimize system interrupts to these real-time processes, the BIOS on each computer must be set to disable such things as USB interrupts, hyper-threading, etc.

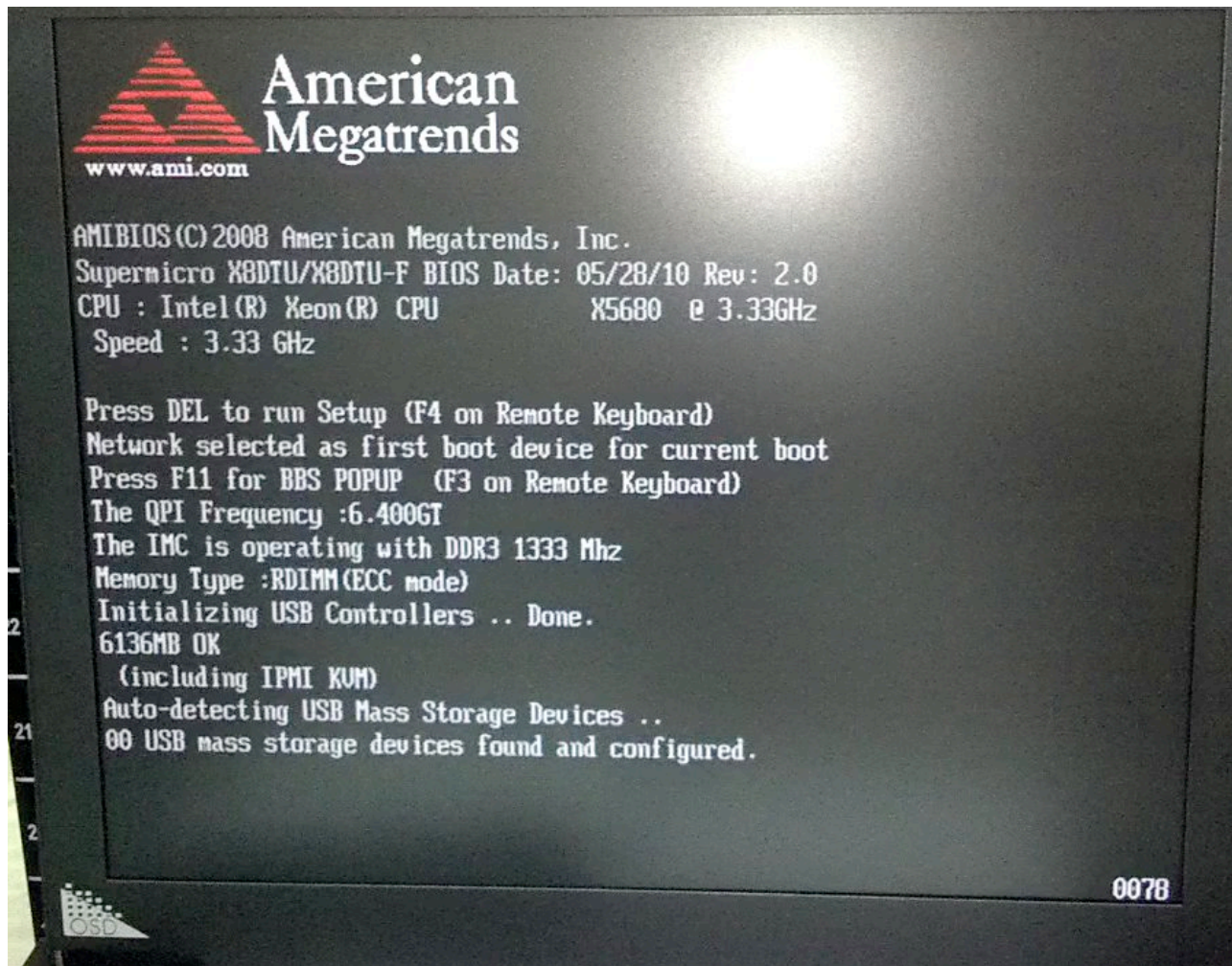
The following details how this is done, using sets of screen shots to illustrate the correct settings

4 BIOS variants

As the front-end computers were acquired over a period of time, the BIOS versions are not presently identical on all computers. The first step is to identify the BIOS version using the boot-up splash screen. The following shows screen shots to help with that identification

