THEMIS

User Manual

NanoSWITCH™

Layer 3 Gigabit Ethernet Switch
for Networked Systems in Demanding Applications

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Layer 3 Gigabit Switch for Networked Systems

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Version 1.0— May 2013

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TRADEMARKS and SERVICEMARKS

CE Marking

This product complies with the European EMC Directive (2004/108/EC) and the European Low Voltage Safety Directive (2006/95/EC)/.

Safety Precautions

Instructions regarding safety precautions during installation, operation, or maintenance of the equipment are given in the section entitled “Safety Instructions” on page iv.

WARNINGS and CAUTIONS

The definitions of WARNINGS and CAUTIONS as used in this document are given in the Preface in the section entitled “Notes, Cautions, Warnings, and Sidebars”.

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Safety Instructions

To maximize user safety and ensure correct device operation, all instructions contained in this section should be read carefully.

Caution: It is important that the user observe all warnings and instructions that are on the device and contained in this manual.

- The device must be used in accordance with the instructions for use.
- Make sure the device has adequate ventilation.
- The device is no longer safe to operate when
  - — the device has visible damage or
  - — the device no longer functions.
- In these cases, the device must be shut down and secured against unintentional operation.
- Repairs may only be carried out by a person authorized by Themis Computer.
- If extensions are made to the device, the legal stipulations and the device specifications must be observed.

Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

1. Transport boards in static-safe containers such as boxes or bags.
2. Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
3. Always be properly grounded when touching a sensitive board, component, or assembly.
4. Store electrostatic-sensitive boards in protective packaging or on conductive foam.

Grounding Methods

Guard against electrostatic damage at workstations by following these steps:

1. Cover workstations with approved anti-static material. Provide a wrist strap connected to a work surface and properly grounded tools and equipment.
2. Use anti-static mats, heel straps, or air ionizers to give added protection.
3. Handle electrostatic-sensitive components, boards, and assemblies by the case or the PCB edge.
4. Avoid contact with pins, leads, or circuitry.
5. Turn off power and input signals before inserting and removing connectors or test equipment.
6. Keep the work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
7. Use field service tools, such as cutters, screwdrivers, and vacuums that are conductive.
8. Always place drives and boards PCB-assembly-side down on the foam.

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Preface Section

How to Use This Manual

This document, entitled *NanoSWITCH™ User Manual*, provides instructions on how to install, configure, and power up the NanoSWITCH™ (see *Figure 1*).

The NanoSWITCH™ is a Layer 3 Gigabit Ethernet Switch based on a Marvell Multilayer Switch Device offering 10 Gigabit Ethernet ports for connecting multiple Ethernet networked devices in demanding applications. .

Figure 1. NanoSWITCH™

An overview of NanoSWITCH™ design and specifications is provided in Chapter 1 of this manual.

Themis Computer values its customer comments and opinions; therefore, a “Reader Comment Card” is located at the end of this manual for your use. Please take the time to fill out this card with any comments concerning Themis products and services, and return it to Themis Computer. Your comments may also be forwarded to Themis by sending email to docfeedback@themis.com.

Before you begin, carefully read each of the procedures in this manual. Serious damage can be caused by improper handling of the equipment.

Intended Audience

This manual is written for system integrators and programmers. It contains all necessary information for installation and configuration of the NanoSWITCH™ and assumes the BIOS program code is installed in the system Flash memory.

Although all specific hardware features are described in the installation manual, programmers wishing to write code for the NanoSWITCH™ without the benefit of an operating system or real-time kernel will require additional data sheets.

Unpacking

Caution: The NanoSWITCH™ contains statically sensitive components. Industry-standard antistatic measures must be observed when removing the NanoSWITCH™ from its shipping container and during any subsequent handling. A wrist strap provides grounding for static electricity between your body and the chassis of the system unit.

Remove the NanoSWITCH™ and accessories from the shipping container and check the contents against the packing list. Be certain to observe industry-standard ESD protection procedures when handling static-sensitive components. The package should include all elements of your order.

Please report any shipping discrepancies to the Themis Computer Customer Support group immediately: support@themis.com or 1-510-252-0870.

Chapter Overview

The chapters and appendices of this manual are briefly outlined as follows:

- Chapter 1 provides a brief overview of the NanoSWITCH™, along with its System, Environmental, and Power specifications.
- Chapter 2 provides instructions on the installation and configuration of the NanoSWITCH™ for your particular environment and application.
- Chapter 3 provides information on the optional SBC, if installed, in the NanoSWITCH™.
- Appendix A provides pinouts and signal descriptions for the NanoSWITCH™ connectors.
- Appendix B provides instructions on setting up and configuring the BIOS for the optional SBC, if installed, for those SBCs using the InsydeH2O® BIOS, primarily the AMD SBCs.
- Appendix C provides instructions on setting up and configuring the BIOS for the optional SBC, if installed, for those SBCs using the AMI BIOS, primarily the Intel® SBCs.
- Appendix D provides information about repackaging the equipment for return to the manufacturer.

Notes, Cautions, Warnings, and Sidebars

The following icons and formatted text are included in this document for the reasons described:

Note: A note provides additional information concerning the procedure or action being described.

Caution: A caution describes a procedure or action that may result in damage to the equipment. This may involve—but is not restricted to—heavy equipment or sharp objects. To reduce the risk, follow the instructions accompanying this symbol.

Warning: A warning describes a procedure or action that may cause injury or death to the operator as a result of hazardous voltages. To reduce the risk, follow the instructions accompanying this symbol.

Sidebar: A "sidebar" adds detail to the section within which it is placed, but is not absolutely vital to the description or procedure of the section.

Website Information

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Your Comments are Welcome

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at **docfeedback@themis.com**. Please include the document part number in the subject line of your email.

General Section

Chapter 1

Overview and Specifications

1.1 Overview

The NanoSWITCH™ is a Layer 3 Gigabit Ethernet Switch based on a Marvell Multilayer Gigabit Ethernet Switch. It supports an optional Single Board Computer (SBC) Module which functions as a firewall with standard application software if installed. Without the SBC installed, the NanoSWITCH™ will function as a standalone managed Layer 3 switch. The NanoSWITCH™ is designed to be deployed as part of Ethernet networked systems in demanding applications. (See *Figure 1-1*)

Figure 1-1. NanoSWITCH™

1.2 Product Description

1.2.1 A Multi-Layer Switch

The NanoSWITCH™ is based on a Marvell DX4101 Multilayer Gigabit Ethernet Switch. It is managed by an ARM processor internal to the DX4101 running Linux. The switch supports a total of 12 Gigabit Ethernet interfaces, with two of these ports being used internally, leaving 10 Gigabit Ethernet ports available for connecting network devices. 11 Mighty Mouse connectors provide connections for external systems and devices. A NanoETXexpress mezzanine connector supports the optional installation of a Single Board Computer (SBC). With the optional SBC installed, the switch will function as a firewall with standard application software. If the SBC is not installed, the switch will function as a standalone managed Layer 3 switch.

A block diagram is shown in *Figure 1-2* on page 1-3.

Main Features

- Marvell DX4101 Multi-Layer Gigabit Ethernet Switch w/integrated processor
- Layer 3 Routing and Layer 3 wire speed switching
- Managed QoS, Multicasting and many more
- Ten available 10/100/1000 Base-T Network ports
- Mighty Mouse connectors
- Option to install a Themis SBC inside, for use as a firewall and/or gateway for 1553 and/or CANbus
- Option to populate 1553 circuits (requires optional SBC installed)
- Mini PCIe connector to support CANbus (2 ports)
- 1GB NAND Flash Memory
- 1GB DDR2 Memory
- Ruggedized
- Water Resistant
- Isolated input power supply (DC, from 10V to 36V)

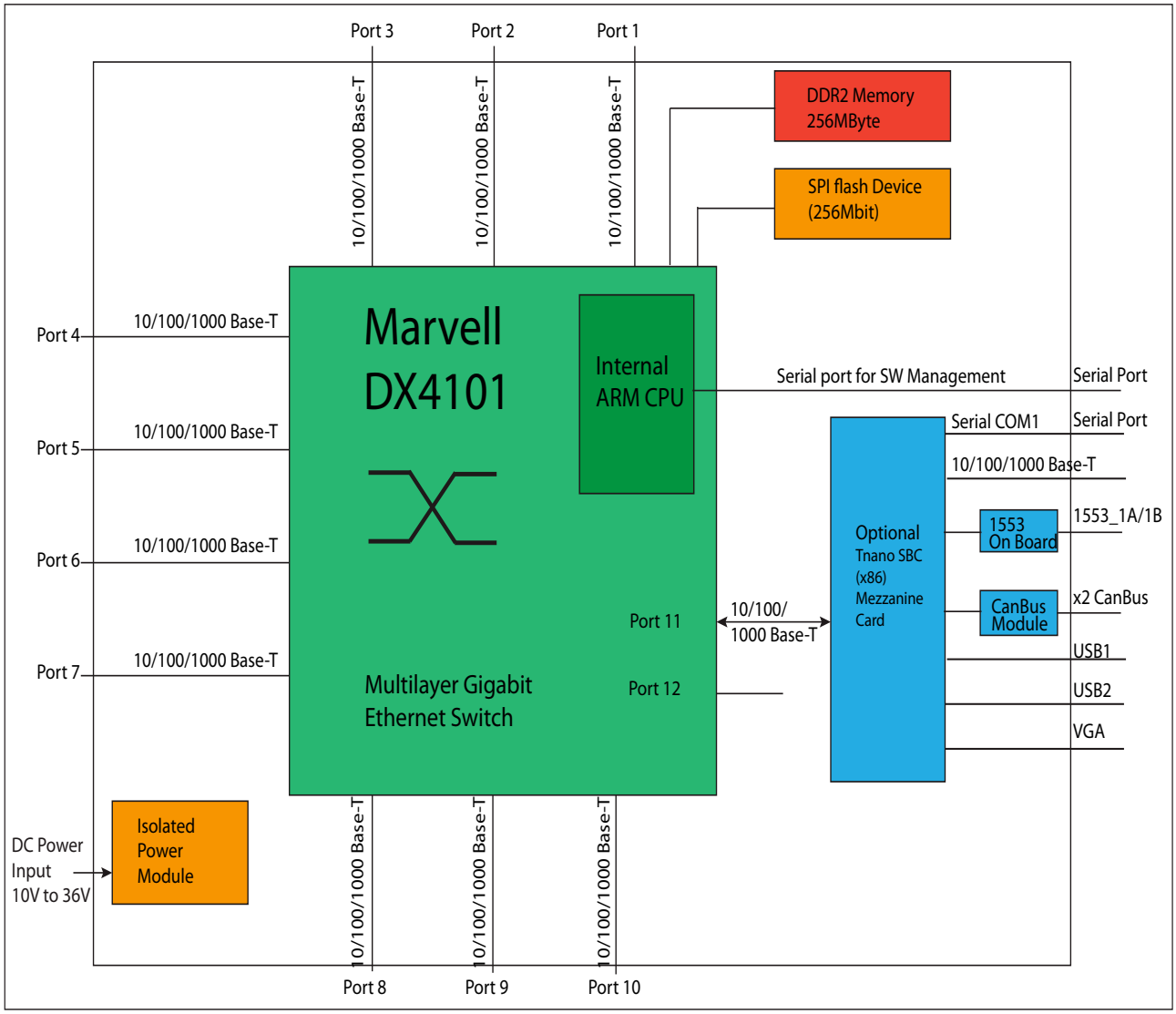


Figure 1-2. Block Diagram of NanoSWITCH™

1.2.2 Layout and Indications

The top of the NanoSWITCH™ features 11 Mighty Mouse connectors as depicted in *Figure 1-3* on page 1-5. *Table 1-1* on page 1-4 lists the connectors, their part numbers and suitable mating plugs for each connector type. Connectors J2 through J6 service the 10 GBe ports, two ports per connector. Each GBe connector has two LEDs alongside, one for each port. Each LED is labeled for the port with which it is associated. GBe link status and activity are indicated by these LEDs as indicated in *Figure 1-3*. Connector J1 provides power connections for the NanoSWITCH™, with an associated LED for power status indications. Connectors J7 through J9 provide

auxiliary function connections as indicated in *Table 1-1*. J10 is a multi-I/O connector which provides for various inputs and outputs such as VGA, USB, and Serial as required. Connector J11 provides Ethernet connections for the first Ethernet port, (Port 0), for the optional Single Board Computer (SBC), if installed.

Table 1-1. Circular Connector Part Numbers

Themis Part Number		Mighty Mouse Part Number	Con tacts	Use	Units	Suitable Mating Connector (Glenair or Amphenol Equivalent)
J1	119637-L03	801-033-07M9-4PA	4	Input Power	1	801-007-16M9-4SA
J2 thru J6	119641-L03	801-033-07M9-19SA	19	2 GBe ports each	5	801-007-16M9-19PA
J7	119640-L03	801-033-07M6-6SC	6	CANBus	1	801-007-16M6-6PC
J8	119639-L03	801-033-07M6-6SB	6	1553	1	801-007-16M6-6PB
J9	119638-L03	801-033-07M6-6SA	6	USB	1	801-007-16M6-6PA
J10	119642-L03	801-033-07M10-26SA	26	VGA, USB, Serial	1	801-007-16M10-26PA
J11	119520-L02	801-033-07M8-13SA	13	SBC Mezz GBe port	1	801-007-16M8-13PA

Port and SBC EthØ LED Indications:

Solid Green		= 1Gb Link Up
Blinking Green		= 1Gb Link Activity
Solid Yellow		= 100Mbit Link Up
Blinking Yellow		= 100Mbit Link Activity
Solid Yellow Green		= 10Mbit Link Up
Blinking Yellow Green		= 10Mbit Link Activity

Power LED Indications:

Green		= Normal
Yellow Green		= One or more power rails not normal

Over Temp LED Indications:

Green		= Temperature Normal
Red		= Temperature out of Range

Figure 1-3. Layout and Indications

1.3 Specifications

1.3.1 General

Table 1-2. NanoSWITCH™ General Specifications

Parameter	Description
Dimensions	• 33mm (1.3”) deep • 228.6mm (9”) long • 152.4mm (6”) wide
Weight	• 2.8 lb (1.27kg)
Temperature Operating: Non-Operating:	 • –40° to +71° C (–40° to 160°F) • –40° to +105° C (–40° to 221° F)
Relative Humidity Operating: Non-Operating:	 • 10% to 95% (non-condensing) • 0 to 100% (non-condensing)
Shock	• 50G @25 msec
Vibration	• 5G RMS 10Hz to 2kHz
Compliance	• MIL-STD-704A/E/F • MIL-STD-1275A/B/D • MIL-STD-461E

1.4 Packaging and Shipping

The NanoSWITCH™ is packaged in a reusable shipping container. Approximate weight of an empty container, with packing material, is 2 pounds (906 g). The approximate weight of a NanoSWITCH™ with included hardware is approximately 3 pounds (1.36 kg). Therefore, both the shipping container and a fully installed NanoSWITCH™, including manual and associated paperwork, weigh approximately 5 pounds (2.27 kg).

In the event it becomes necessary to return the unit to Themis, repackaging instructions are provided in Appendix D, “Repackaging Instructions”.

Installation Section

Chapter 2

Installation and Operation

This chapter describes how to install and operate the NanoSWITCH™.

Caution: Use industry-standard ESD grounding techniques when handling all components. Wear an antistatic wrist strap and use an ESD-protected mat. Store ESD-sensitive components in antistatic bags before placing them on any surface.

2.1 Connecting

All connections to the NanoSWITCH™ are made on the top of the NanoSWITCH™ box, depicted in *Figure 1-3* on page 1-5. *Table 1-1* on page 1-4 lists all the connectors, their part numbers and suitable mating plugs for each connector type.

Caution: When mating and unmating connectors, care should be taken to remove power from the cable contacts, as it is possible to cause internal component damage by inadvertent power shorts. It is best to apply power only after cables are mated and secured.

2.2 Applying Power

Connector J1 provides power connections for the NanoSWITCH™, with an associated LED for power status indication. The NanoSWITCH™ requires a low input voltage that range from a minimum voltage of +10VDC up to a maximum of +36 VDC. Input voltage is then converted to +12VDC, +3.3VDC, +5VDC, +1.8VDC, +1.5VDC, and +1.0VDC. These voltages are present on the power rails as long as input voltage is applied.

Note: It is recommended that power not be applied to the NanoSWITCH™ until all cables which are to be used are connected and the terminal management software is configured and connected.

2.2.1 Provide Adequate Cooling

This product has a relatively small power consumption, however, as with all electronic components, care should be taken to provide free airflow about the unit, or it should be mounted on a structure which can serve as a heat sink. The many different configurations and applications for our product make it impracticable to supply one standard heat dissipating solution. The heat dissipation method employed should suit the intended application.

2.3 Configuring the NanoSWITCH™

This section describes the configuration that must be performed after the NanoSWITCH™ is installed and power is applied, to prepare the switch for the network, and subsequent management by the web GUI interface.

2.3.1 NanoSWITCH™ Management Port

The NanoSWITCH™ is configured and monitored through a desktop terminal system that runs terminal emulation software. The NanoSWITCH™ connects to the terminal through the DX4101 Management Port.

To connect the NanoSWITCH™ to a terminal:

1. Connect an RS-232 cable to the serial connector of a desktop system running terminal emulation software.
2. Connect the other end of the RS-232 cable to the DX4101 Management Port connector on the cable connected to the 26-pin Multi I/O connector J10.
3. Set the terminal emulation software parameters as follows:
   - Select the appropriate serial port to connect to the switch.
   - Set the data rate to 115200 baud.
   - Set the data format to 8 data bits, 1 stop bit, and no parity.
   - Set Flow Control to none.

2.3.2 Booting the NanoSWITCH™

After the local terminal is connected, turn on the power. The switch then goes through power-on self-test (POST). POST runs every time the switch is started and checks hardware components to determine if the NanoSWITCH™ is operational before completely booting. If the system detects a critical problem, the boot process stops. If POST passes successfully, a valid executable image is loaded into RAM. POST messages are displayed on the terminal and indicate test success or failure. The boot process runs for approximately 40-45seconds.

See *Figure 2-1* on page 2-4 for an example of a boot screen.

When the boot process is complete, the NanoSWITCH™ displays the Command Line Interface (CLI), which initially appears as a `User Name:` prompt. The default user name is `admin`, and by default no password is required, (press Enter with no password entered). The command prompt will appear. **By using the serial command interface of the DX4101 Management Port, the user enters directly into the Privileged EXEC Mode**, the second level of command modes. Therefore, the command prompt appears as `console#`. The command prompt consists of the device host name, the default value of which is `console>`, followed by either the angle bracket (>), denoting the lowest user level command mode, the **User EXEC Mode**, or the number sign (#), for the **Privileged EXEC Mode**. The Privileged EXEC Mode allows access to system configuration commands.

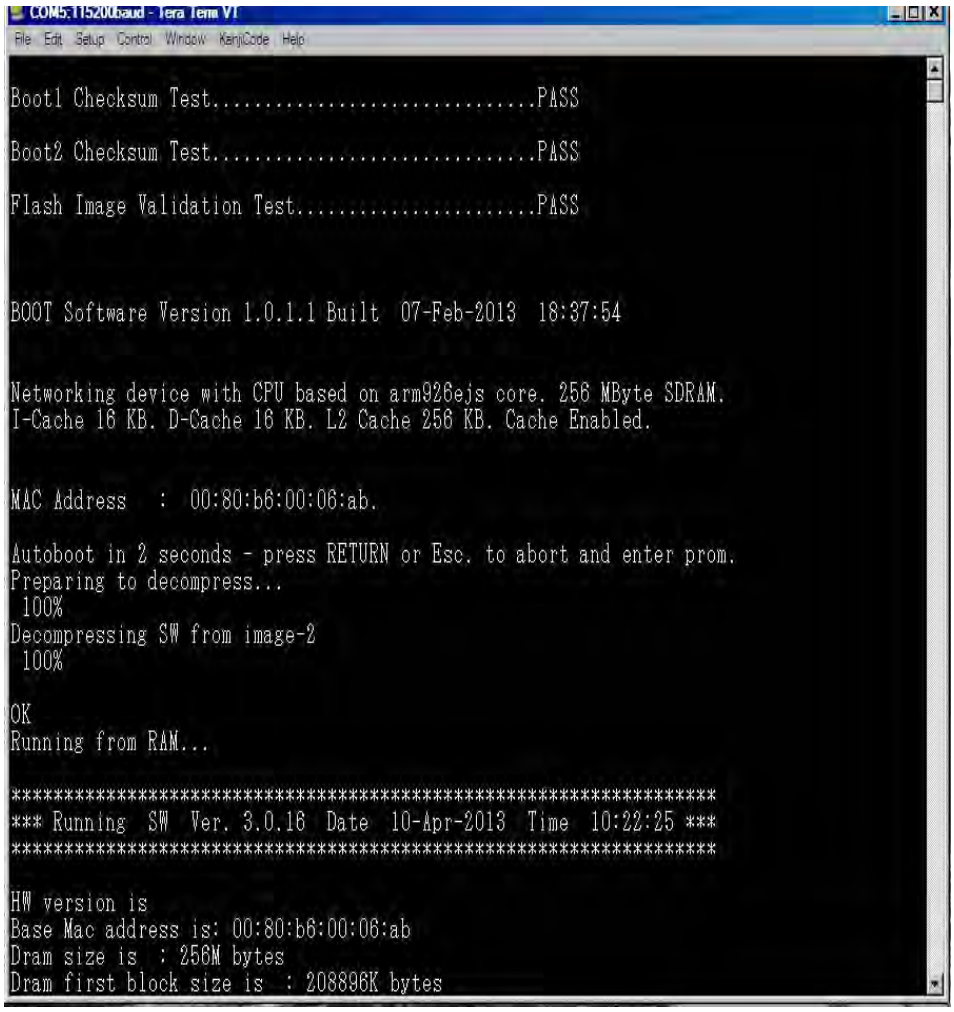


Figure 2-1. NanoSWITCH™ Boot Screen

2.3.3 Command Modes and User Privilege Levels

A complete listing and thorough explanation of **commands, command modes, and user privilege levels** will be found in the NanoSWITCH™ *Command Reference Guide.*

There are two **user privilege levels, Level 1** and **Level 15**. User privilege **Level 1** provides access to low level commands not involving system configuration. User privilege **Level 15** provides access to all commands. User privilege **Level 1** can access only the **User EXEC Mode.** User privilege **Level 15** can access the **Privi-**

leged EXEC Mode, and subsequent **Global** and **Interface Configuration Modes**. User privilege levels may be configured by the system administrator. User privilege **Level 15** is required to access the GUI interface.

There are four CLI command modes, each with its own set of commands (see *Figure 2-2*). The lowest level of command mode is the **User EXEC Mode**, (default command prompt `console>`), enabling the user to perform basic tests and display system information. The next higher level is the **Privileged EXEC Mode**, accessed by entering the **enable** command, (default command prompt `console#`). From this mode, the user may access the **Global Configuration Mode** by entering the command **configure**, (default command prompt `console(config)#`). The commands in this mode apply to features that affect the system as a whole, rather than a specific interface. For configuring specific interfaces, the user may enter one of the six **Interface Configuration Modes**. By default, no passwords are required for these modes, but they may be configured by system administrators. The command prompt will display according to the mode entered, i.e. `console(config-if)#`.

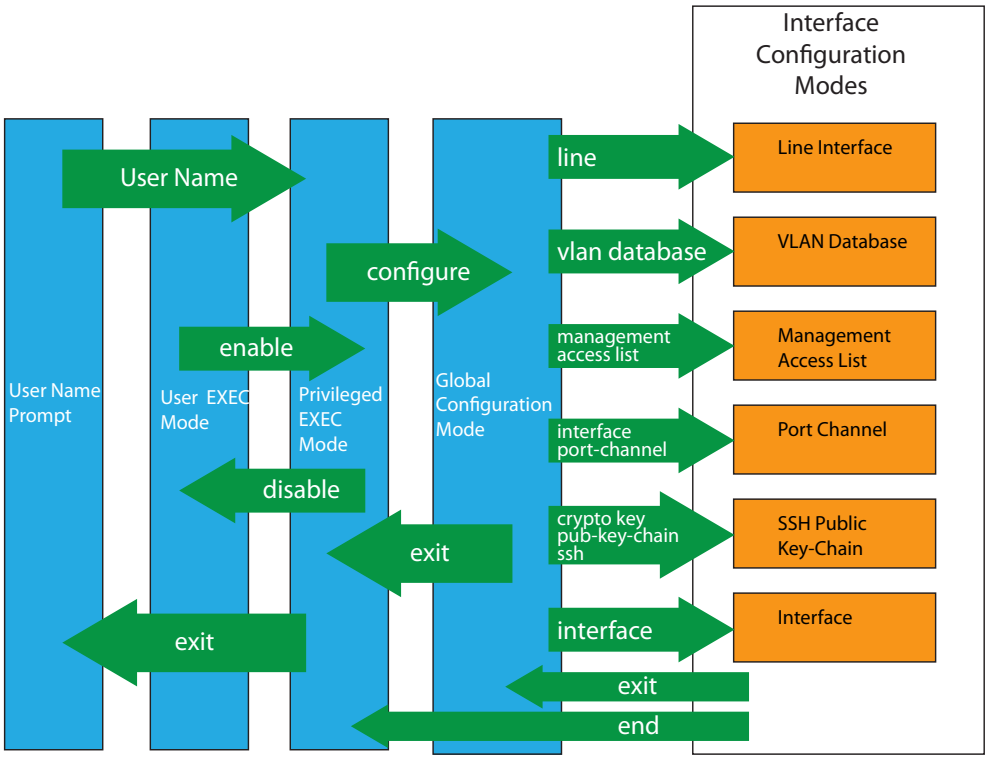


Figure 2-2. CLI Command Modes

2.3.4 Initial Configuration

In order to provide for access to the GUI interface to configure the NanoSWITCH™, it is necessary to configure the network interface to provide an IP address. This is done through the switch management serial access port. The preceding sections provide information for preparing the switch and a serial terminal for accessing the serial management port.

By default, all ports are assigned to the interface VLAN 1, so that the initial configuration can deal with VLAN 1 only, obviating the need to set up an initial interface. If it is desired to use DHCP server mode to provide an IP address for your network, it is necessary to disable the DHCP client mode, since the switch can not be both a DHCP client and a DHCP server. If it is desired to provide a static IP address, it is necessary to insure that the DHCP client is disabled.

A useful command for information is **show ip interface**. This command, issued with no parameters, lists the ip addresses which have been assigned for all the interfaces , if any. This is an EXEC mode command, and should be used before entering the Global Configuration mode.

Use the following steps to set up the switch for network use.

1. **Log in to the serial management port** at the `User Name:` prompt. (Default user name is `admin`, no password).

   `console#` (command prompt, privileged EXEC mode)

   This is the place to issue the **show ip interface** command.

   ```
   show ip interface
   ```

   (Example response)

   ```
   IP Address           I/F        Type    Status
   ----------------     -------    ------- -----------
   10.5.234.207/24      vlan 1     Static  Valid
   192.168.105.85/24    vlan 1     DHCP    Valid
   ```

2. **Disable the DHCP client.** (The DHCP client interface may or may not be set, but in any case it is prudent to insure the DHCP client is disabled so that a static IP address can be set, or DHCP server mode can be entered.)

   `console#` (command prompt, privileged EXEC mode)

   `configure <Enter>` (Enter the Global Configuration Mode)

   `console(config)#` (command prompt, Global Conf. Mode)

`interface vlan 1 <Enter>` (Enter the Interface Configuration Mode, interface VLAN 1)

`console(config-if)#` (command prompt, Interface Config. Mode)

`no ip address dhcp <Enter>` (releases any acquired IP address)

`console(config-if)#` (command prompt)

3. **Set a static IP address**.

`console(config-if)#` (command prompt)

`ip address 172.30.4.24 /16` (sets IP address to 172.30.4.24, prefix length 16 bits)

`console(config-if)#` (command prompt)

`exit <Enter>` (Exit the Interface Configuration Mode)

`console(config)#` (command prompt)

`exit <Enter>` (Exit the Global Configuration Mode)

`console#` (command prompt)

The NanoSWITCH™ is now accessible through the GUI interface from a browser via the static IP address.

DHCP Server Mode

To set up the DHCP server, follow these steps.

1. **Log in to the serial management port** at the `User Name:` prompt. (Default user name is `admin`, no password).

2. **Disable the DHCP client.**

`console#` (command prompt, privileged EXEC mode)

`configure <Enter>` (Enter the Global Configuration Mode)

`console(config)#` (command prompt, Global Conf. Mode)

`interface vlan 1 <Enter>` (Enter the Interface Configuration Mode, interface VLAN 1)

`console(config-if)#` (command prompt, Interface Config. Mode)

`no ip address dhcp <Enter>` (releases any acquired IP address)

`console(config-if)#` (command prompt, Interface Config. Mode)

3. **Enable the DHCP server mode,** (and set up an address pool).

`exit <Enter>` (Exit the Interface Configuration Mode)

```
console(config)#  (command prompt, Global Conf. Mode)
ip dhcp server  (enable DHCP server)
console(config)#  (command prompt, Global Conf. Mode)
ip dhcp pool host switch  (set up the address pool)
address 192.168.1.100 255.255.255.0
00:15:C9:28:EF:AC
console(config)#  (command prompt, Global Conf. Mode)
lease 0 0 1
console(config)#  (command prompt, Global Conf. Mode)
client-name rambostik
console(config)#  (command prompt, Global Conf. Mode)
default-router 192.168.1.254
console(config)#  (command prompt, Global Conf. Mode)
dns-server 10.10.1.8
console(config)#  (command prompt, Global Conf. Mode)
domain-name themis.com
console(config)#  (command prompt, Global Conf. Mode)
exit <Enter>  (Exit the Global Configuration Mode)
console#  (command prompt)
```

Or another example

```
configure
console(config)#  (command prompt, Global Conf. Mode)
ip dhcp server
console(config)#  (command prompt, Global Conf. Mode)
ip dhcp pool network switch20
console(config)#  (command prompt, Global Conf. Mode)
address 192.168.1.0 /24
console(config)#  (command prompt, Global Conf. Mode)
lease 0 0 60
console(config)#  (command prompt, Global Conf. Mode)
ip dhcp excluded-address 192.168.1.254
```

`console(config)#` (command prompt, Global Conf. Mode)

`default-router 192.168.1.254`

`exit <Enter>` (Exit the Global Configuration Mode)

`console#` (command prompt)

DHCP Client Mode

To have the NanoSWITCH™ acquire a dynamic IP address from a DHCP server, use these steps:

1. **Log in to the serial management port** at the `User Name:` prompt. (Default user name is `admin`, no password).

2. **Disable the DHCP server.**

`console#` (command prompt, privileged EXEC mode)

`configure <Enter>` (Enter the Global Configuration Mode)

`console(config)#` (command prompt, Global Conf. Mode)

`no ip dhcp server`

`console(config)#` (command prompt, Global Conf. Mode)

3. **Enable the DHCP client.**

`console(config)#` (command prompt, Global Conf. Mode)

`interface vlan 1 <Enter>` (Enter the Interface Configuration Mode, interface VLAN 1)

`console(config-if)#` (command prompt, Interface Config. Mode)

`ip address dhcp <Enter>` (releases any static IP address, sends information to the DHCP server, acquires an IP address from the server)

`console(config-if)#` (command prompt, Interface Config. Mode)

`exit <Enter>` (Exit the Interface Configuration Mode)

`console(config)#` (command prompt, Global Conf. Mode)

`exit <Enter>` (Exit the Global Configuration Mode)

`console#` (command prompt, privileged EXEC mode)

2.4 The GUI Interface

After the NanoSWITCH™ has been configured with an IP address, the console of the switch can be accessed through a GUI interface via a browser using the IP address as configured in the previous section. This is the same console that is accessed through the CLI in the previous section. Most of the same commands are available through this interface. Some of the highest level system administrator commands are available only through the CLI interface. A sample GUI configuration screen is shown in *Figure 2-3*.

The default user name is `admin`, and by default, there is no password required.

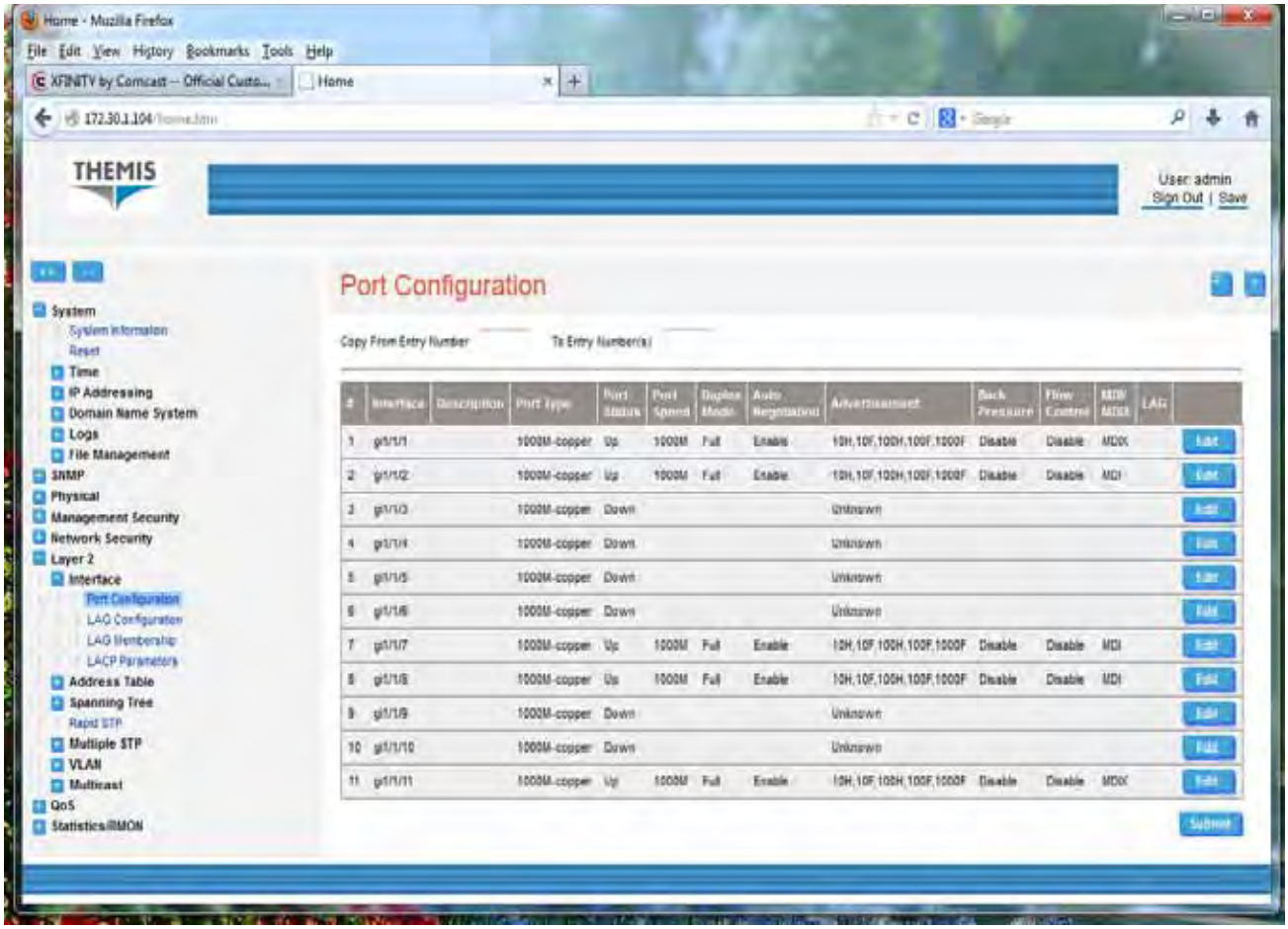


Figure 2-3. Example GUI Configuration Screen

Optional Equipment

Chapter 3

Single Board Computer (SBC)

3.1 Overview

The NanoSWITCH™ is designed to support an optionally installed Single Board Computer (SBC). This chapter describes the types of SBCs which may be installed in the NanoSWITCH™.

3.2 Item Description

The optional SBC is a CPU mezzanine card using the industry standard NanoETX-express® form factor and Type 1 pin assignments. The CPU mezzanine card is mounted on the NanoSWITCH™ circuit board, which interfaces the processor module with the external circular connectors and provides support including I/O and system management functions. The I/O support on the circuit board includes GBE, PCIe, two native serial ports, and a Solid-State Disk drive attached to one of the three SATA ports of the SBC, which can serve as a boot device for the system. The CPU mezzanine card uses one of the processors listed in *Table 3-1*. For connectivity to I/O devices, the CPU will be paired with a CH as listed in *Table 3-1*. The BIOS is contained in a flash device connected to the CH over the SPI interface.

Table 3-1 lists major features of the optional SBC

Table 3-1. SBC Features

Parameter	Description
Processor	● Intel® Atom N455/ICH8M or ● AMD Fusion T40N/A55E
Memory	● 2GB DDR3 on board ● 32GB iSSD on main circuit board
Ethernet port	● Single 10/100/1000 MB Ethernet
I/O Ports	● 4 USB 2.0 ports ● 2 Serial ports ● MiniPCIe Card Slot (for options) ● 1553 (optional) ● CANBus (optional)
Video	● 1 VGA port
BIOS	● 2MB BIOS Flash ● InsydeH2O® BIOS for AMD Processor ● AMI BIOS for Intel® Processor
TPM	● Standard

3.3 Configurations

The optional SBCs available feature CPUs by both Intel® and AMD. Support for the SBC is installed on the NanoSWITCH™ main circuit board, and includes control and I/O functions. *Figure 3-1* diagrams the Intel® SBC, along with its I/O support. *Figure 3-2* on page 3-4 illustrates the AMD SBC and its I/O support.

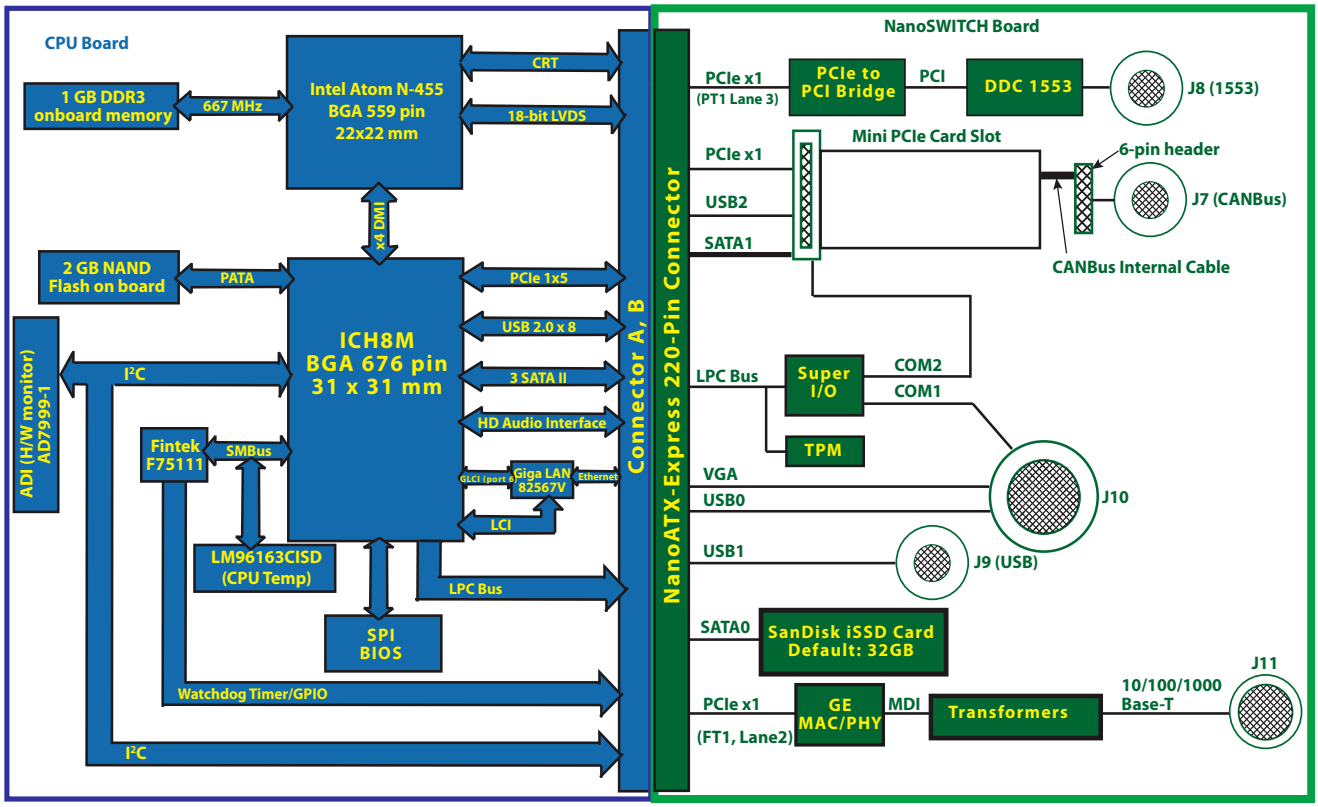


Figure 3-1. Intel® Block Diagram

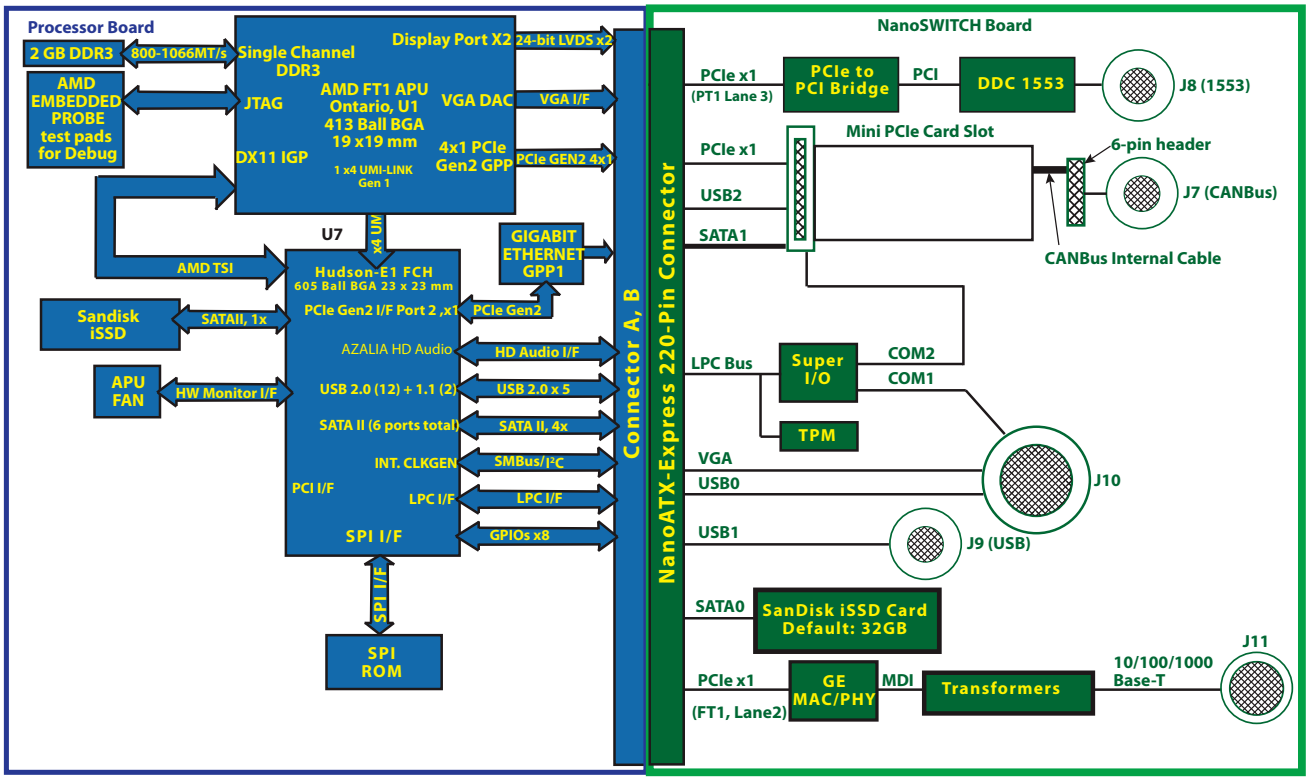


Figure 3-2. AMD Block Diagram

Appendix A

Connectors, Pinouts and Signals

A.1 Circular Connectors

A fully populated NanoSWITCH™ uses 11 Mighty Mouse circular connectors, of 7 different kinds. These connectors and their numbering are illustrated in *Figure A-1*.