4.1 BIOS rev 2.0

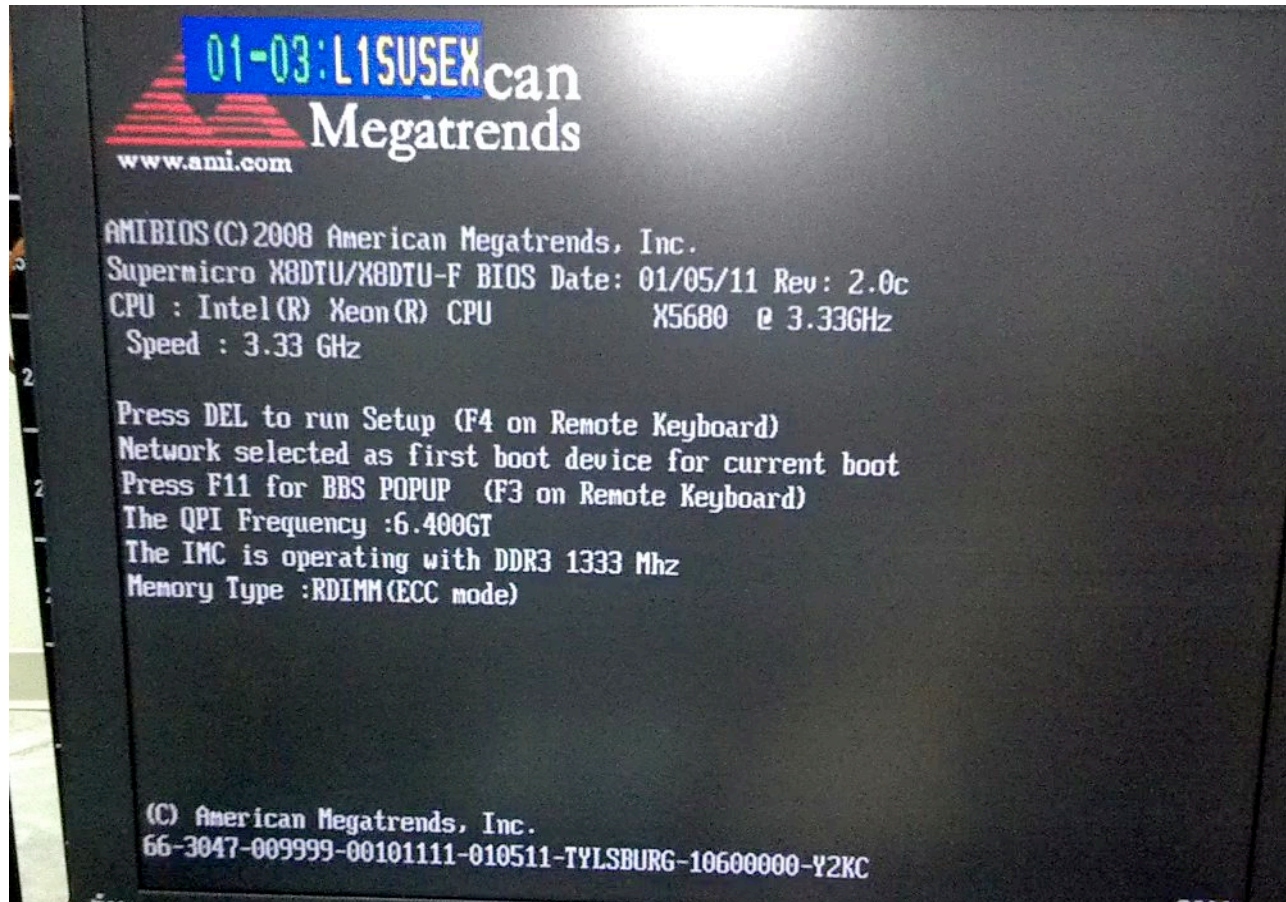
This revision is dated 5/28/10 and is on the earliest front-end computers (the bulk of the L1 front-ends). Here is a screen shot



There is a later V2.0a revision that appears to follow this same setup.

4.2 BIOS rev 2.0c

This revision is dated 1/05/11. These are from a later purchase (the bulk of H1 front-ends)