Figure A-1. NanoSWITCH™ Connector Numbering

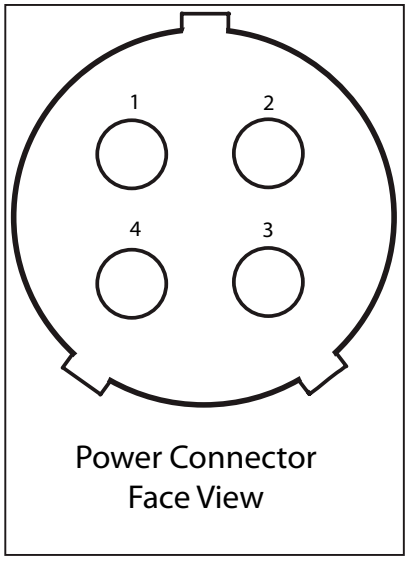
Table A-1. Circular Connector Part Numbers

Themis Part Number		Mighty Mouse Part Number	Contacts	Use	Connectors per Unit
J1	119637-L03	801-033-07M9-4PA	4	Input Power	1
J2 thru J6	119641-L03	801-033-07M9-19SA	19	2 GBe ports each	5
J7	119640-L03	801-033-07M6-6SC	6	CANBus	1
J8	119639-L03	801-033-07M6-6SB	6	1553	1
J9	119638-L03	801-033-07M6-6SA	6	USB	1
J10	119642-L03	801-033-07M10-26SA	26	VGA, USB, Serial	1
J11	119520-L02	801-033-07M8-13SA	13	SBC Mezz GBe port	1

A.1.1 4-Pin Power Connector J1

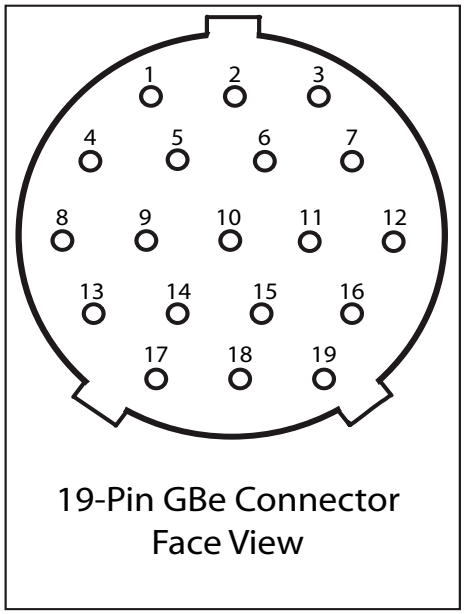
Table A-2. 4-Pin Power Connector Pinouts

Pin No.	Signal Name	Description
1	GND	Chassis GND
2	NC	No Connection
3	28V_IN	28V (10 to 36V) DC Power Input
4	28V_IN_RTN	28V (10 to 36V) DC Return



A.1.2 19-Pin GBe Connectors J2 thru J6

Each of the five 19-Pin connectors carries signals of two GBe ports, Ports 1&2, Ports 3&4, Ports 5&6, Ports 7&8, and Ports 9&10.



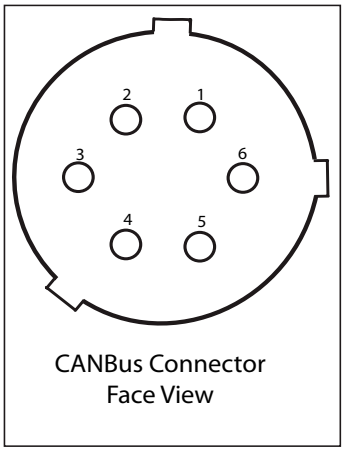
19-Pin GBe Connector
Face View

Table A-3. 19-Pin Circular Connector Pinouts

Pin No.	Signal Name	Description
1	GE1_PAIR1_P	GEPort 1,Pair 1 +
2	GE1_PAIR1_N	GEPort 1,Pair 1 -
3	GE1_PAIR2_P	GEPort 1,Pair 2 +
4	GE1_PAIR3_P	GEPort 1,Pair 3 +
5	GE1_PAIR3_N	GEPort 1,Pair 3 -
6	GE1_PAIR4_P	GE Port 1,Pair 4 +
7	GE1_PAIR2_N	GEPort 1,Pair 2 -
8	NC	No Connection
9	GE2_PAIR4_N	GEPort 2,Pair 4 -
10	NC	No Connection
11	GE1_PAIR4_N	GEPort 1,Pair 4 -
12	NC	No Connection
13	GE2_PAIR2_P	GEPort 2,Pair 2 +
14	GE2_PAIR4_P	GEPort 2,Pair 4 +
15	GE2_PAIR3_P	GEPort 2,Pair 3 +
16	GE2_PAIR3_N	GEPort 2,Pair 3 -
17	GE2_PAIR2_N	GEPort 2,Pair 2 -
18	GE2_PAIR1_P	GEPort 2,Pair 1 +
19	GE2_PAIR1_N	GEPort 2,Pair 1 -

A.1.3 6-Pin CANBus Connector J7

Table A-4. CANBus Connector Pinouts

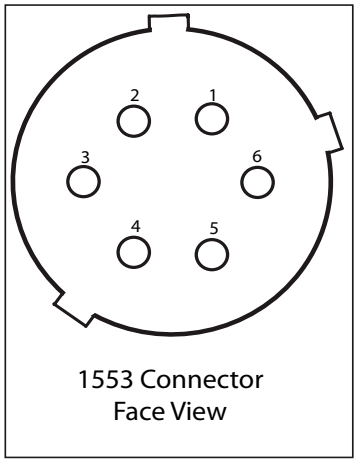


CANBus Connector
Face View

Pin No.	Signal Name	Description
1	CAN_A_HIGH	CANBUS A Signal “High”
2	CAN_A_LOW	CANBUS A Signal “Low”
3	GND	Digital Ground
4	CAN_B_HIGH	CANBUS B Signal “High”
5	CAN_B_LOW	CANBUS B Signal “Low”
6	GND	Digital Ground

A.1.4 6-Pin 1553 Connector J8

Table A-5. 1553 Connector Pinouts



1553 Connector
Face View

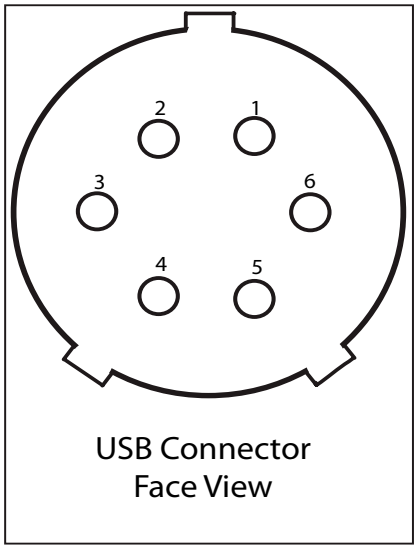
Pin No.	Signal Name	Description
1	CHA1_1553_P	Pair A +
2	CHA1_1553_N	Pair A -
3	CHB1_1553_P	Pair B +
4	CHB1_1553_N	Pair B -
5	N/C	No Connection
6	Chassis GND	Shield

A.1.5 6-Pin USB1 Connector J9

This connector provides for the second USB interface, (USB1), from the SBC, if installed..

Table A-6. USB Connector Pinouts

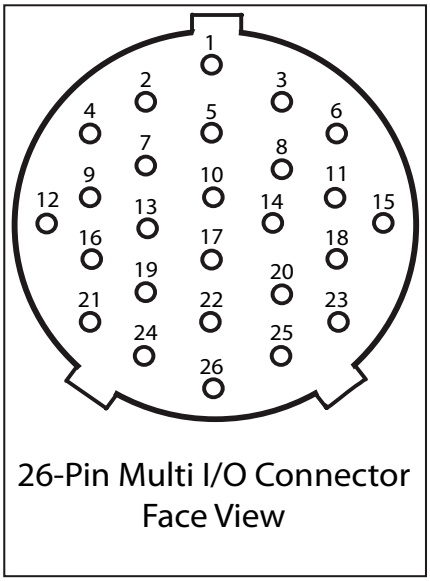
Pin No.	Signal Name	Description
1	5V_USB1_PWR	5V Power USB1
2	USB1_P	USB1 Pair +
3	USB1_N	USB1 Pair -
4	N/C	No Connection
5	N/C	No Connection
6	GND	Digital Ground



A.1.6 26-Pin Multi I/O Connector J10

This connector provides for control and display I/O of the NanoSWITCH™. VGA output, serial port I/O for both the optional SBC and internal processor, the first SBC USB interface I/O, (USB0), and I^2C I/O are routed through this connector, as well as Power Button and System Reset signals. Provision is also made for an external battery input through this connector.

Table A-7. 26-Pin Circular Connector Pinouts



26-Pin Multi I/O Connector
Face View

Pin #	Signal Name	I/O	Description
1	VGA_RED	Out	SBC VGA Output
2	GND	Bi	Digital Ground
3	VGA_GRN	Out	SBC VGA Output
4	GND	Bi	Digital Ground
5	VGA_BLU	Out	SBC VGA Output
6	GND	Bi	Digital Ground
7	VGA_HSYNC	Out	SBC VGA Output
8	VGA_VSYNC	Out	SBC VGA Output
9	VGA_I^2C_CLK	Out	SBC VGA Output
10	VGA_I^2C_DAT	In	VGA Signal In
11	GND	Bi	Digital Ground
12	PWRBTN_L	In	SBC Power Button Input (see notes)
13	NC/GPO1/SW_SYSRSTn	Opt	Opt. Config. (see notes)
14	USB0_N	Bi	SBC USB0 -
15	USB_PWR_5v	In	USB0 5V Power
16	NC/GPI1	Opt	Opt. Config. (see notes)
17	GND	Bi	Digital Ground
18	USB0_P	Bi	SBC USB0 +
19	SBC_SERIAL_RXD	In	SBC COM1 Receive
20	SBC_SERIAL_TXD	Out	SBC COM1 Transmit
21	GND	Bi	Digital Ground
22	SWITCH_SERIAL_RXD	In	Eth. Sw. Ser. Receive
23	SWITCH_SERIAL_TXD	Out	Eth. Sw. Ser. Transmit
24	EXT_BATTERY_INPUT	In	(See Notes)
25	NC/GPI2	Opt	Opt. Config. (see notes)
26	NC/GPI3	Opt	Opt. Config. (see notes)

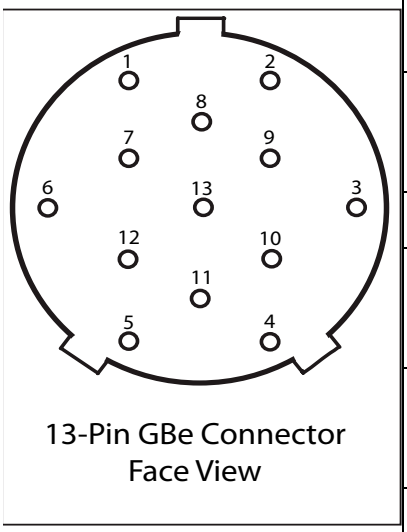
Notes for this connector:

- Pin 12 - SBC Power Button Signal. Connected to a momentary contact push button, hold down for 4 seconds to power down the SBC. Press again to power up the SBC.
- Pin 13 - Default is no connection. Can be configured as either a General Purpose Input to the SBC or a Reset signal to the GBE switch.. A low pulse on this line will reset the GBE switch section of the box, (not the SBC).
- Pin 16 - Default is no connection. Can be configured as a General Purpose Input to the SBC.
- Pin 24 - External Battery Input for clock backup. This input is not required for the NanoSWITCH™ to function. A user has an option to use an internal 3.3V Lithium battery to keep time and date when an SBC is powered down. In the case where an internal battery is not used, the user has an option to use an external battery, 3.3V to 45V. If no backup battery is used, the SBC will still function, but it will lose date and time on power down. Since the SBC can always obtain time from an NTP server if it is connected, or from a PTP master clock if part of a PTP network, a backup battery may not be a requirement for some applications.
- Pins 25 and 26 - General Purpose Input. The default is no connection. Can be configured as a General Purpose input to the SBC.

A.1.7 13-Pin GBe Connector J11

The 13-Pin GBe Connector serves as the GBe connector for the optional SBC, if installed.

Table A-8. 13-Pin Circular Connector Pinouts



13-Pin GBe Connector
Face View

Pin No.	Signal Name	Description	RJ45 Pin#
1	SBC_ETH0_PAIR4_N	SBC Ethernet Signal 1, Pair 4 -	8
2	SBC_ETH0_PAIR3_N	SBC Ethernet Signal 1, Pair 3-	5
3	N/C	No Connection	N/C
4	SBC_ETH0_PAIR2_P	SBC Ethernet Signal 1, Pair 2 +	3
5	SBC_ETH0_PAIR1_P	SBC Ethernet Signal 1, Pair 1 +	1
6	N/C	No Connection	N/C
7	SBC_ETH0_PAIR4_P	SBC Ethernet Signal 1, Pair 4 +	7
8	N/C	No Connection	N/C
9	SBC_ETH0_PAIR3_P	SBC Ethernet Signal 1, Pair 3 +	4
10	SBC_ETH0_PAIR2_N	SBC Ethernet Signal 1, Pair 2 -	6
11	N/C	No Connection	N/C
12	SBC_ETH0_PAIR1_N	SBC Ethernet Signal 1, Pair 1 -	2
13	N/C	No Connection	N/C

BIOS Setup Utility

Appendix B

InsydeH2O® BIOS Setup Utility

B.1 Introduction

This chapter describes the InsydeH2O® BIOS Setup Utility for the optionally installed AMD Single Board Computer in the NanoSWITCH™. The InsydeH2O® ROM BIOS is an UEFI-type BIOS stored in a Flash EEPROM which is connected through SPI. This allows the BIOS configuration data to be retained when power is removed, and allows the BIOS to be easily updated. However, the system date and time is not retained when power is removed.

Caution: 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 Themis be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating. This is to avoid possible boot failure.

B.2 Starting the BIOS Setup Utility

The BIOS Setup Utility may be access while the system is booting up after initial power application, or when rebooted by simultaneously pressing the <CTRL>, <ALT> and <DELETE> keys. An initial “splash” screen will appear, and while the

"splash" screen is visible, pressing the <F2> key will bring up the BIOS Setup Utility (See *Figure B-1* on page B-2). It may be necessary to press the <F2> key more than once to bring up the Setup screen. The first screen to appear is the BIOS Information Screen (*Figure B-2*) which displays the BIOS version details. Use the left-right <arrow> keys to select the desired menu.

Figure B-1. Splash Screen

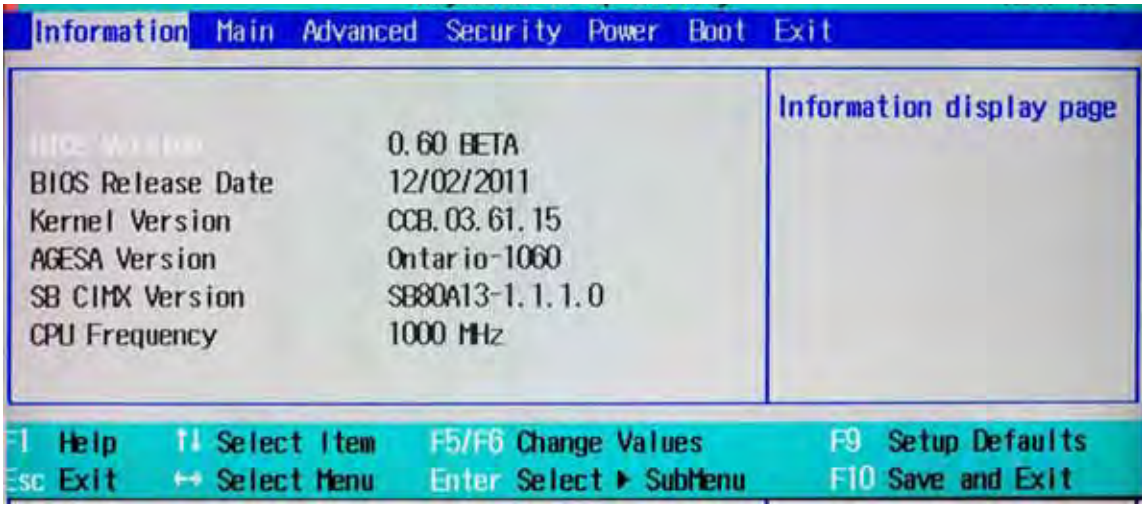


Figure B-2. BIOS Information Screen

B.2.1 Navigating the Utility Screens

The InsydeH2O® BIOS Setup Utility screen has two frames. (See *Figure B-3*). The left frame displays information items in black and the options that can be configured in blue. When an option is selected in the left frame, it is highlighted in white, and the right frame displays a text message for the highlighted configurable option.

The InsydeH2O® BIOS Setup Utility navigation keys are shown in the legend in *Fig-*

ure B-3. Most of these navigation keys can be used at any time during the setup navigation process. The left and right <arrow> keys select the menu at the top. The up and down <arrow> keys select the configurable item. Press <Enter > to bring up the sub menu to configure the item.

Note: Options printed in **Bold** are default settings.

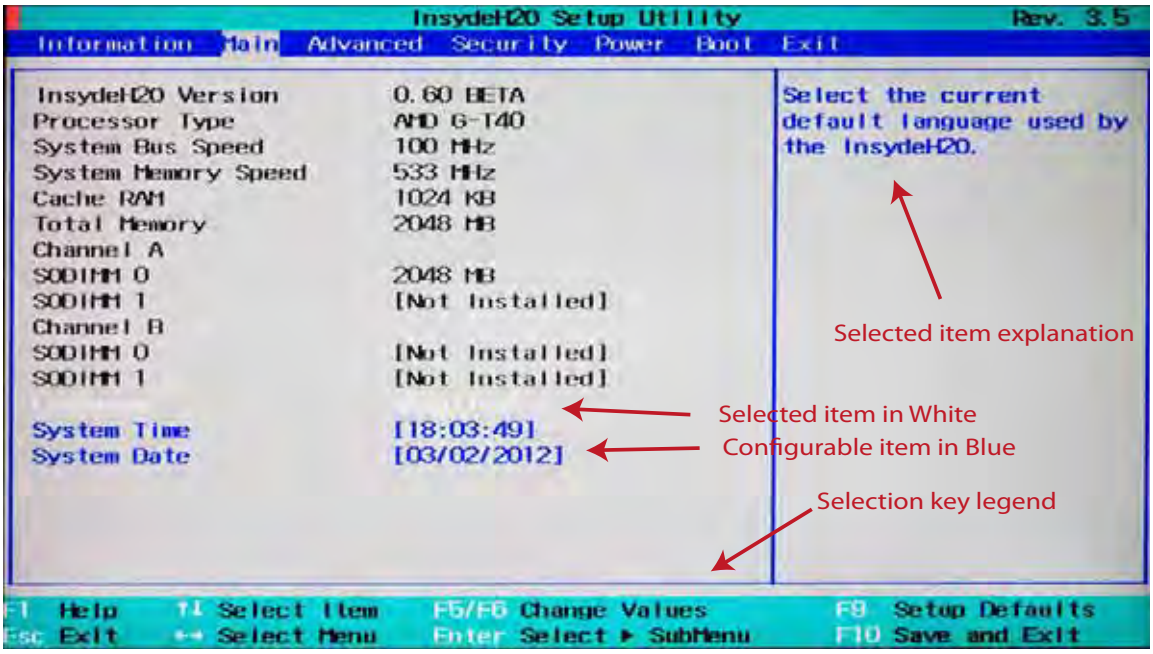


Figure B-3. Setup Screen Legend

B.3 Main BIOS Setup

To view the Main setup screen, use the left-right <arrow> keys to select the Main menu tab at the top.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 in *Figure*

B-4.