5 BIOS Settings

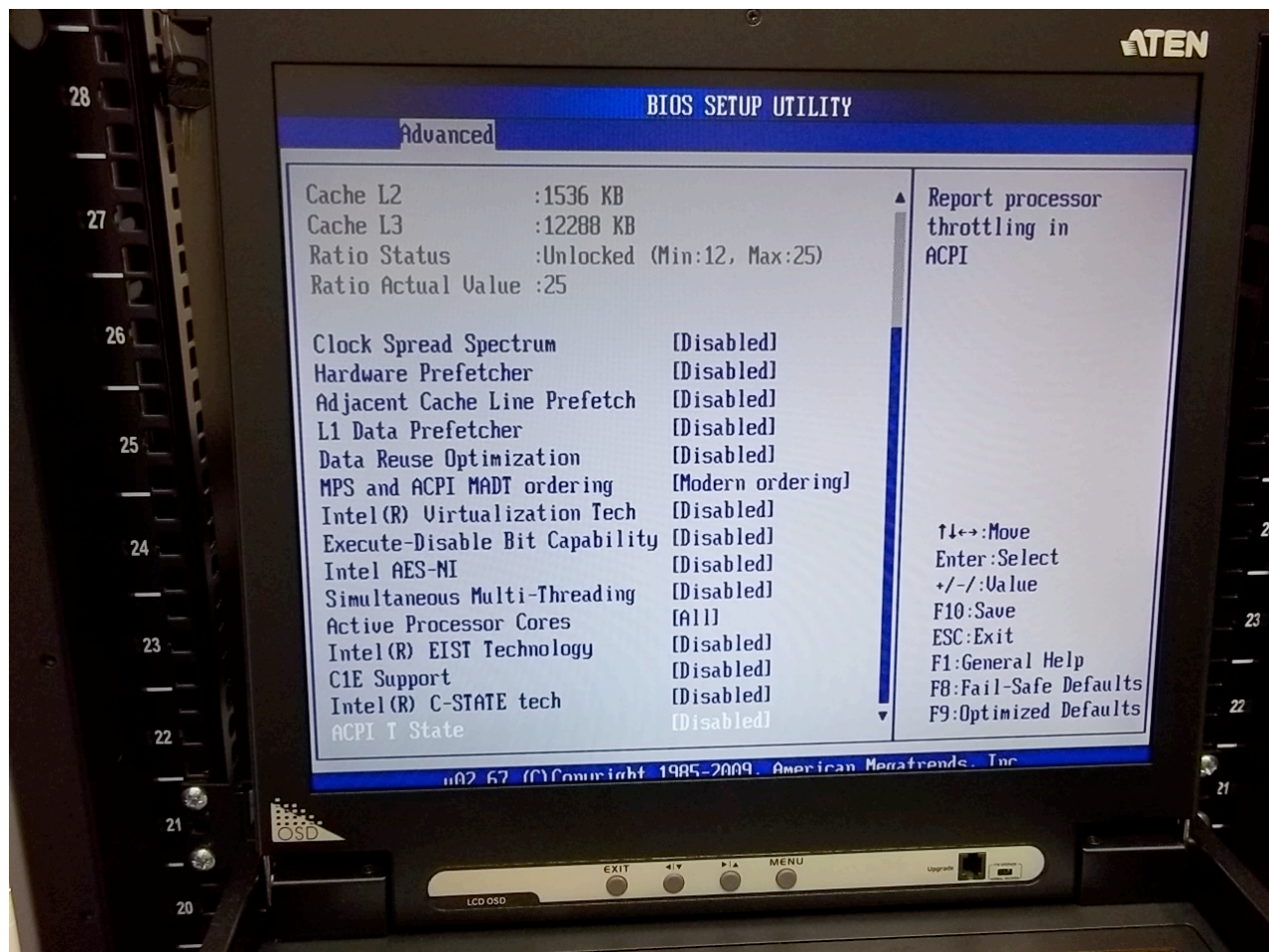
Once the BIOS version is known, we can customize the settings. The DEL key during boot-up will gain access to the BIOS settings screens.

One can start by setting to good defaults using ‘Reset BIOS to safe defaults’ feature.

After that, we only need to change settings on a few screens, as detailed below. Note that the SuperIO screen is different for the two BIOS versions

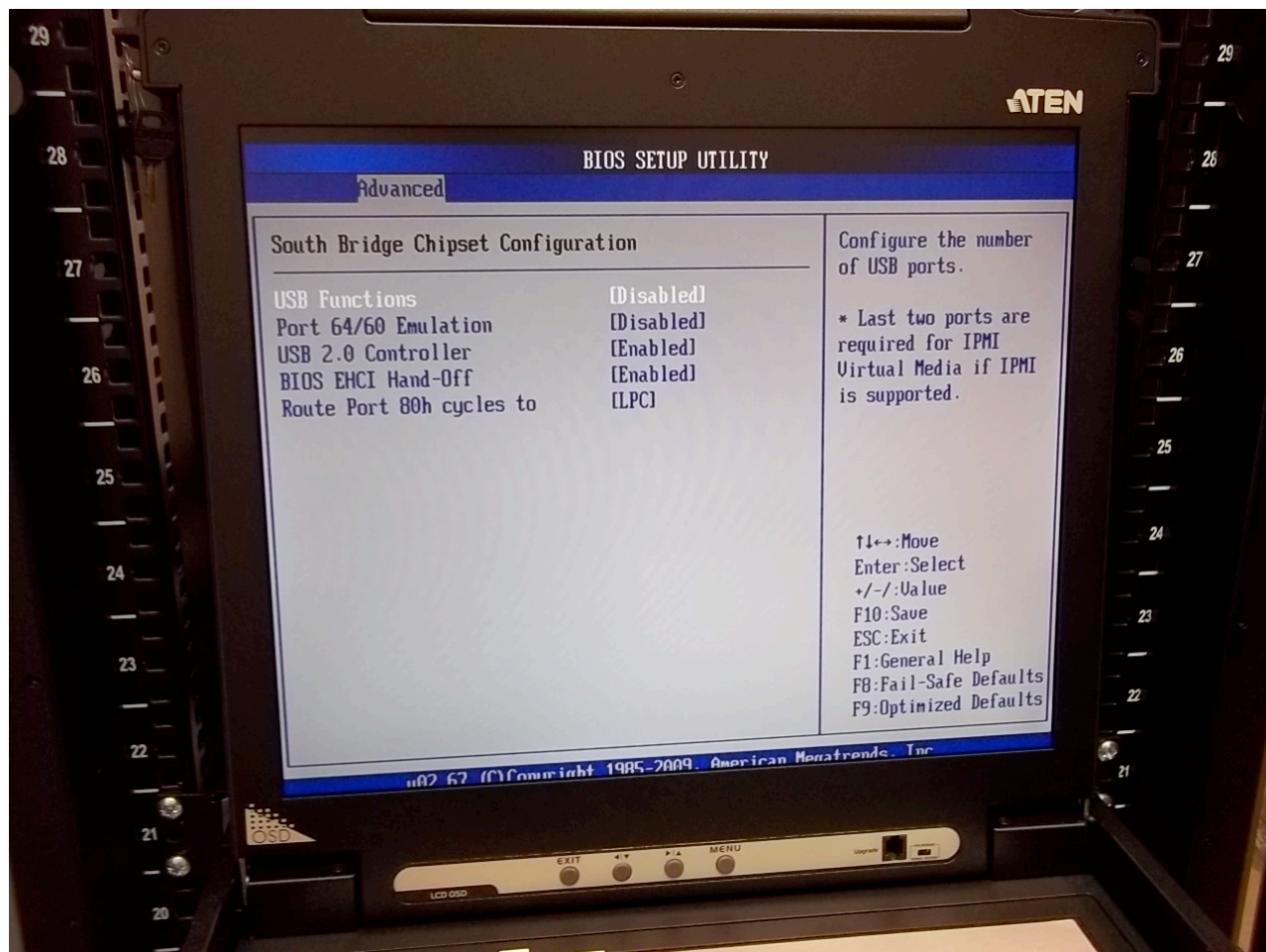
5.1 BIOS Advanced screen

On the BIOS Advanced screen, we disable nearly everything, except Active Processor Cores and MPS ordering. In particular, the Simultaneous Multi-Threading is disabled to turn off hyperthreading.



5.2 BIOS Advanced South Bridge screen

On the BIOS Advanced South Bridge screen, we disable the USB functions. This is why we use the PS/2 ports for the KVM connection. However we leave the USB 2.0 Controller enabled.