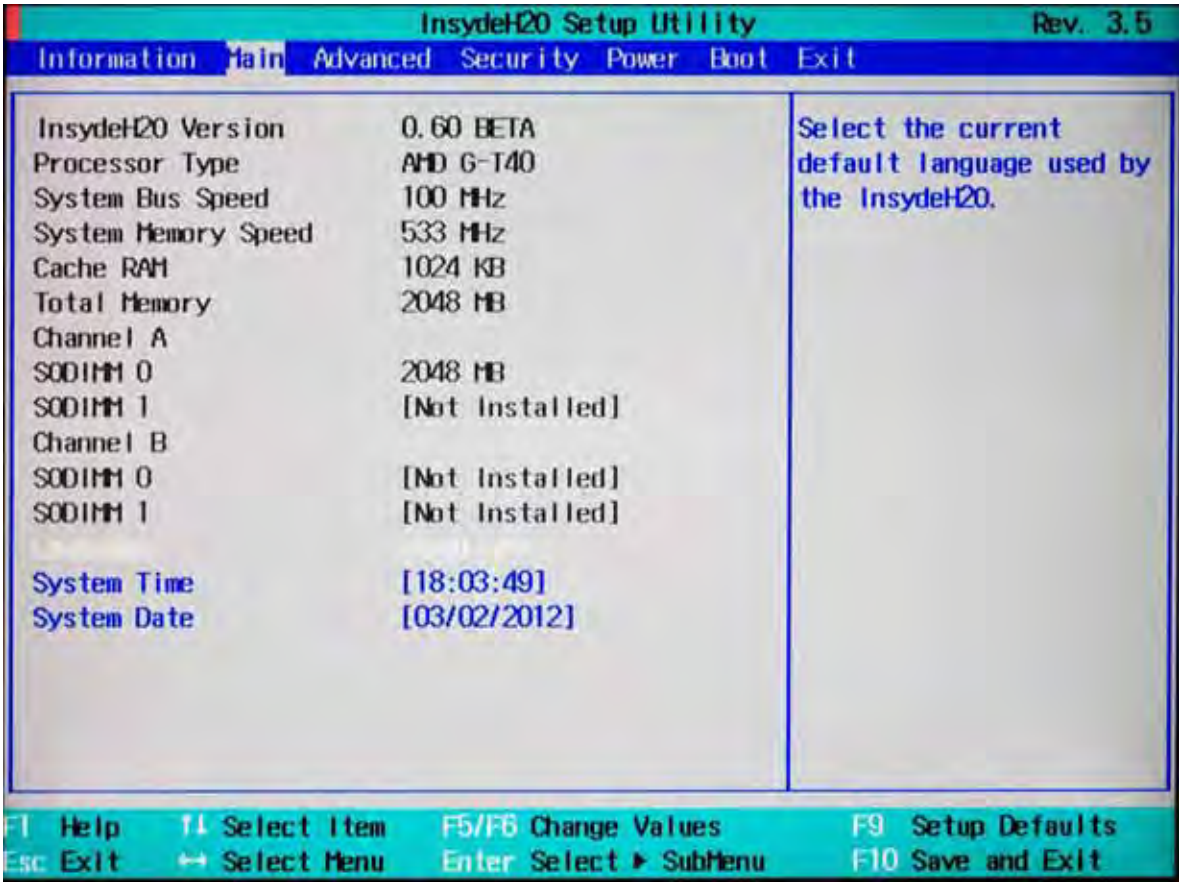


Figure B-4. Main Setup Screen

B.3.1 System Overview

System details such as Processor Type, Bus Speed, Memory Speed, Cache, and Memory details are listed, along with the BIOS version. The configurable items in this screen are Language, System Time and System Date.

B.3.2 System Time/System Date

Use this option to change the system time and date. Highlight *System Date* or *System Time* using the <Arrow> keys. Key in new values through the keyboard and press <Enter>. Press the <Tab> key to move between fields. The date must be entered in

MM/DD/YY format. The time is entered in HH:MM:SS format.

Note: The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.

B.3.3 Language

Use the <Arrow> keys to select the desired BIOS Menu language, and press <Enter> to select it.

B.4 Advanced Setup

Caution: It is advisable not to change from the default settings, as they are set according to the hardware design of this board. Options in **Bold** are the **default settings**.

Use the horizontal arrow keys to select the Advanced Settings screen. Use the vertical arrows to select the submenu items, and hit <Enter> to access them.

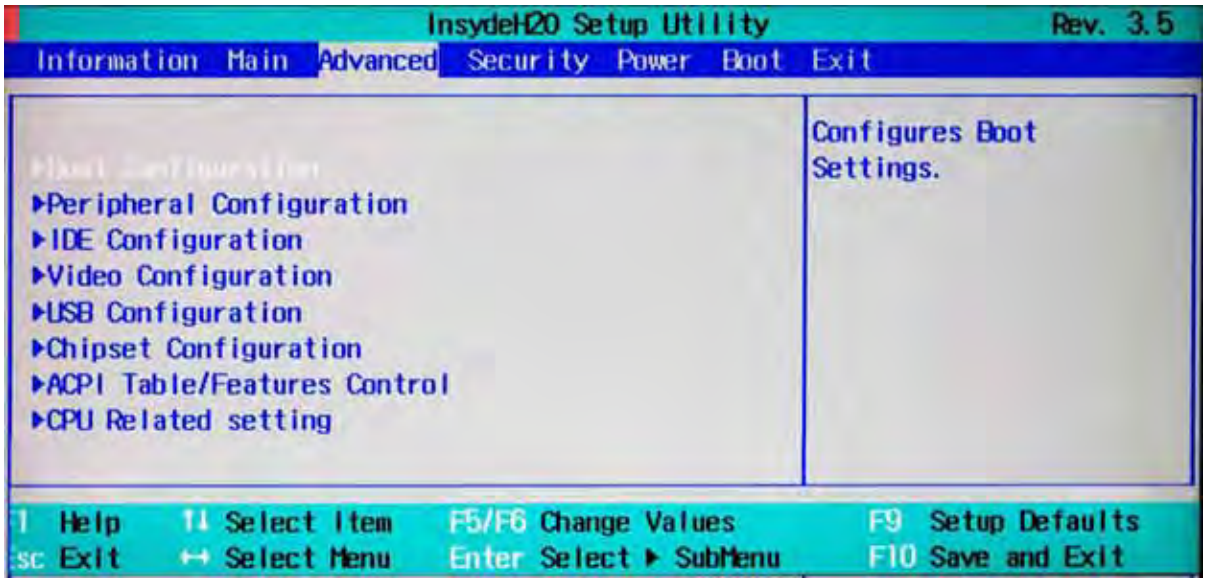


Figure B-5. Advanced Settings Screen

B.4.1 Boot Configuration

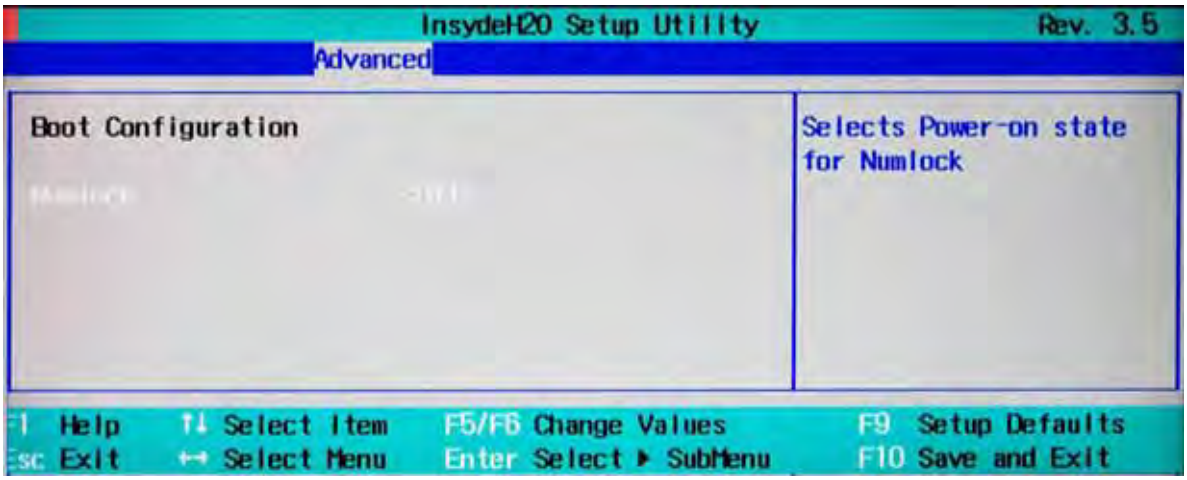


Figure B-6. Boot Configuration Settings

- The Boot Configuration screen sets the power-on state for the Numlock key.

B.4.2 Peripherals Configuration

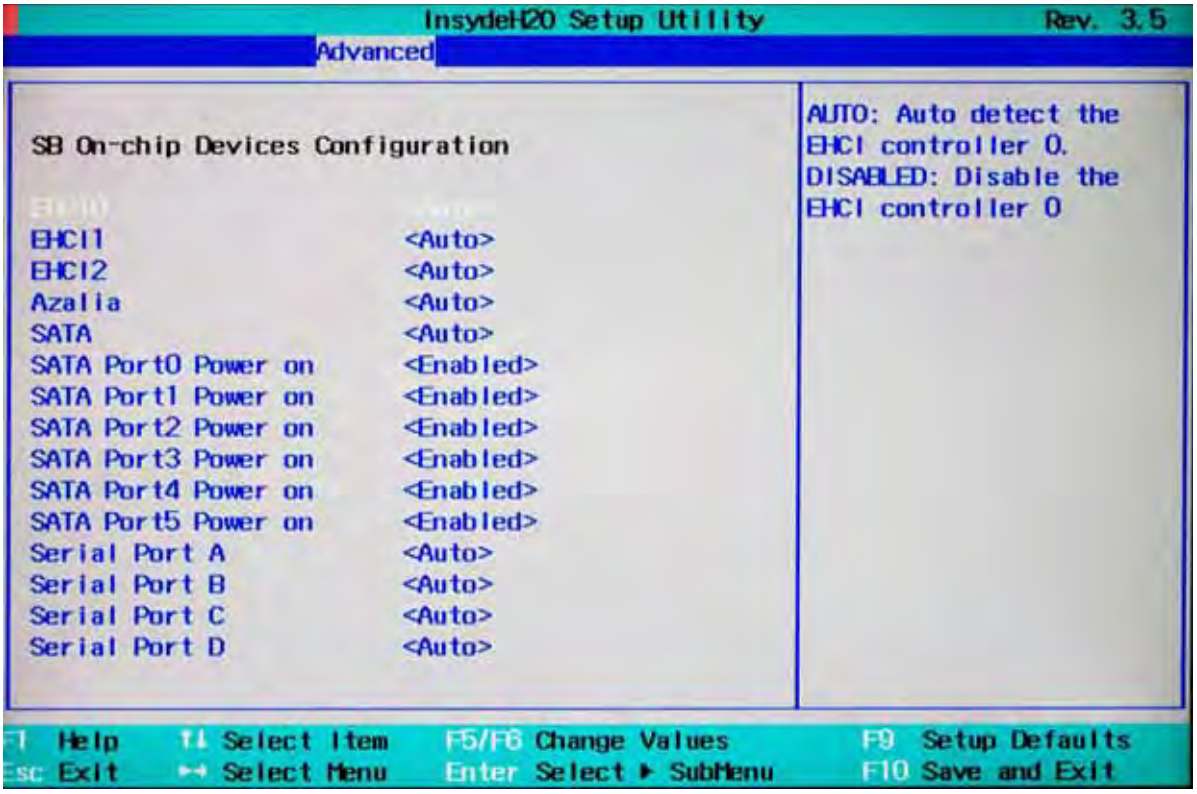


Figure B-7. Peripheral Configuration Settings

- Enhanced Host Controller Interface (EHCI)
  Sets the EHCI for USB ports 0, 1, and 2 to **Auto** detect or Disabled.
- Azalia
- SATA
- SATA Port(s) Power on
- Serial Port(s)

B.4.3 IDE Configuration

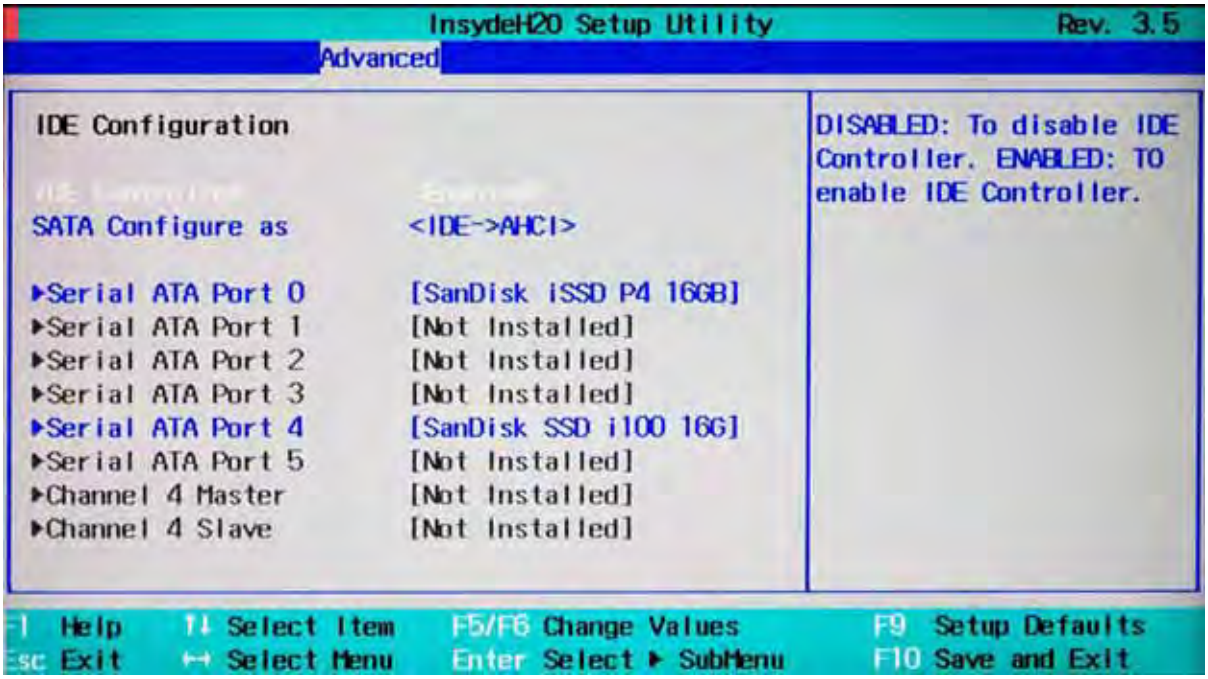


Figure B-8. IDE Configuration Settings

- IDE Controller
  Allows the IDE Controller to be **Enabled** or Disabled.
- Configure SATA
- SATA Port(s) 0 thru 4 connections
- Channel 4

B.4.4 Video Configuration

Figure B-9. Video Configuration Settings

- Enable or **Disable** Edid Support Option.

B.4.5 USB Configuration

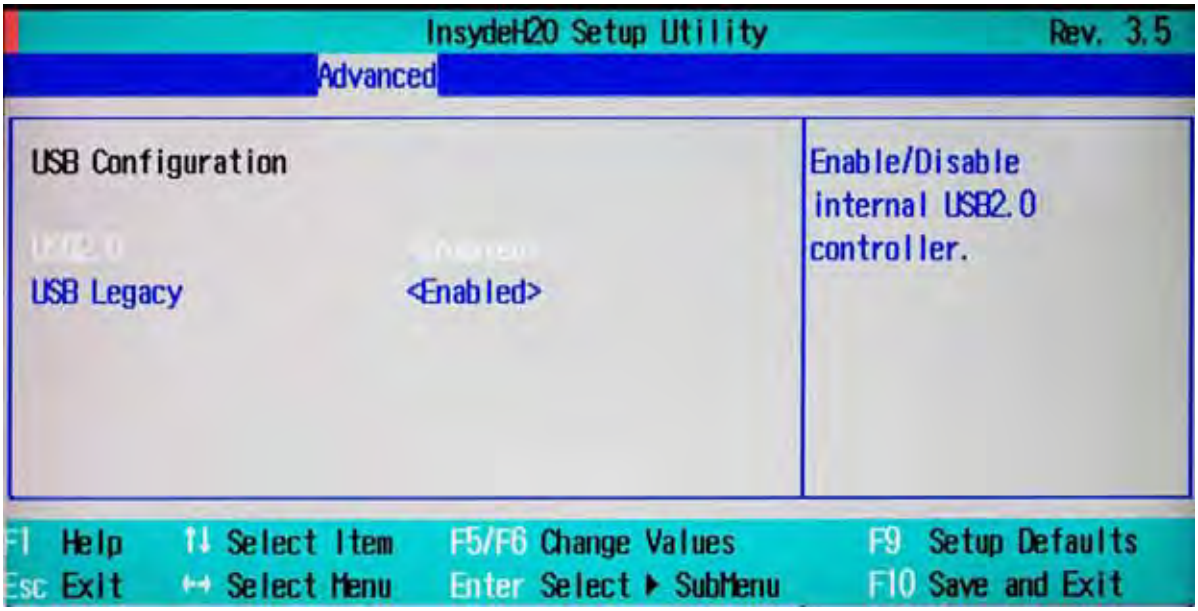


Figure B-10. USB Configuration Settings

- **Enable** or Disable USB 2.0 Controller.
- **Enable** or Disable USB Legacy support.

B.4.6 Chipset Configuration

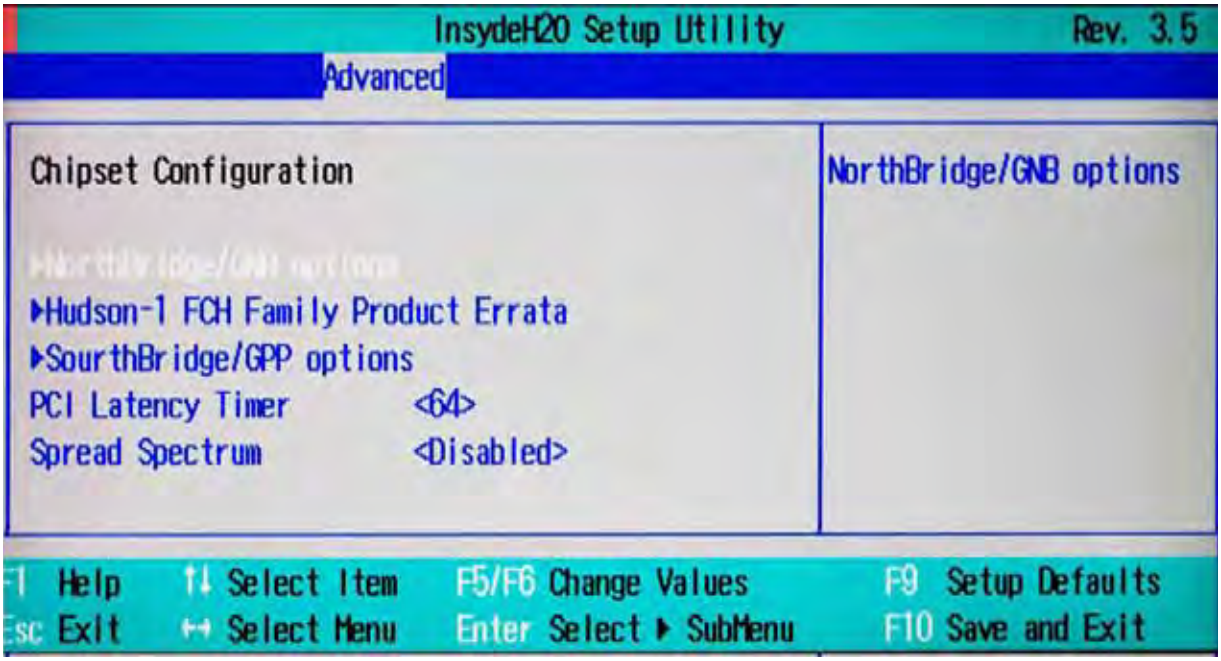


Figure B-11. Chipset Configuration Settings

- Select NorthBridge/GNB Options Screen.
- Select Hudson-1 FCH Family Product Errata Screen.
- Select SouthBridge/GPP Options Screen.
- Set the PCI Latency Timer Setting
- Enable or **Disable** Spread Spectrum Operation.

B.4.6.1 NorthBridge Configuration

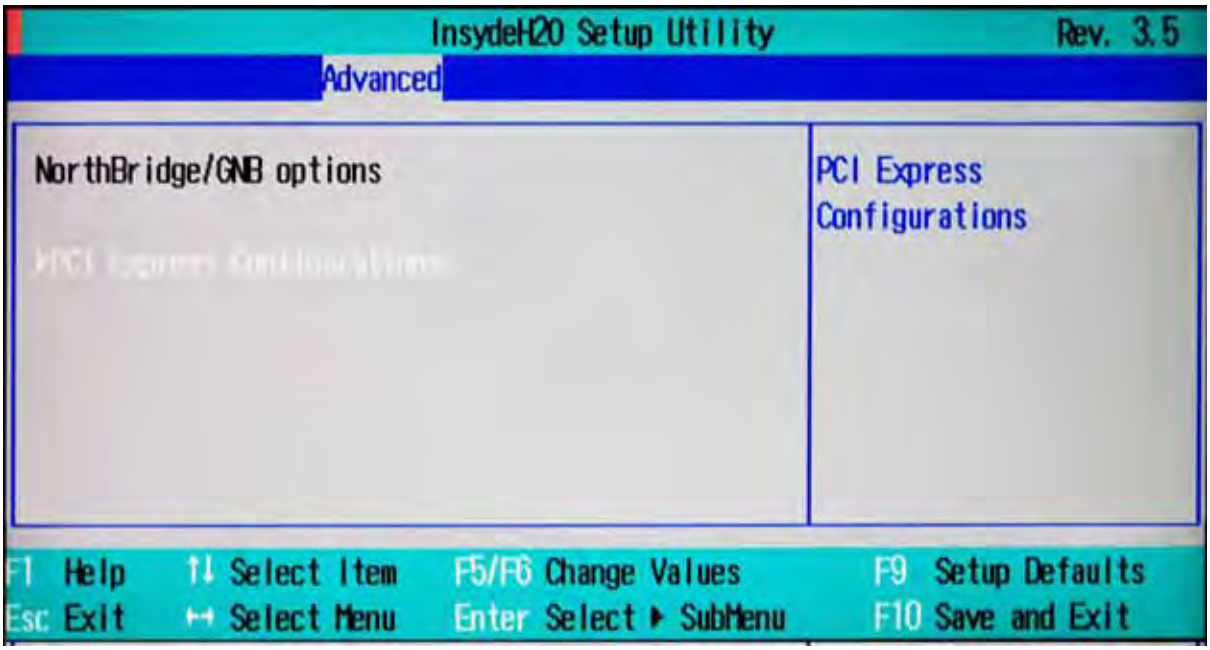


Figure B-12. NorthBridge Configuration

- Select the PCI Express Configuration Screen.