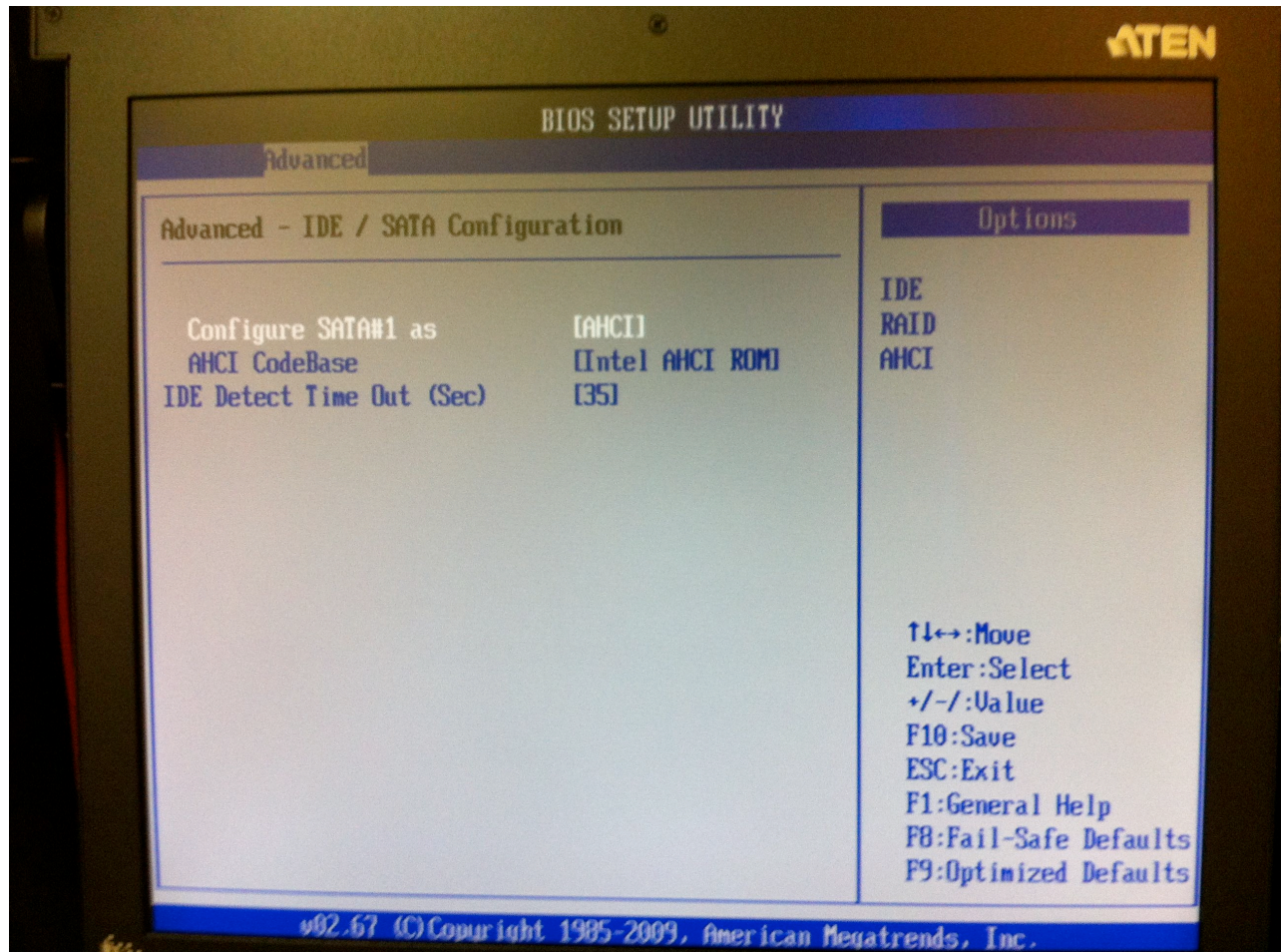


5.3 BIOS Advanced IDE/SATA screen

The BIOS Advanced IDE / SATA screen is different for the two versions.