B.4.6.2 NorthBridge PCIe Configuration

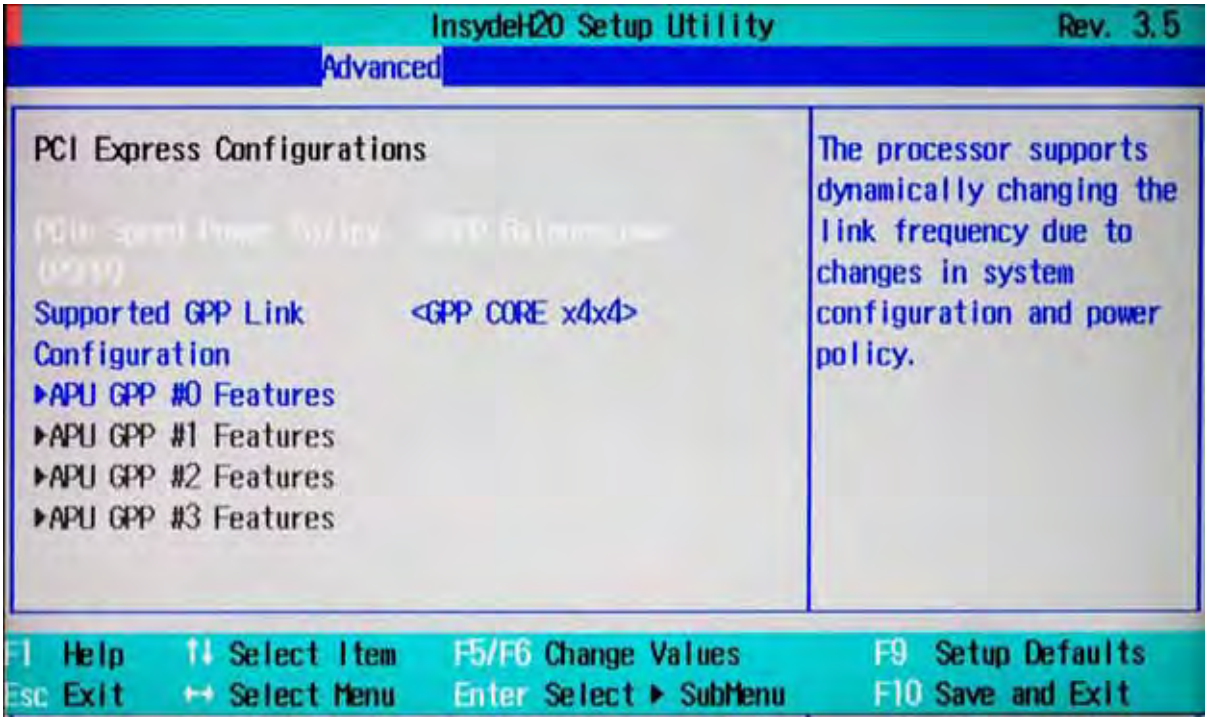


Figure B-13. NorthBridge PCIe Configuration Settings

- Enable dynamic link frequency changes.
- Configure the GPP Link
- Configure the processor GPP features.

B.4.6.3 APU GPP Features Configuration

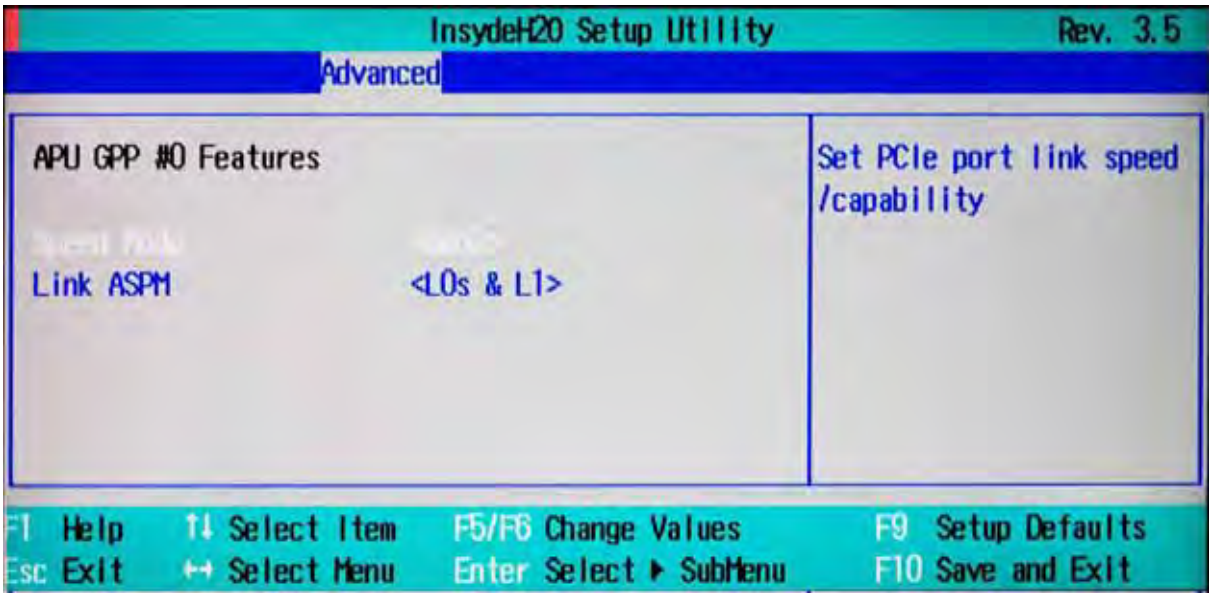


Figure B-14. APU GPP Features Configuration Screen

- Configure the PCIe port link Speed Mode to Gen1 or **Gen2**.
- Configure the Link ASPM.

B.4.6.4 Hudson-1 FCH Configuration

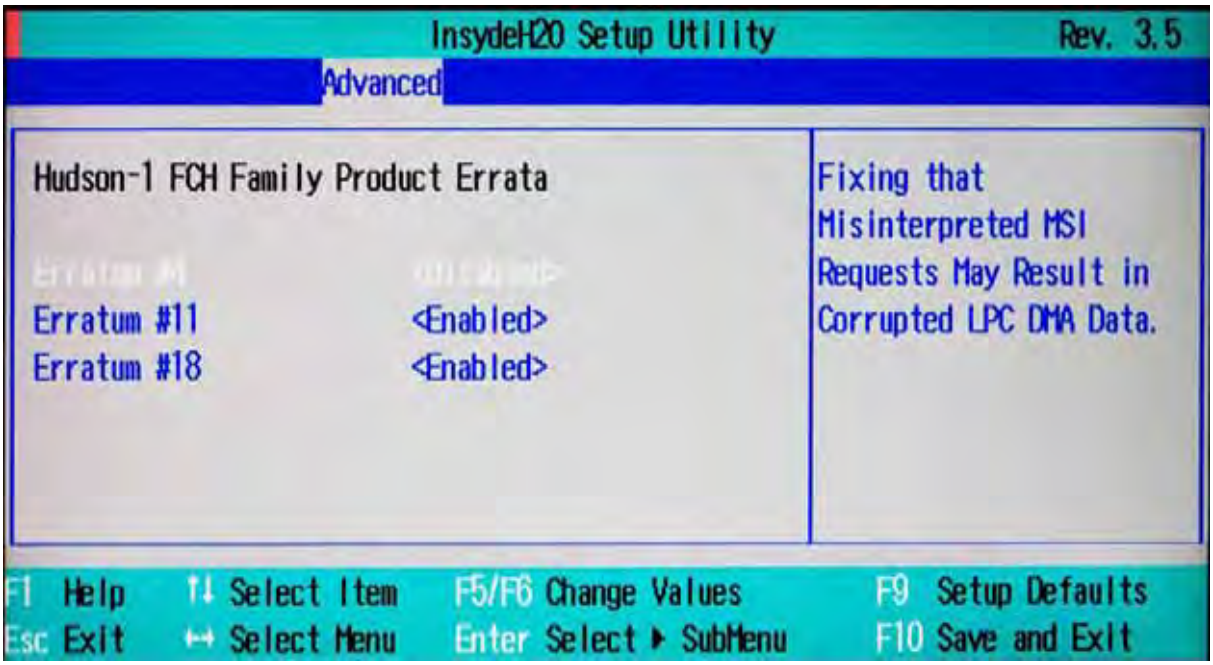


Figure B-15. Hudson-1 FCH Configuration Settings

- Enable or Disable various FCH fixes.

B.4.6.5 SouthBridge/GPP Configuration

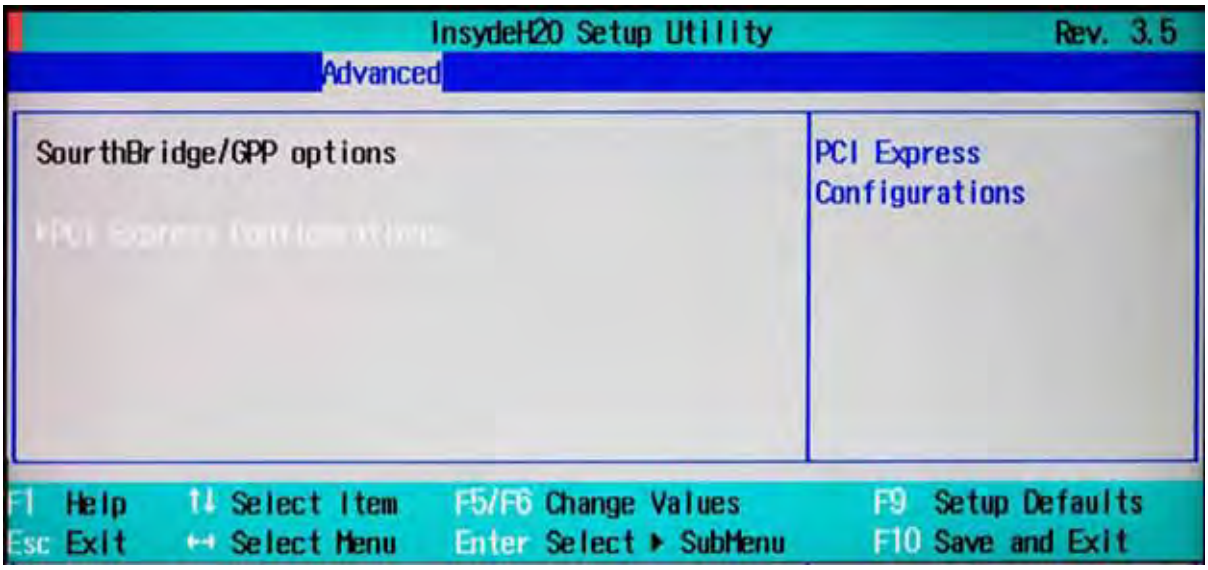


Figure B-16. SouthBridge/GPP Configuration Settings

- Select PCI Express Configurations Screen.

B.4.6.6 SouthBridge PCIe Configuration

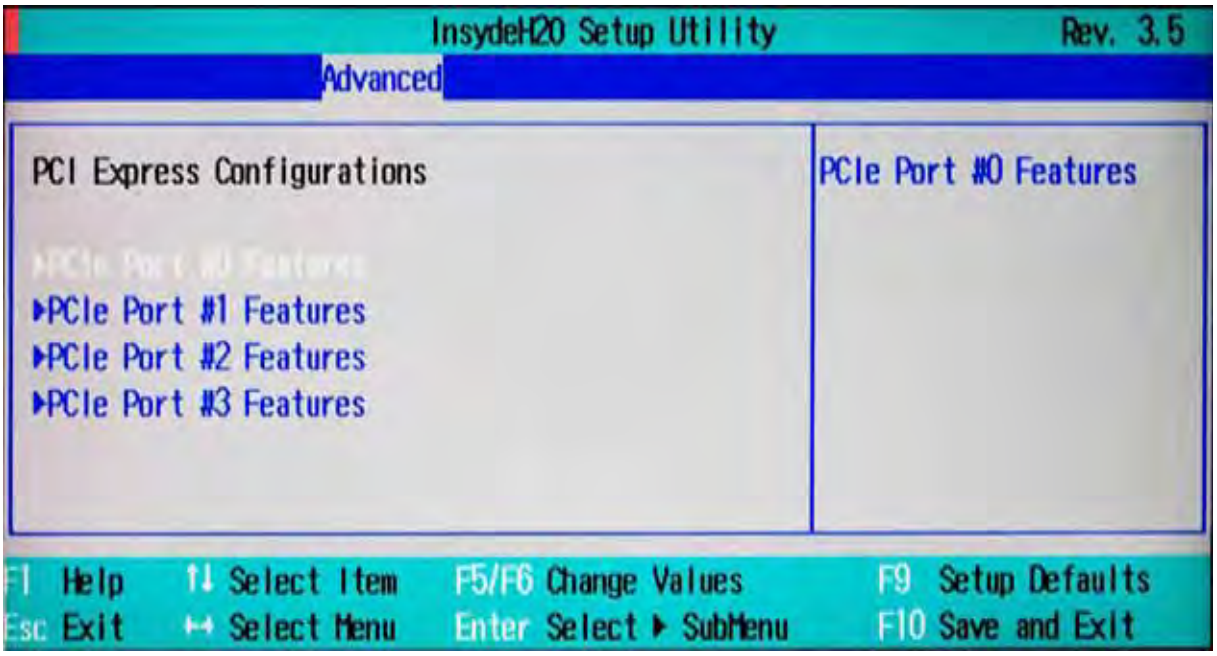


Figure B-17. SouthBridge PCIe Configuration Settings

- Select an individual PCIe Port to configure.

B.4.6.7 SouthBridge PCIe Port Features Configuration

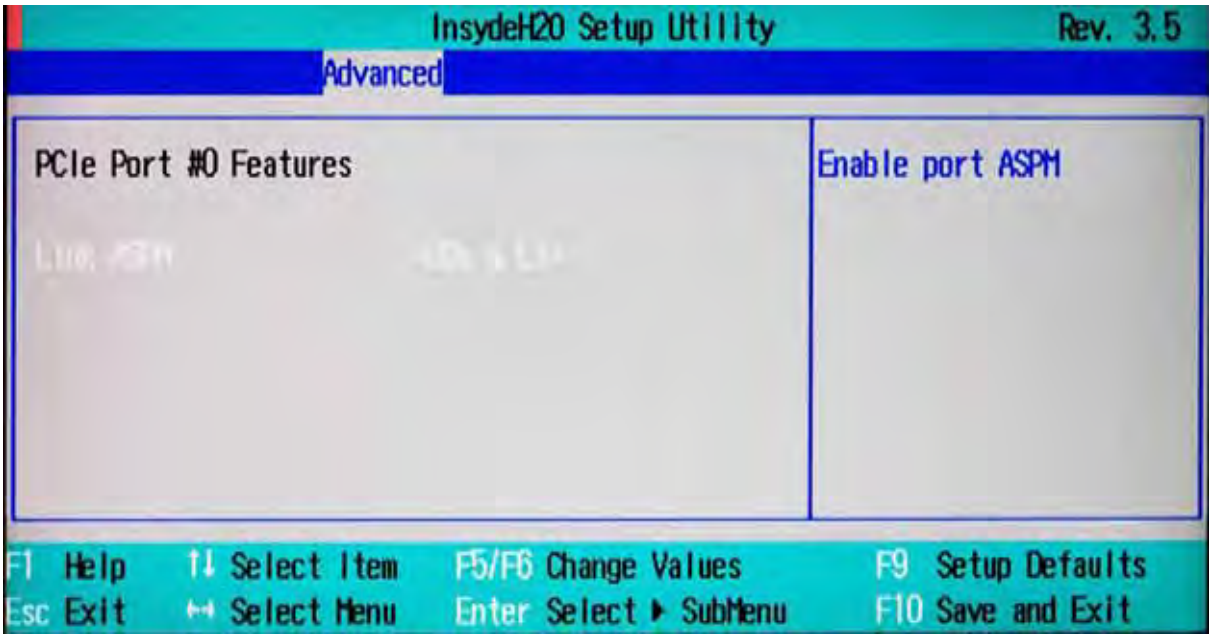


Figure B-18. SouthBridge PCIe Port Features Configuration Settings

- **Enable** PCIe Port ASPM.

B.4.7 ACPI Tables/Features Control

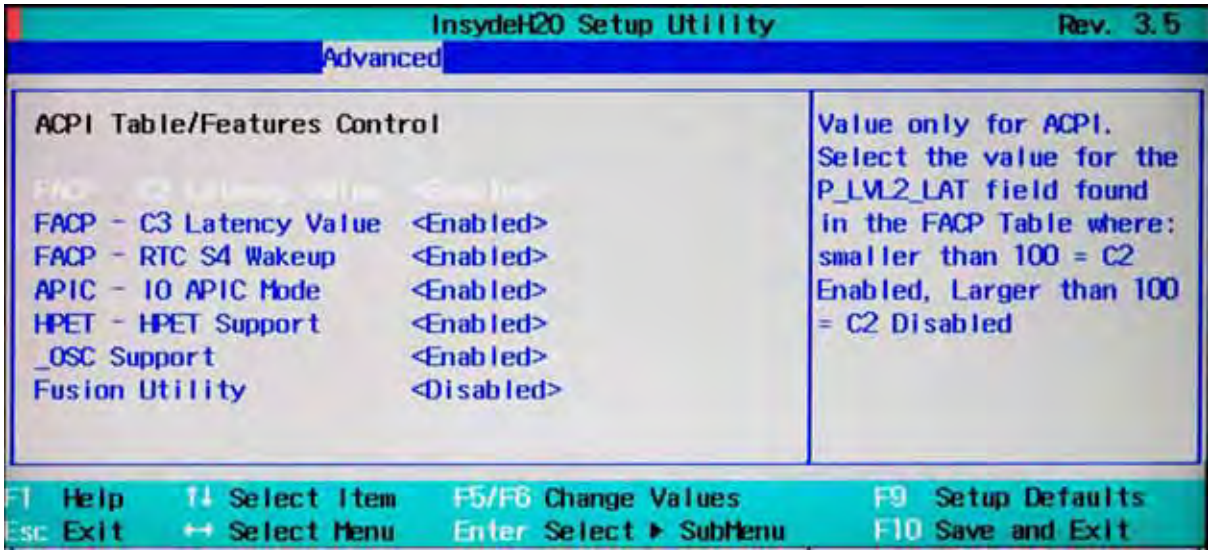


Figure B-19. ACPI Tables/Features Control

- FACP - C2 Latency Value = **Enabled**
-
- FACP - C3 Latency Value = **Enabled**
-
- FACP - RTC s4 Wakeup = **Enabled**
-
- APIC - IO APIC Mode = **Enabled**

- HPET - HPET Support = **Enabled**
- _OCS Support = **Enabled**

- Fusion Utility = **Disabled**

B.4.8 CPU Related Settings

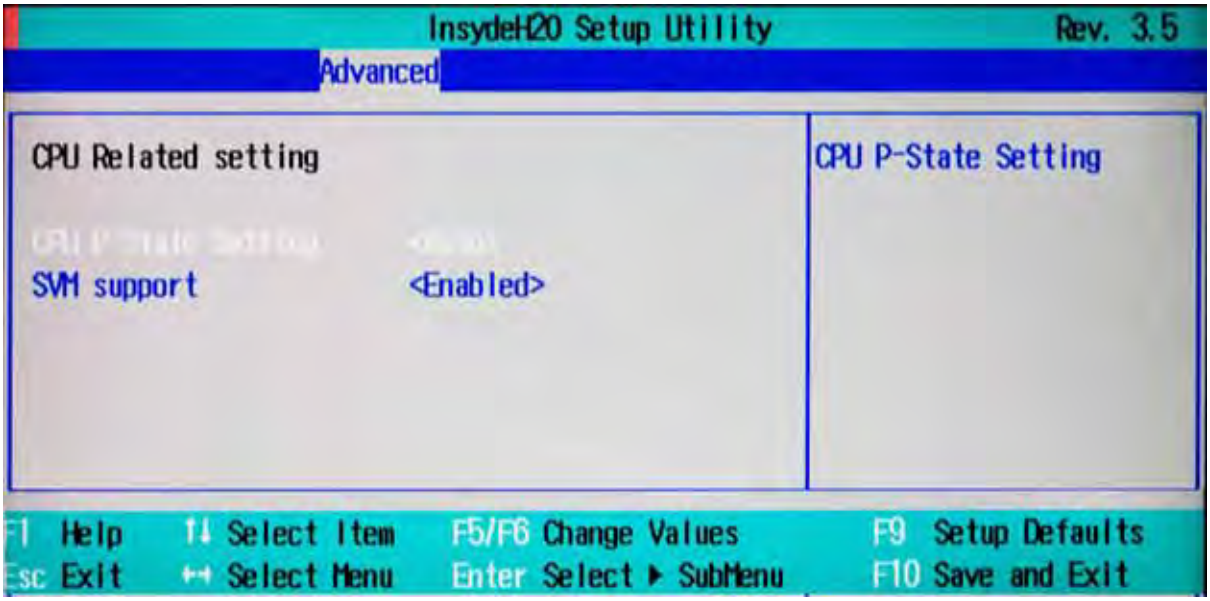


Figure B-20. CPU Related Settings

- CPU P-State Setting = **Auto**
- SVM Support = **Enabled**

B.4.9 AMD PBS Option

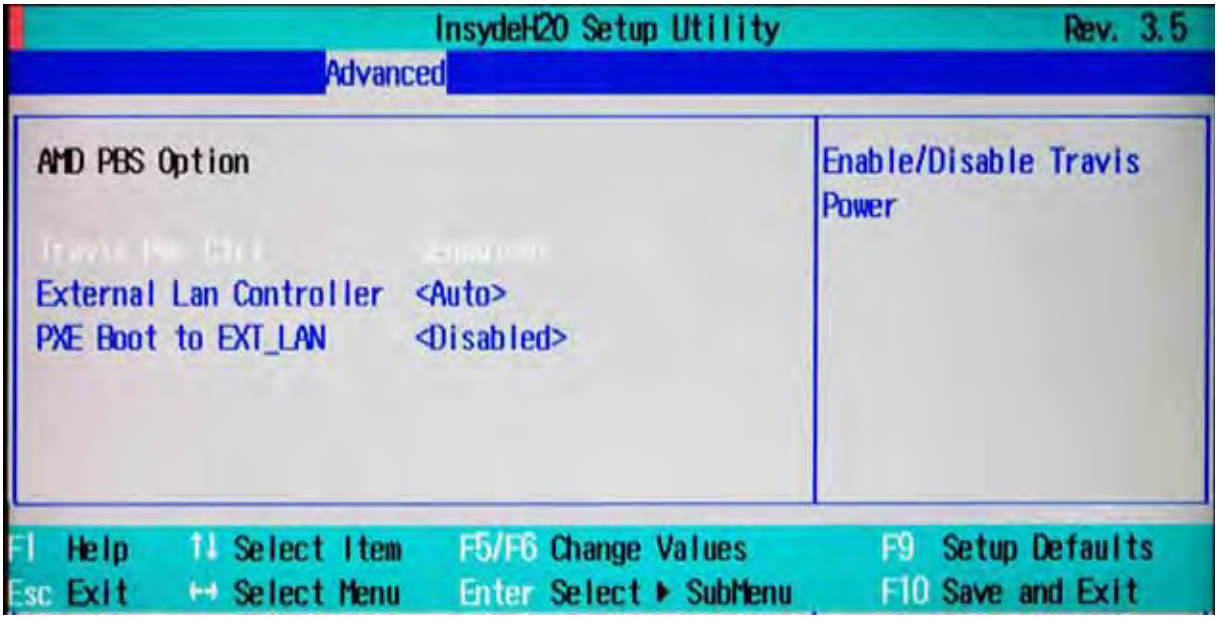


Figure B-21. AMD PBS Option

- Travis Power Control = **Enabled**
- External LAN Controller = **Auto**
- PXE Boot to EXT_LAN = **Disabled**

B.5 Security Configuration

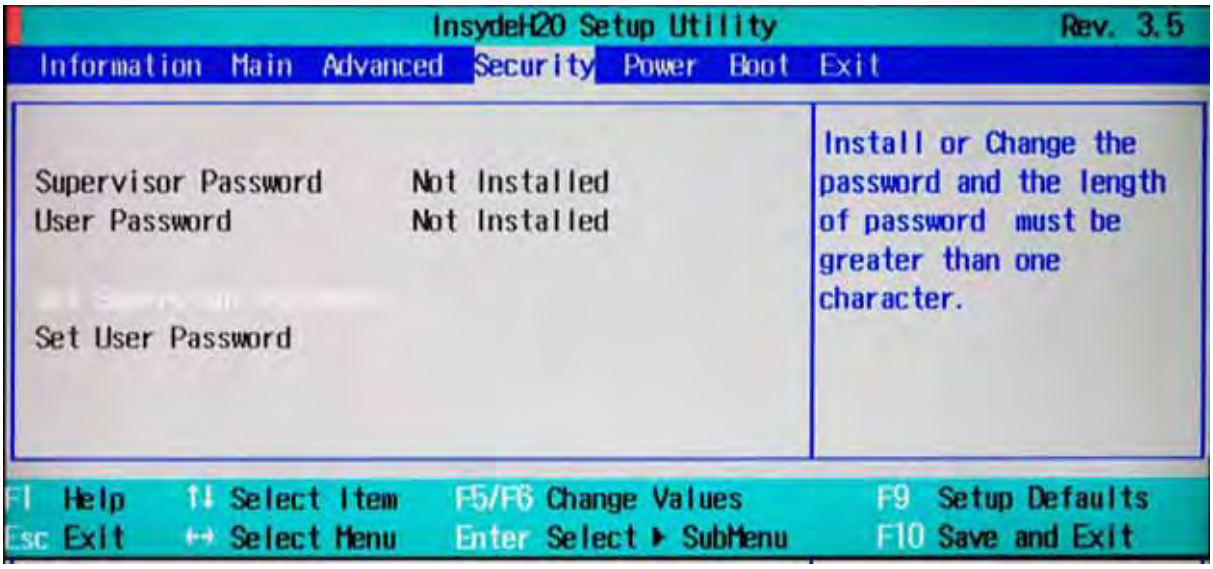


Figure B-22. Security Configuration Settings

- Install or change Supervisor Password.
- Install or change User Password. Supervisor Password must be installed in order to install a User Password

B.6 Power Configuration

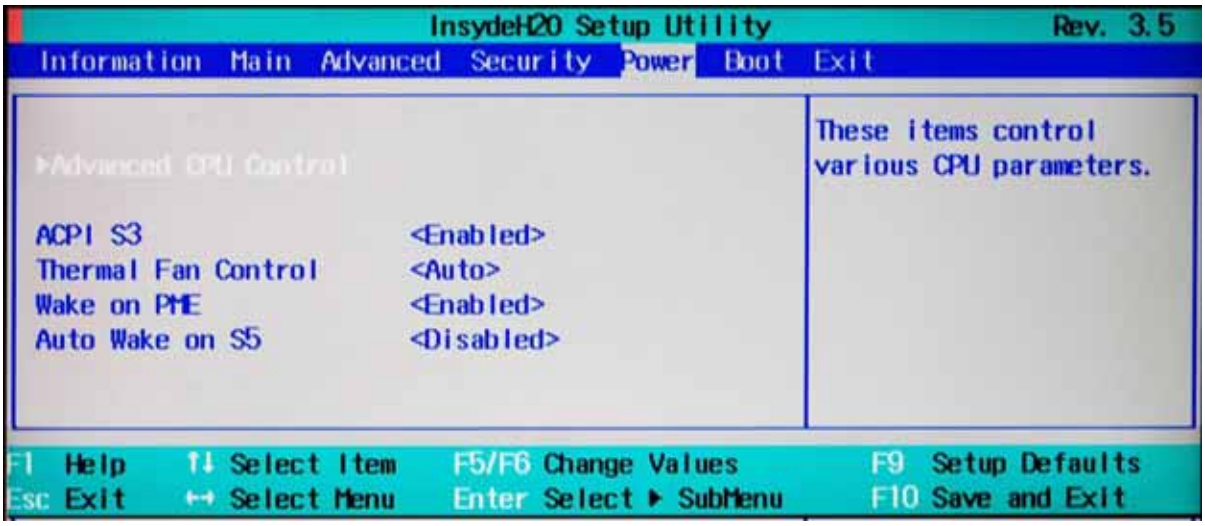


Figure B-23. Power Configuration

- Select the Advanced CPU Control screen to configure various CPU parameters.
- ACPI s3 = **Enabled**
- Thermal Fan Control = **Auto**
- Wake on PME = **Enabled**
- Auto Wake on s5 = **Disabled**

B.6.1 Advanced CPU Control

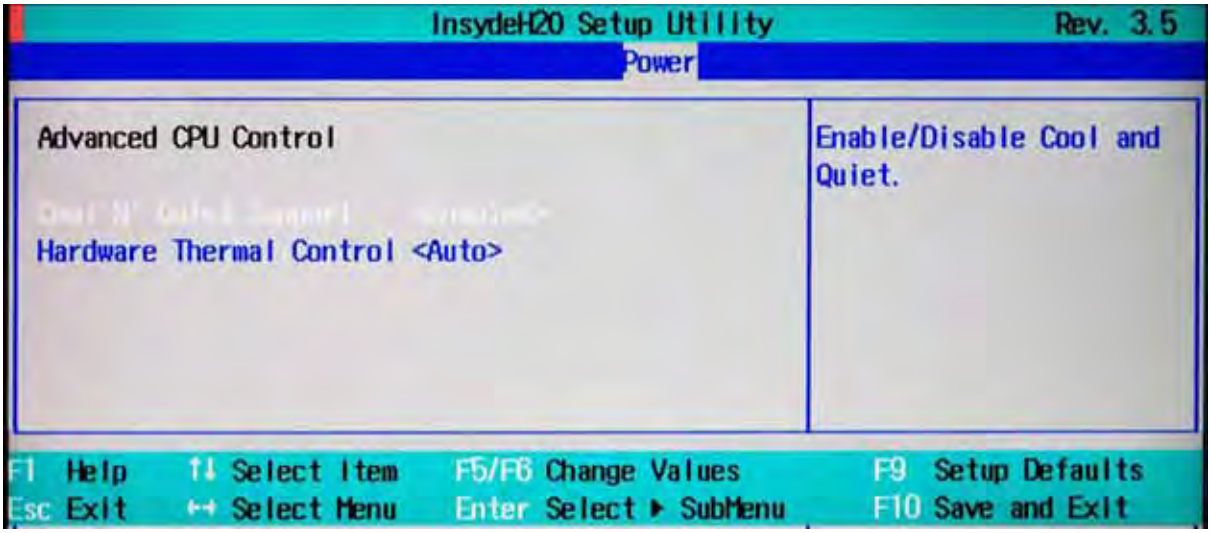


Figure B-24. Advanced CPU Control

- Cool N' Quiet Support = **Enabled**
  Enable or Disable Cool and Quiet Support.
- Hardware Thermal Control = **Auto**

B.7 Boot Configuration

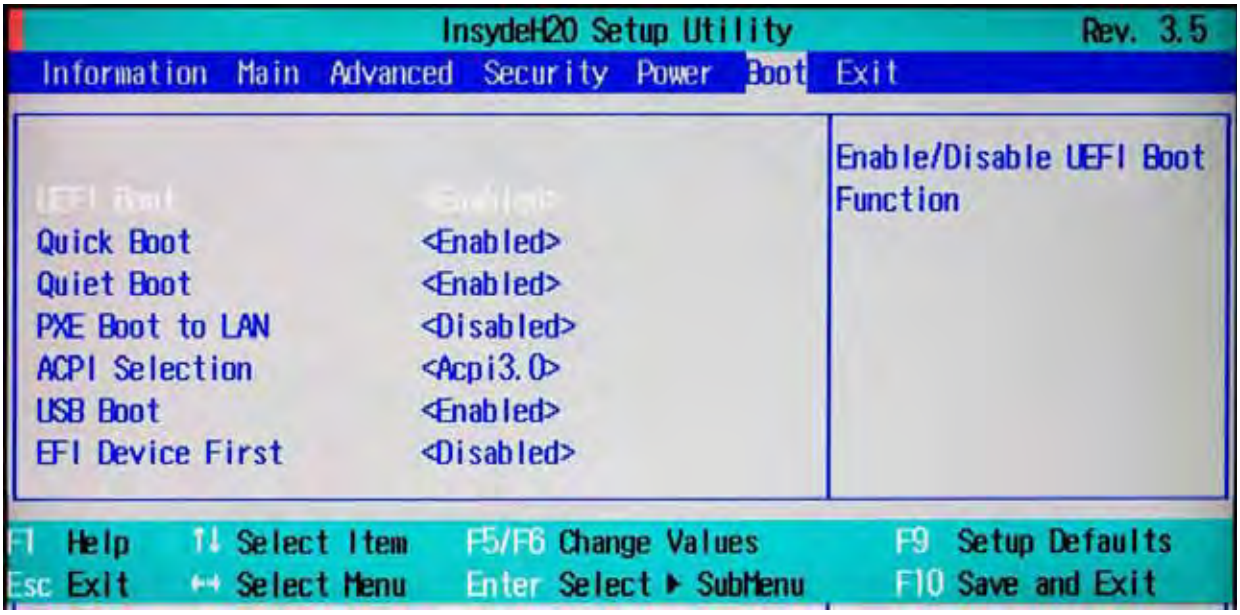


Figure B-25. Boot Configuration

- UEFI Boot = **Enabled**
- Quick Boot = **Enabled**
- Quiet Boot = **Enabled**
- PXE Boot to LAN = **Disabled**
- ACPI Selection = **ACPI 3.0**
- USB Boot = **Enabled**
- EFI Device First = **Disabled**

- Select EFI to configure the Internal EFI shell.

- Select Legacy to configure Legacy Boot Device Priority.
-

B.7.1 EFI Configuration

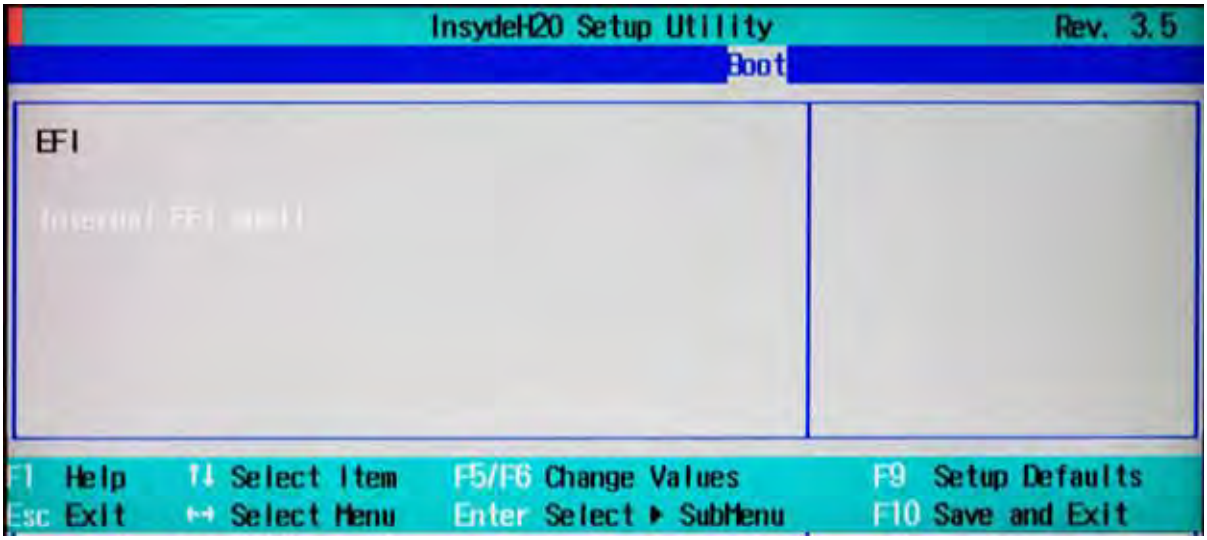


Figure B-26. EFI Configuration

-

B.7.2 Legacy Boot Device Configuration

Figure B-27. Legacy Boot Device Configuration

- Select Normal Boot Option Priority or **Advanced** Boot Option Priority.
- Select the Boot Device

B.8 Exit Menu

Figure B-28. Exit Menu

- Exit Saving Changes
  When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect of all system configuration parameters.
- Save Change Without Exit
  Save changes and continue in the BIOS Setup Utility.
- Exit Discarding Changes
  Select this option to quit Setup without making any permanent changes to the system configuration.
- Load Optimal Defaults
  The BIOS automatically configures all setup items to optimal settings when users select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if the user's computer is experiencing system configuration problems.
- Load Custom Defaults
  Load previously saved Custom Defaults.

- Save Custom Defaults
  Save the current settings as Custom Defaults.
- Discard Changes
  Discard any changes previously made and continue in the BIOS Setup Utility.

BIOS Setup Utility

Appendix C

AMI BIOS Setup Utility

C.1 Introduction

This chapter describes the AMI BIOS Setup Utility for the optionally installed Intel® Single Board Computer in the NanoSWITCH™. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter explains the basic navigation of the AMI BIOS Setup Utility setup screens.

Caution: 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 Themis be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating. This is to avoid possible boot failure.

C.1.1 Starting the BIOS Setup Utility

Turn on the computer and check for the “patch code”. If there is a number assigned to the patch code, the on board CPU is supported by current BIOS. If there is no number assigned to the patch code, please contact a Themis application engineer to obtain an up-to-date patch code file, to ensure the system status of CPU is valid. Then press <DEL> to enter Setup menu.

The first screen to appear is the Main Settings Screen. (See *Figure C-1*). The Main

BIOS setup menu screen has three 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 bottom right frame displays the key legend. The frame above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

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 the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, arrow keys, etc.

Note: Options printed in **Bold** are default settings.

C.2 Main BIOS 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 in *Figure C-1*.

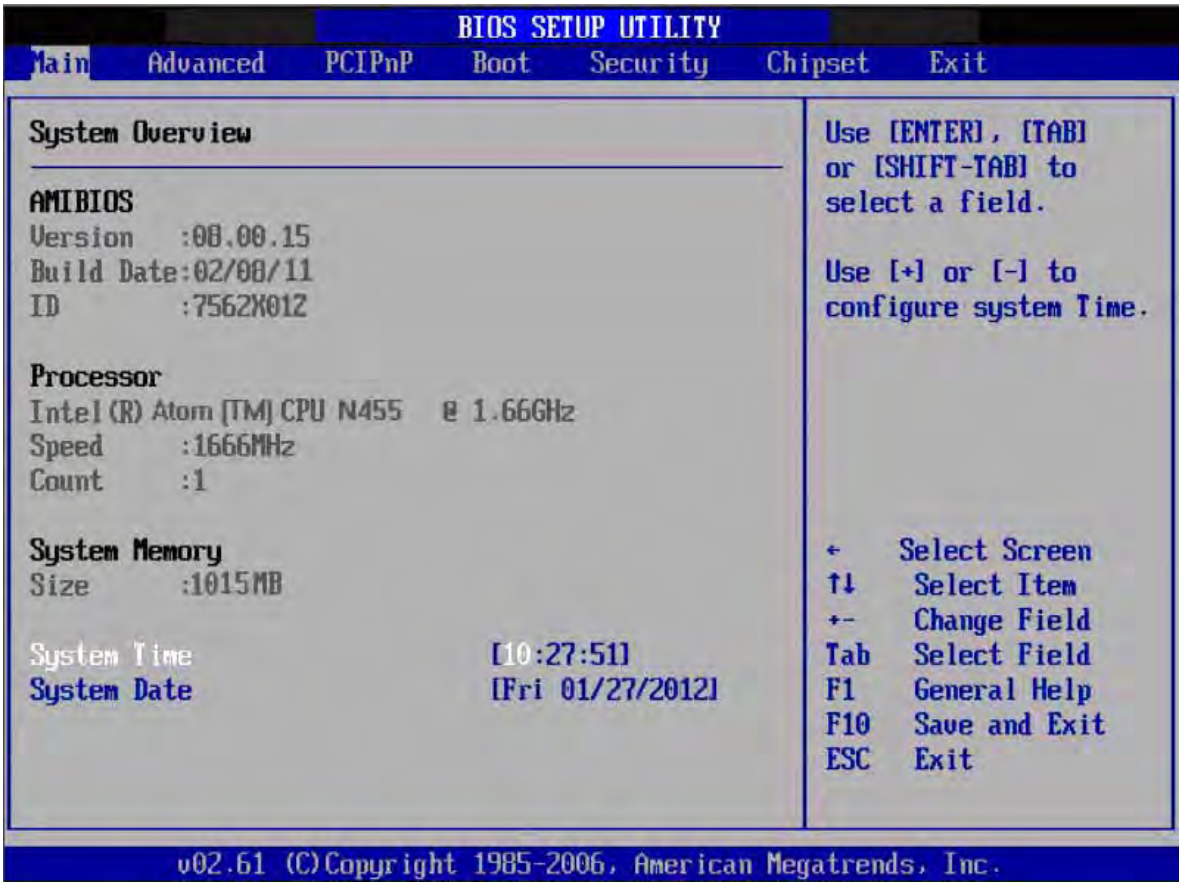


Figure C-1. Main Setup Screen

C.2.1 System Overview:

The following BIOS information will be displayed:

C.2.1.1 BIOS Information

This area displays the BIOS version, the build date, and ID of the BIOS.

C.2.1.2 System Memory Information

This area displays the size of the system memory.

C.2.1.3 System Time/System Date

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

Note: The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.

C.3 Advanced Setup Configuration

Caution: It is advisable not to change from the default settings, as they are set according to the hardware design of this board. Options in **Bold** are the **default settings**.

Use the horizontal arrow keys to select the Advanced Settings screen. Use the verti-

cal arrows to select the submenu items, and hit <Enter> to access them.

Figure C-2. Advanced Settings

C.3.1 CPU Configuration

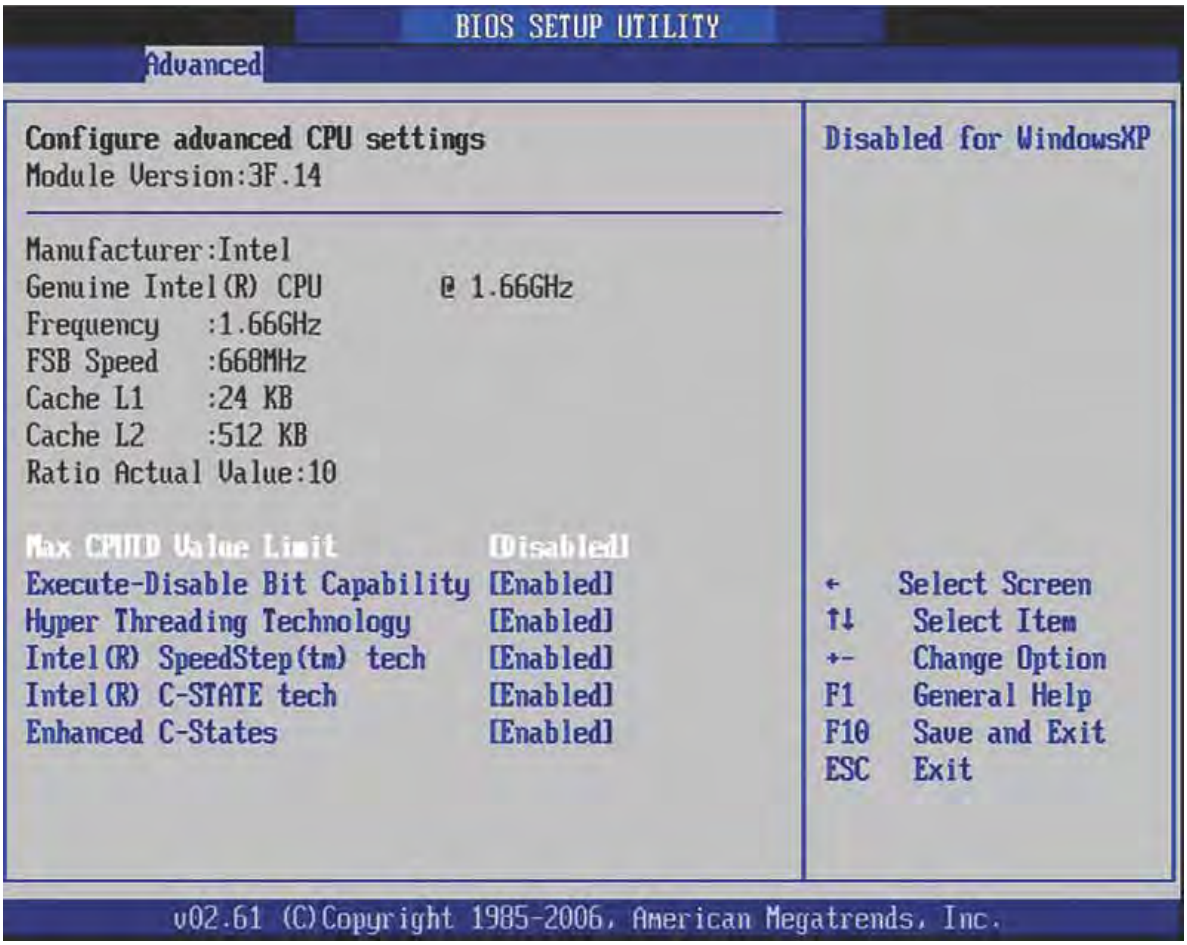


Figure C-3. CPU Configuration Settings

- Max CPUID Value Limit = **Disabled**
  This item allows users to limit the maximum value of CPUID.
- Execute-Disable Bit Capability = **Enabled**
  This item allows users to enable or disable the No-Execution page protection technology.
- Hyper Threading Technology = **Enabled**
  This item allows users to enable or disable Intel® Hyper Threading technology.
- Intel® Speed Step™ tech = **Enabled**
  CPU runs at its default speed if disabled; CPU speed is controlled by the operating system if enabled.