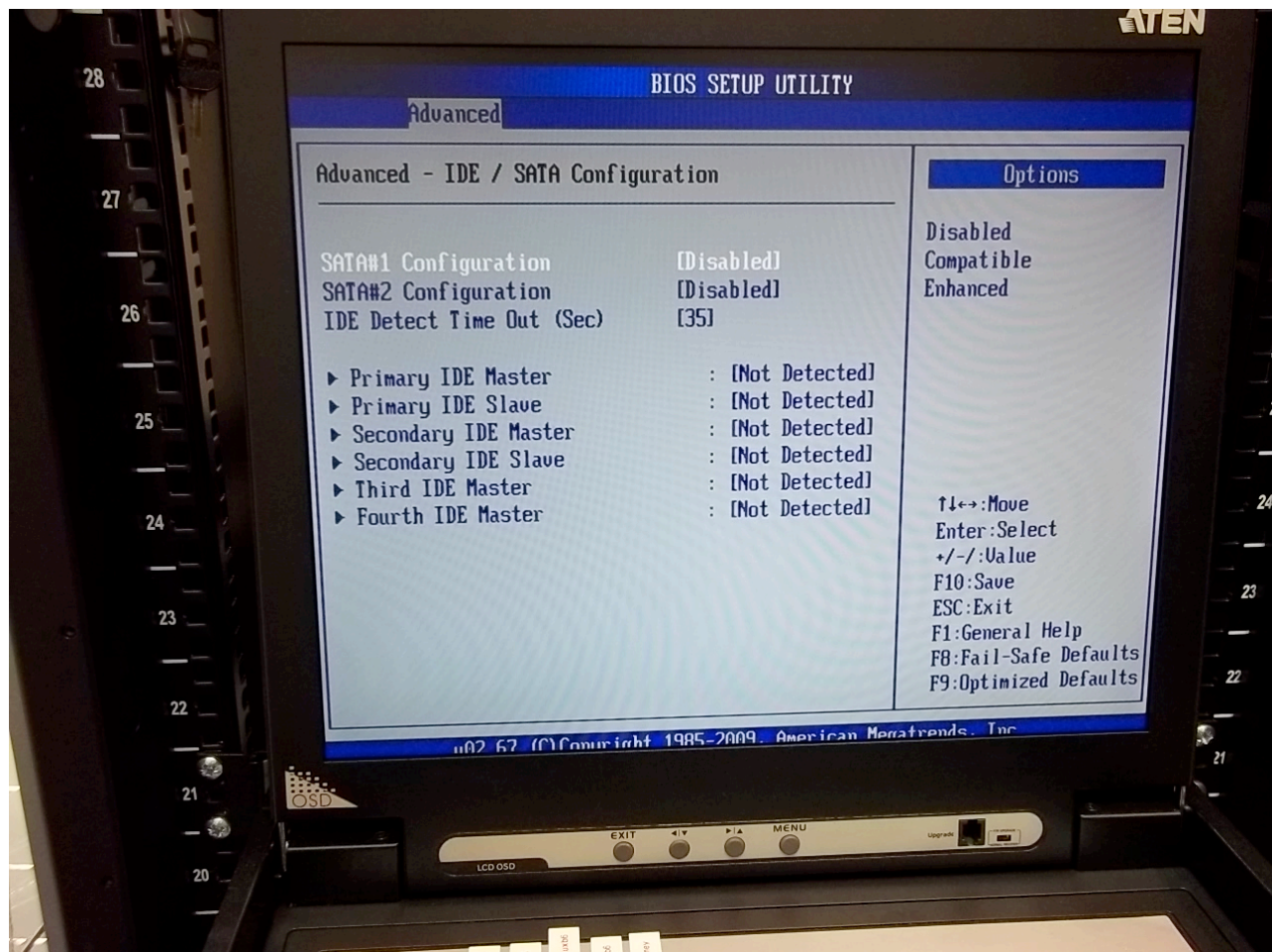
5.3.1 IDE/SATA screen for Rev 2.0

For Rev 2.0, the screen can stay as is, with SATA#1 as AHCI



5.3.2 IDE/SATA screen for Rev 2.0c

For Rev 2.0c, we disable the SATA#1 and SATA#2 configurations as we are diskless.

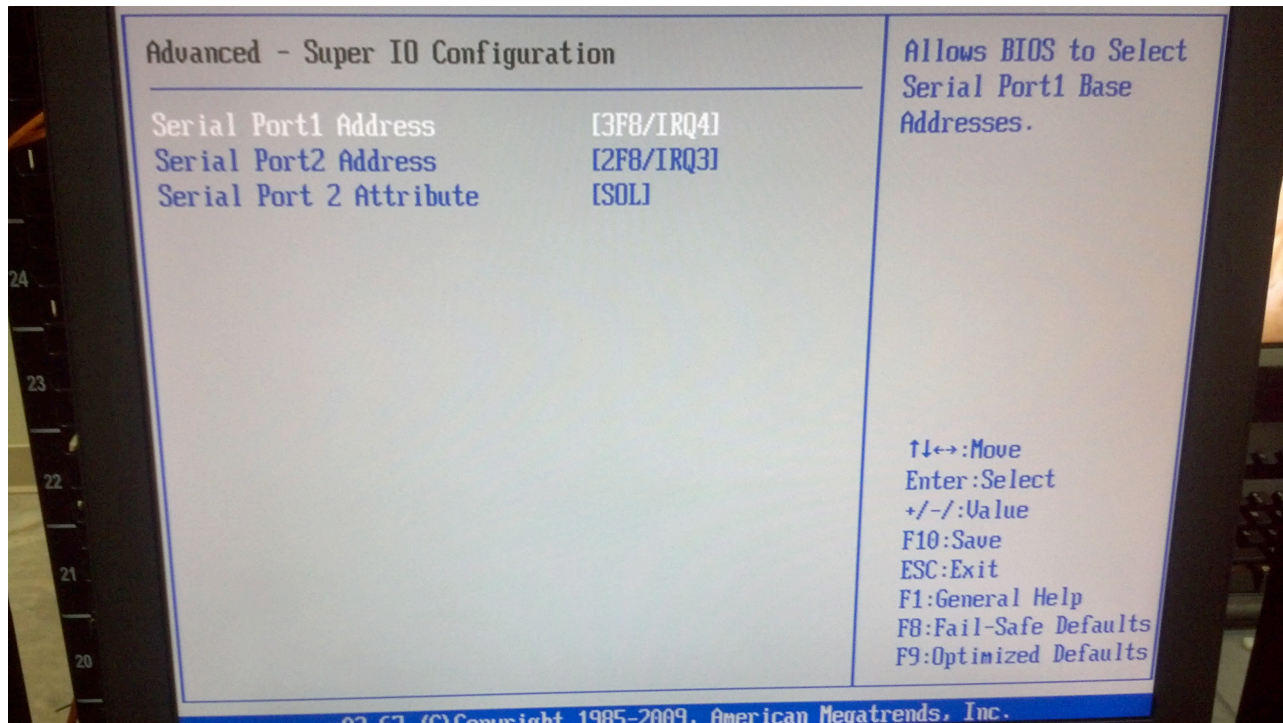


5.4 BIOS Advanced SuperIO screen

The BIOS Advanced SuperIO screen is different for the two versions.

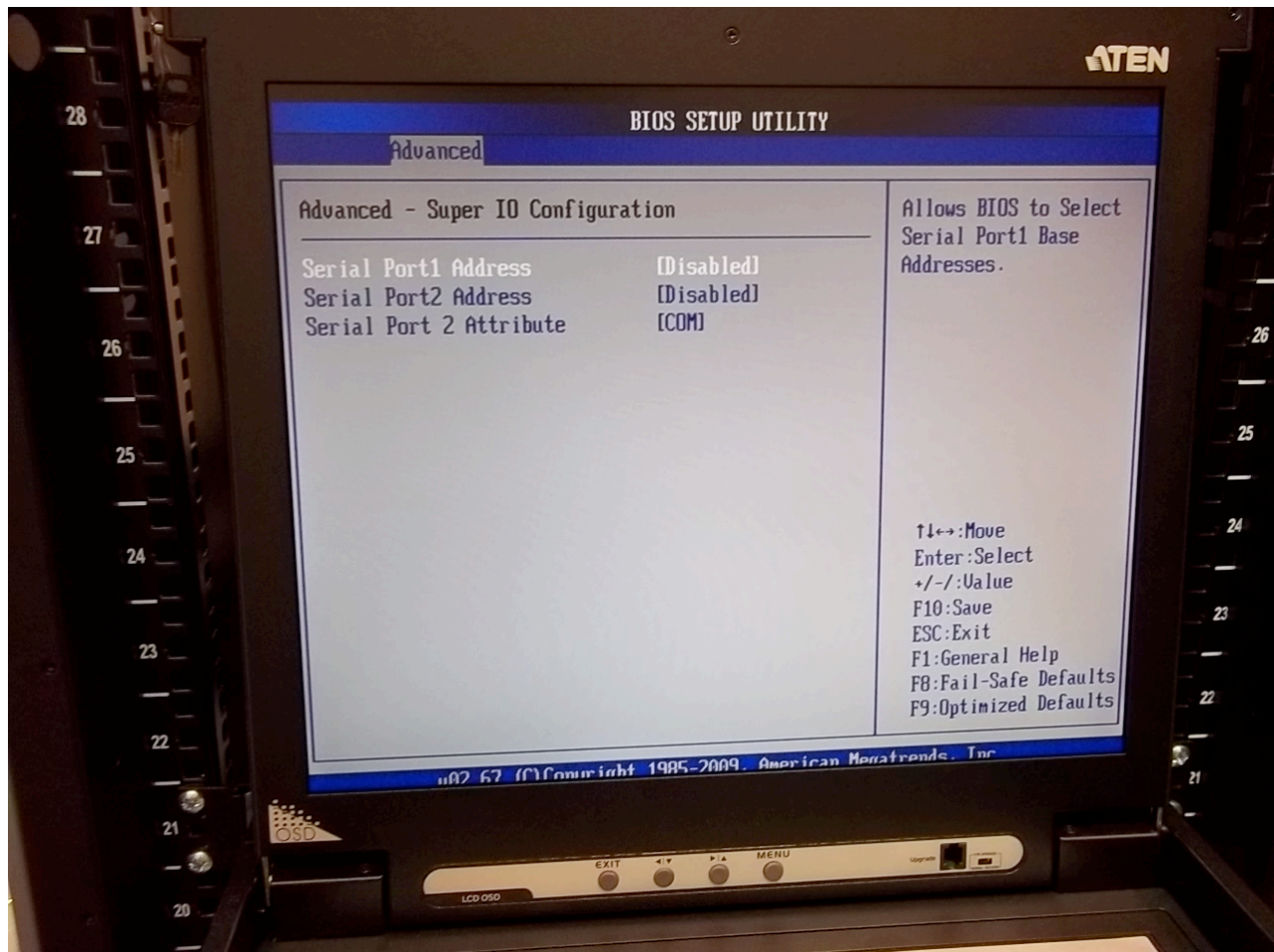
5.4.1 SuperIO for BIOS V2.0

For BIOS version V2.0, we need to leave the COM ports active or the PXE boot feature will not work.