- Intel® C-STATE tech = **Enabled**
  This item allows the CPU to save more power in idle mode.
- Enhanced C-States = **Enabled**
  Enable / Disable Intel® C-STATE technology

C.3.2 IDE Configuration

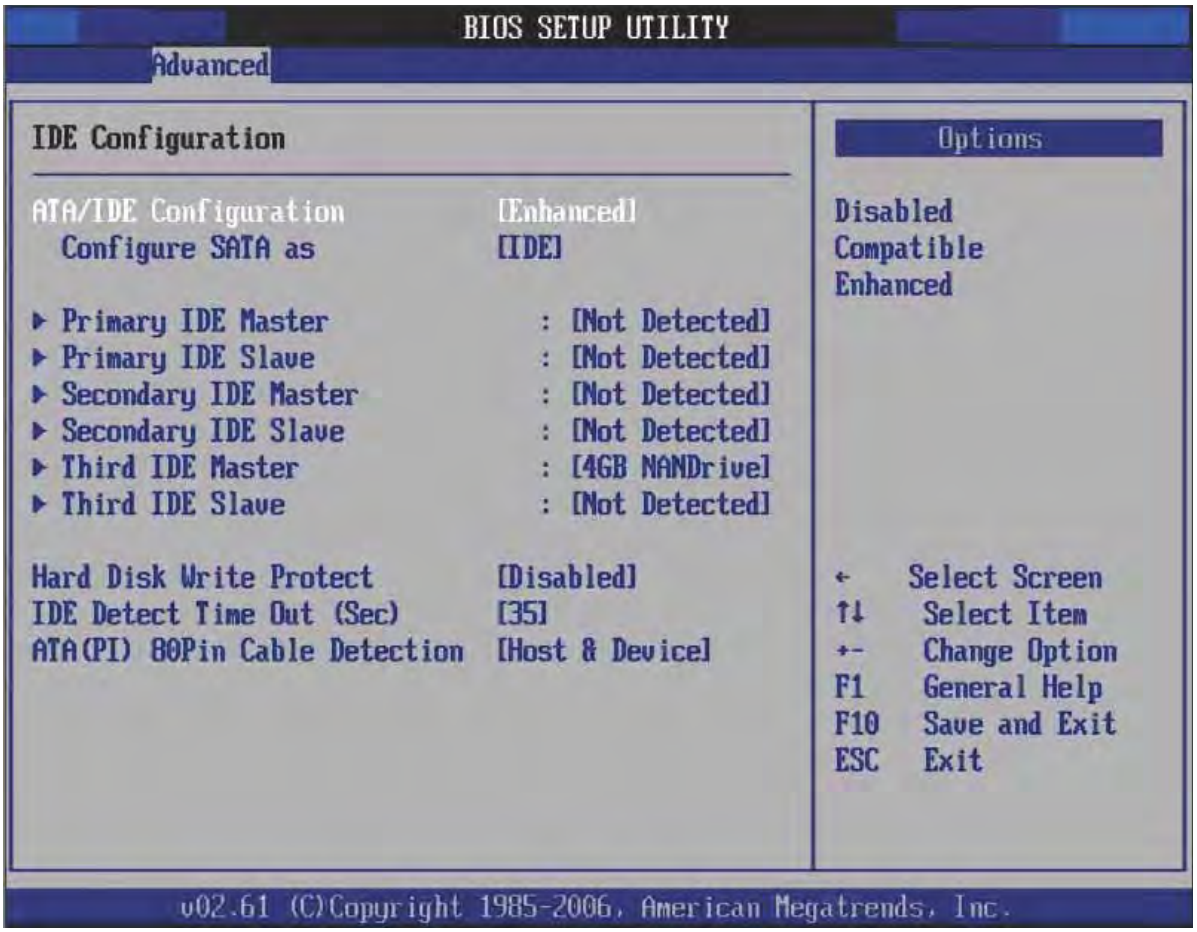


Figure C-4. IDE Configuration Settings

- ATA/IDE Configuration = **Enhanced**
  This item allows users to select Disabled / Compatible / Enhanced modes. When set to Enhanced mode, users can select IDE or AHCI mode. When set to Compatible mode, users can select “SATA only,” “SATA Primary, PATA Secondary” or “PATA Only.”

- Primary / Secondary / Third IDE Master / Slave
  BIOS auto detects the presence of an IDE device, and displays the status of auto detection of the IDE device.
  - — Type: Select the type of SATA driver; [Not Installed] [Auto] [CD/DVD] [ARMD]
  - — LBA/Large Mode: Enables or Disables the LBA Mode.
  - — Block (Multi-Sector Transfer): Enables or Disables data multi-sectors transfers.
  - — PIO Mode: Select the operating mode of PIO.
  - — DMA Mode: Select the operating mode of DMA
  - — S.M.A.R.T.: Select the smart monitoring, analysis, and reporting technology.
  - — 32Bit Data Transfer: Enables or disables 32-bit data transfer.
- Hard Disk Write Protect = **Disabled**
  Disable / Enable device write protection. This will be effective only if device is accessed through BIOS.
- IDE Detect Time Out (Sec)
  This item allows users to select the time out value for detecting ATA/ATAPI devices.
- ATA(PI) 80Pin Cable Detection
  This item allows users to select the way to detect IDE 80-pin cable.

C.3.3 Floppy Configuration

Figure C-5. Floppy Configuration Settings

- Floppy A/B
  Select the type of floppy drive, if any are connected to the system. Disabling the floppy driver is recommended if no floppy drive is connected.

C.3.4 ACPI Settings

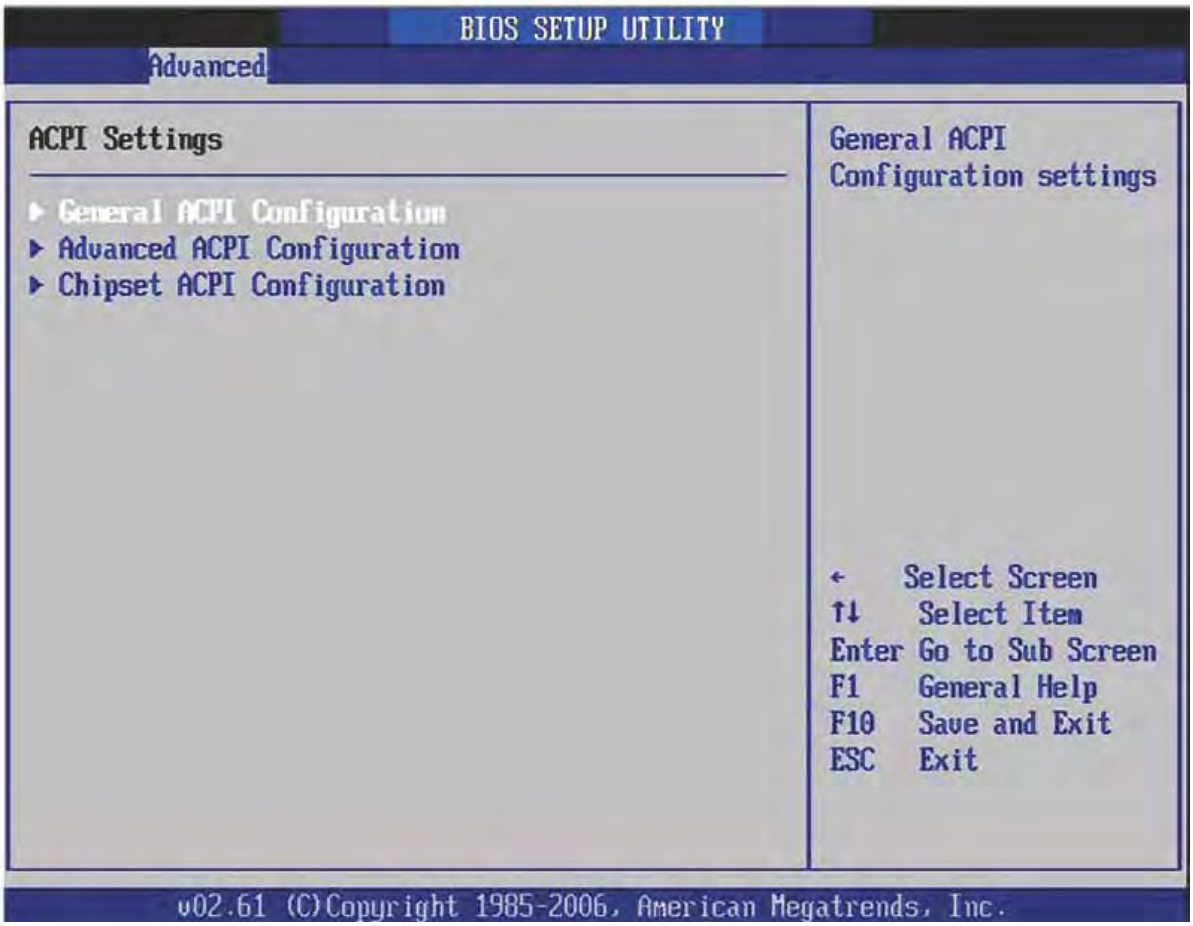


Figure C-6. ACPI Settings

C.3.4.1 General ACPI Configuration

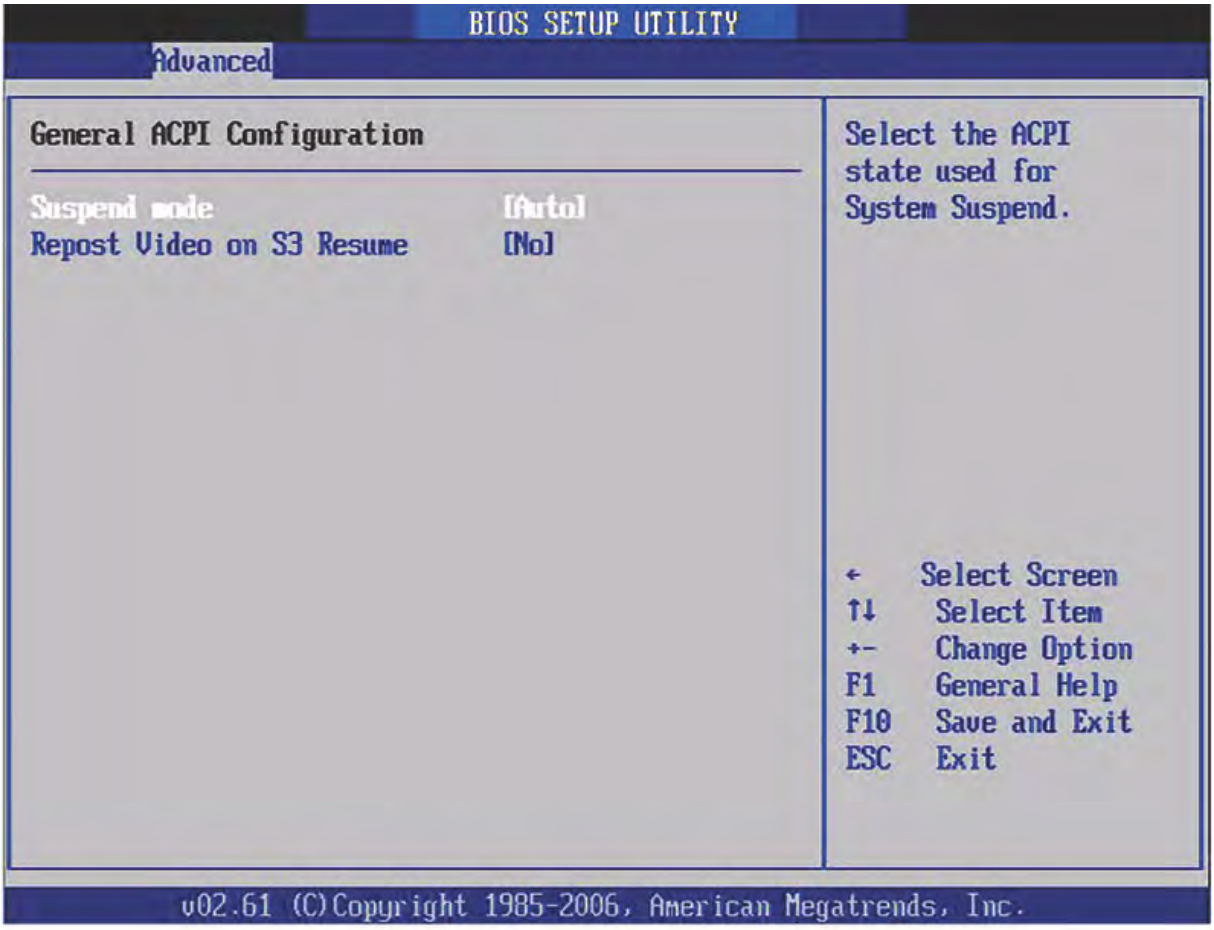


Figure C-7. General ACPI Configuration Settings

- Suspend Mode = **Auto**
  Select the ACPI state used for system suspend.
- RePOST Video on S3 Resume = **NO**
  This item allows users to invoke VGA BIOS POST on S3/STR resume.

C.3.4.2 Advanced ACPI Configuration

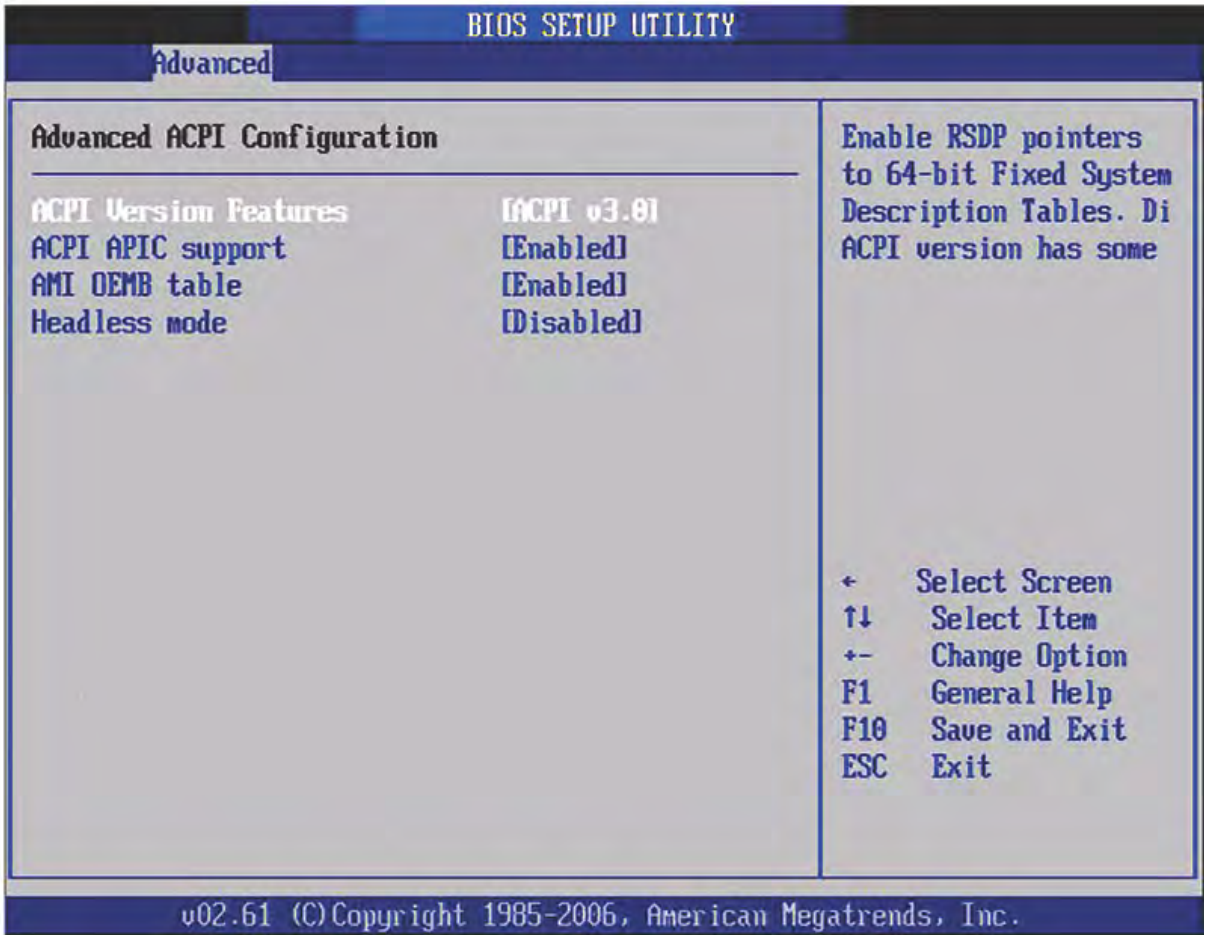


Figure C-8. Advanced ACPI Configuration Settings

- ACPI Version Features
  This item allows users to enable RSDP pointers to 64-bit fixed system description tables.
- ACPI APIC support = **Enabled**
  Include APIC table pointer to RSDT pointer list.
- AMI OEMB table = **Enable**
  Include OEMB table pointer to R(x)SDT pointer lists.
- Headless Mode = **Disable**
  Enable / Disable headless operation mode through ACPI.

C.3.4.3 Chipset ACPI Configuration

C.3.4.4 Chipset ACPI Configuration Settings

- Energy Lake Feature = **Disabled**
  This item allows users to configure Intel's® Energy Lake power management technology.
- APIC ACPI SCI IRQ = **Disabled**
  Enable / Disable APIC ACPI SCI IRQ
- USB Device Wakeup From S3/S4 = **Disabled**
  Enable / Disable USB Device Wakeup from S3/S4
- High Performance Event Timer = **Disabled**
  Enable / Disable High Performance event timer.

C.3.5 AHCI Configuration

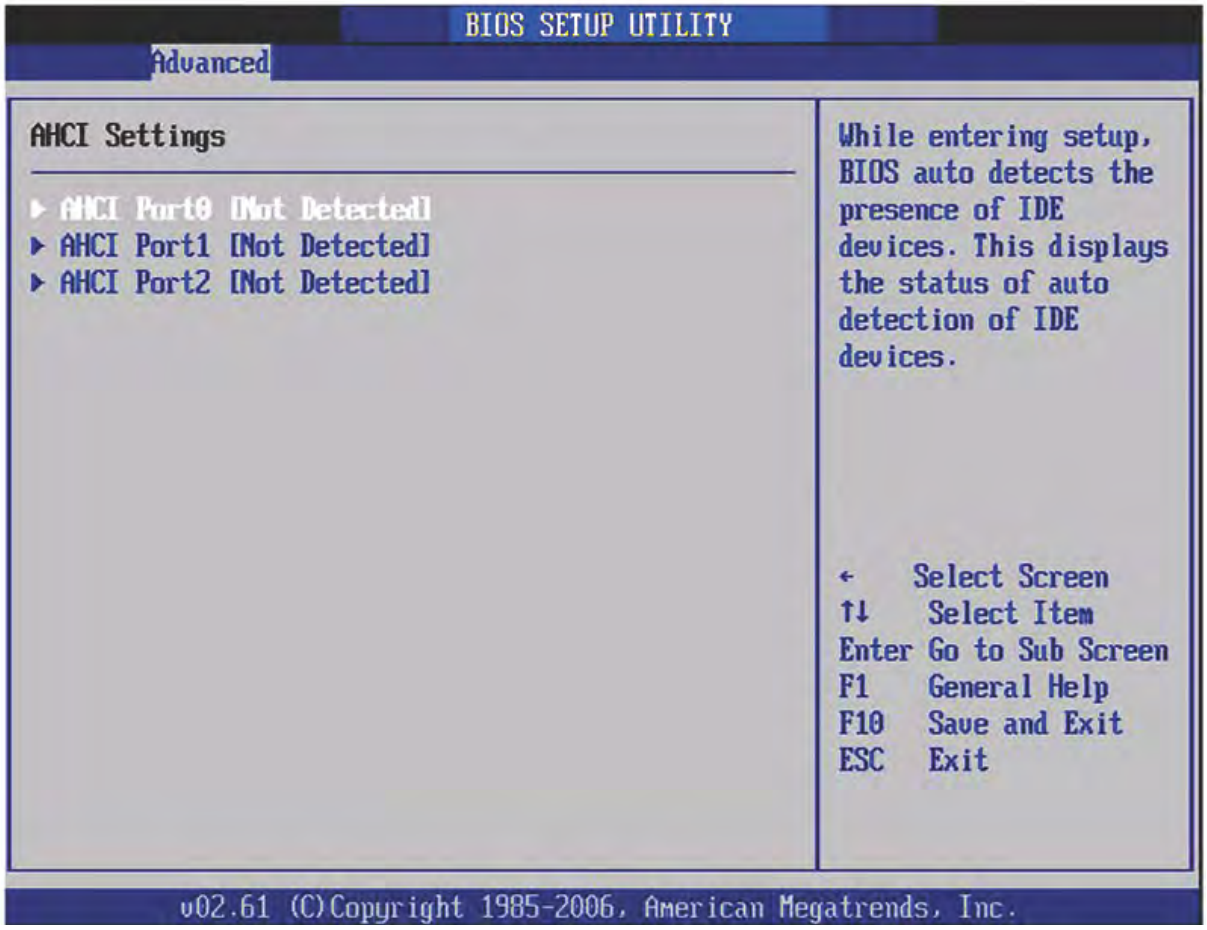


Figure C-9. AHCI Configuration Settings

- AHCI Port0 / Port1 / Port2
  While entering setup, BIOS auto detects the presence of IDE devices and displays the status of detected IDE devices.