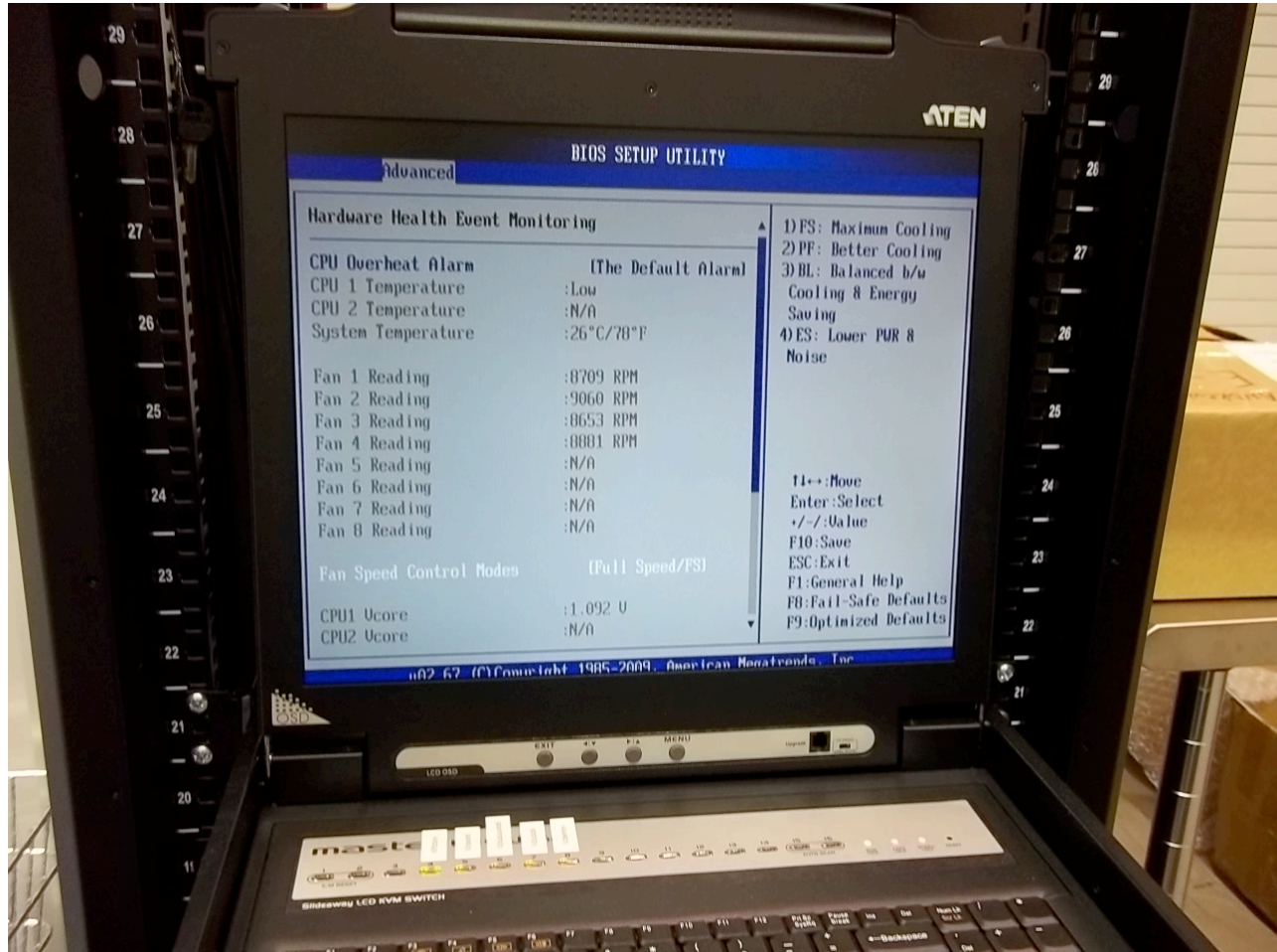
5.4.2 SuperIO for BIOS V2.0c

For BIOS version V2.0c, we can turn the COM ports off



5.5 BIOS Advanced Hardware Health screen

On the Advanced Hardware Health screen, we set the Fan Speed Control Mode to Full Speed to maximize cooling.



5.6 BIOS IPMI LAN Configuration

On the IPMI LAN Configuration screen, we change it from DHCP to Static. We then set a fixed IP that puts in on the Admin LAN. This also prevents the IPMI board from attempting to send DHCP request broadcasts out all the other Ethernet ports.