C.3.6 Event Log Configuration

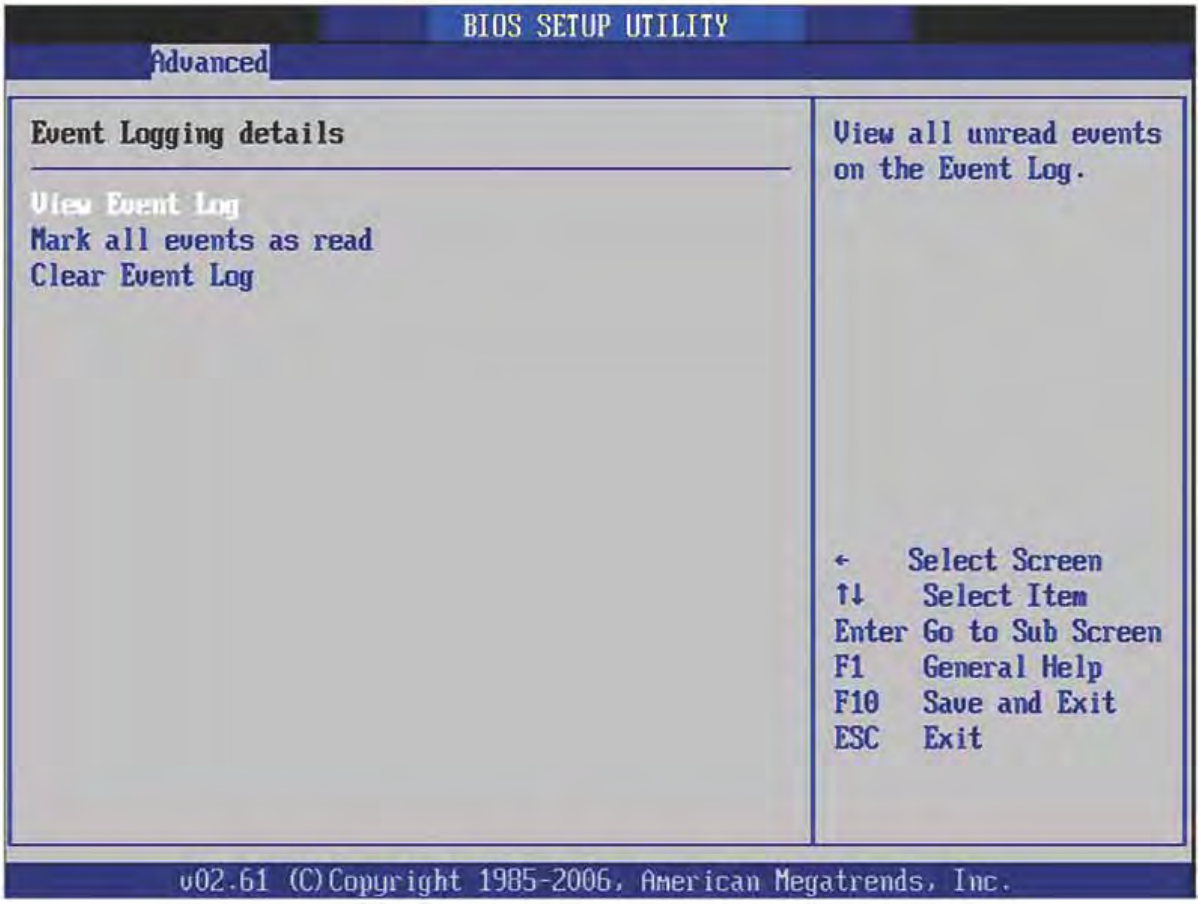


Figure C-10. Event Log Configuration Settings

- View Event Log
  View all unread events in the Event Log.
- Mark all events as read
  Mark all unread events as read.
- Clear Event Log
  Discard all events in the Event Log.

C.3.7 Hardware Health Configuration

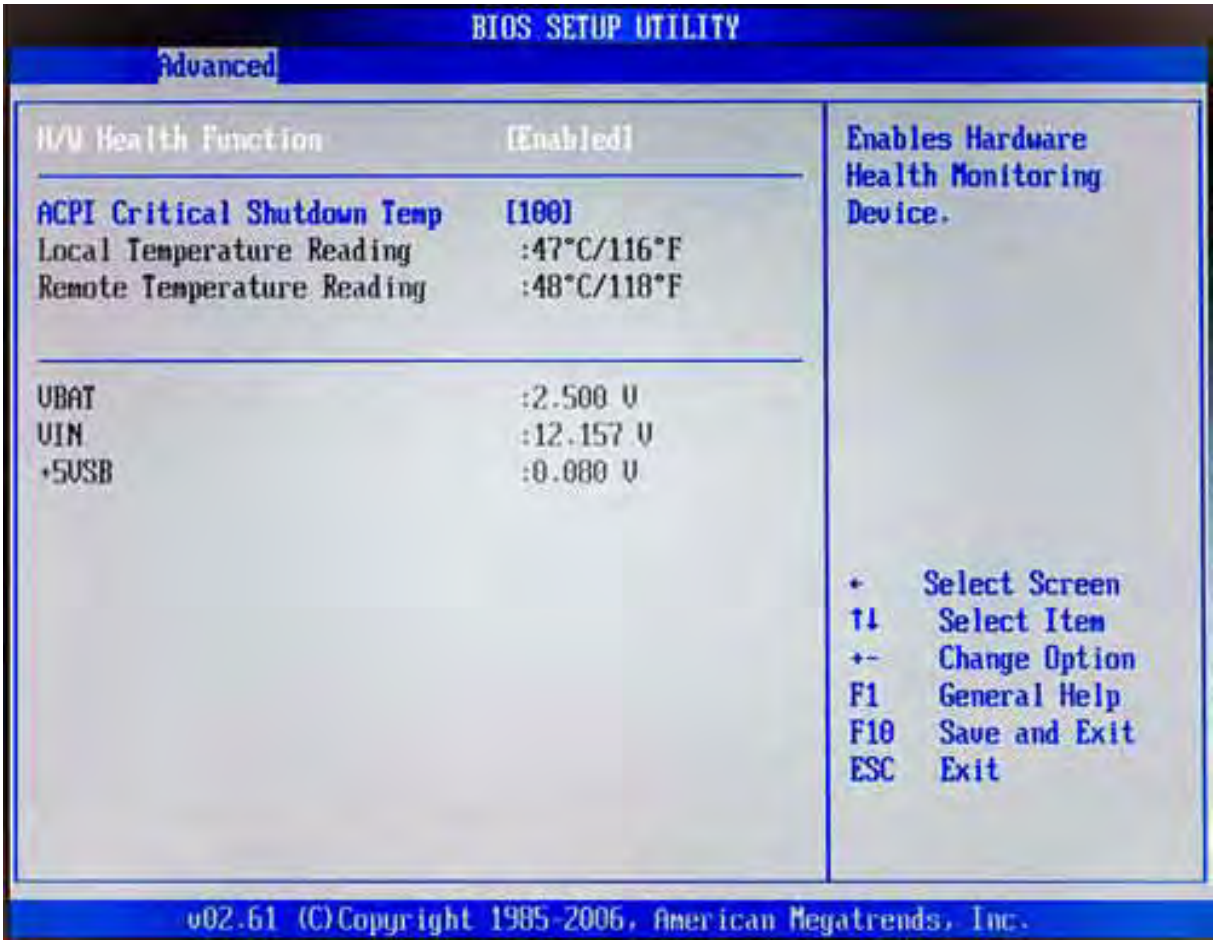


Figure C-11. Hardware Health Configuration Settings

- Hardware Health Function = **Enabled**
  This item allows users to display or hide the status of a H/W monitor.
- ACPI Critical Shutdown Temp
  This item allows users to set the value of CPU shutdown temperature in ACPI OS.
- Temperature and Voltage Information
  Local (System) / Remote (CPU) Temperature.
  VBAT / VIN / +5VSB

C.3.8 MPS Configuration

Figure C-12. MPS Configuration Settings

- MPS Revision
  This item allows users to select MPS reversion.

C.3.9 SMBIOS Configuration

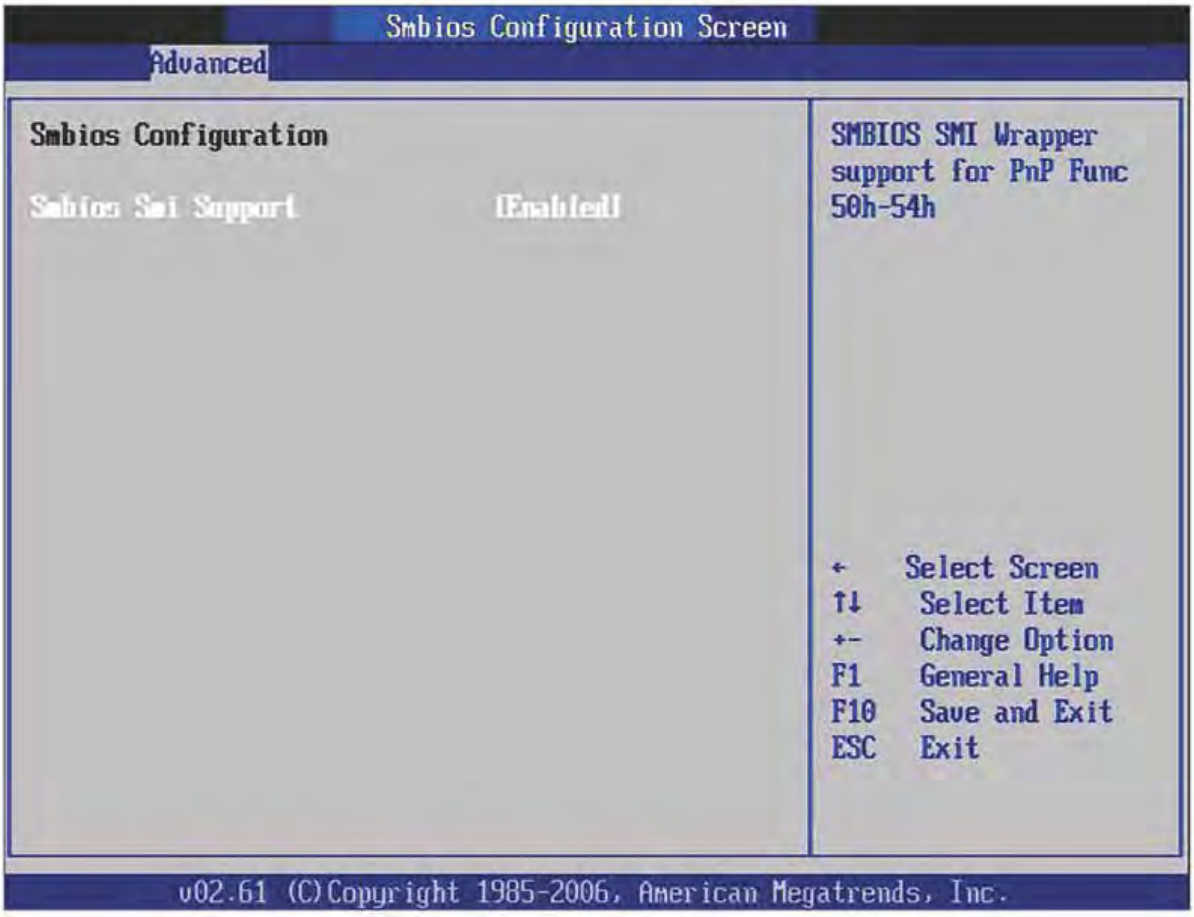


Figure C-13. SMBIOS Configuration Settings

- SMBIOS SMI Support = **Enabled**
  SMBIOS SMI wrapper support for PnP function 50h-54h.

C.3.10 USB Configuration

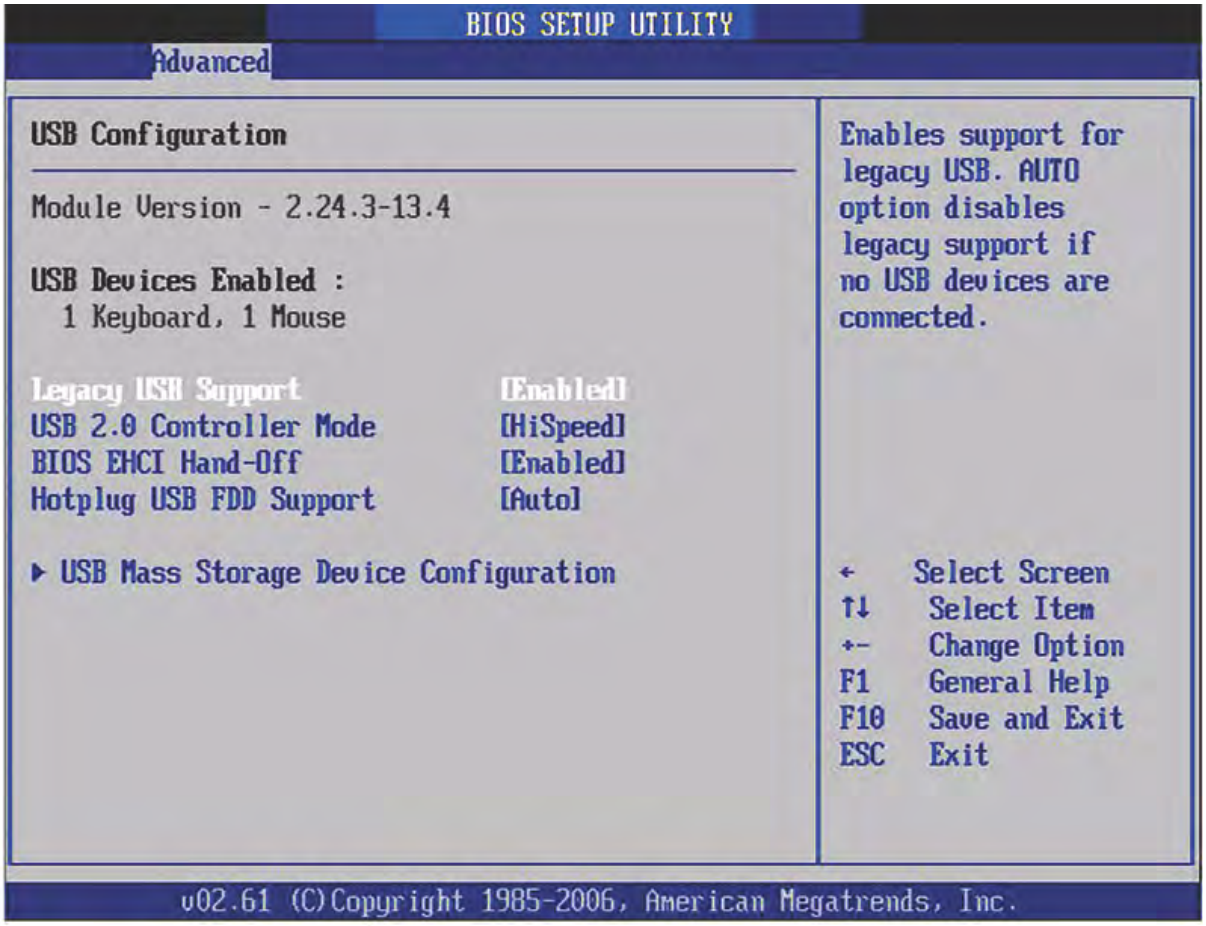


Figure C-14. USB Configuration Settings

- Legacy USB Support = **Enabled**
  Enable the support for legacy USB. Auto option disables legacy support if no USB devices are connected.
- USB 2.0 Controller Mode = **HiSpeed**
  This item allows users to select HiSpeed (480 Mbps) or FullSpeed (12 Mpbs).
- BIOS EHCI Hand-Off = **Enabled**
  This is a workaround for the OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.

- Hotplug USB FDD Support = Auto
  A dummy FDD device is created that will be associated with the hot-plugged FDD later. Auto option creates this dummy device only if there is no USB FDD present.

C.3.10.1 USB Mass Storage Device Configuration

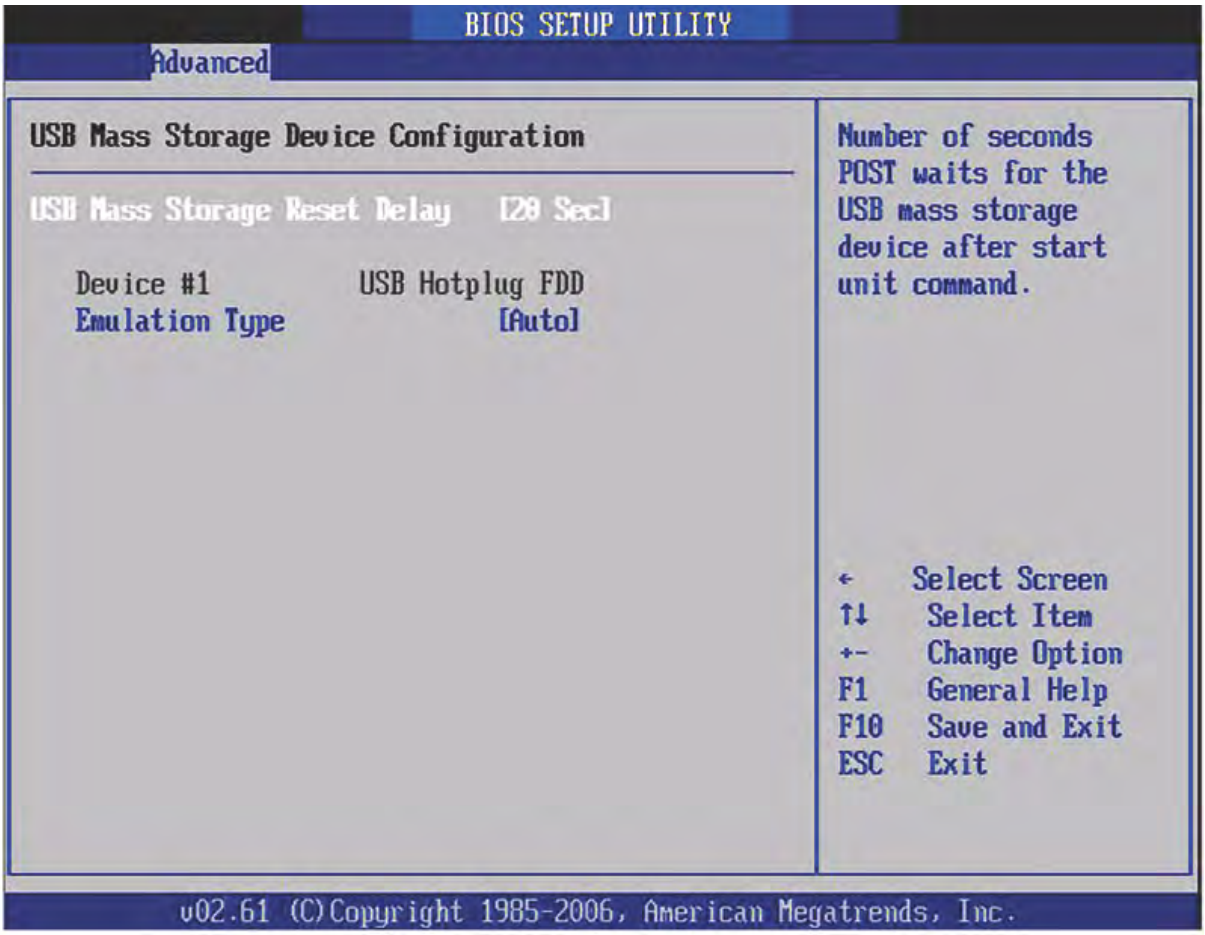


Figure C-15. USB Mass Storage Device Configuration Settings

- USB Mass Storage Reset Delay = **20 Sec**
  Number of seconds POST waits for the USB mass storage device after start unit command.
- Emulation Type = **Auto**
  If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Force FDD option can be used to force a FDD formatted drive to boot as FDD (Example, ZIP drive).

C.4 Advanced PCI/PnP Settings

Select the PCI/PnP tab from the BIOS setup screen to enter the Plug and Play BIOS Setup screen. Users can display a Plug and Play BIOS Setup option by highlighting is using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

Figure C-16. PCI/PnP Configuration Settings

- Clear NVRAM = **NO**
  Set this value to force the BIOS to clear the Non-Volatile Random Access Memory (NVRAM). The Optimal and Fail-Safe default setting is NO.

- Plug & Play O/S = **NO**
  when set to NO, the BIOS configures all devices in the system. If set to YES, and the OS supports Plug & Play, then rebooting the system is not required after the OS finishes configuration of the plug and play devices.
- PCI Latency Timer
  Value in units of PCI clocks for PCI device latency timer register.
- Allocate IRQ to PCI VGA = **YES**
  When to ES will assign IRQ to PCI VGA card if the card requests an IRQ. When set to NO the BIOS will not assign an IRQ to PCI VGA card even if the card requests it.
- Palette Snooping = **Disabled**
  This item is designed to solve problems caused by some non-standard VGA cards.
- PCI IDE BusMaster = **Enabled**
  When set to enable BIOS, it uses PCI bus mastering for reading/writing to IDE devices.
- OffBoard PCI/ISA IDE Card = **Auto**
  Some PCI IDE cards may require this to be set to the PCI slot number that is holding the card. When set to Auto, it will work for most PCI IDE cards.
- IRQ3 / 4 / 5 / 7 / 9 / 10 / 11
  This item allows users to respectively assign an interruptive type for IRQ3, 4, 5, 7, 9, 10, 11.
- DMA Channel0 / 1 / 3 / 5 / 6 / 7
  When set to Available, will allow specified DMA to be available to be used by PCI/PnP devices. When set to Reserved, will allow specified DMA to be reserved for use by legacy ISA devices.
- Reserved Memory Size
  This item allows users to reserve a specific size of memory block for legacy ISA devices.

C.5 Boot Settings

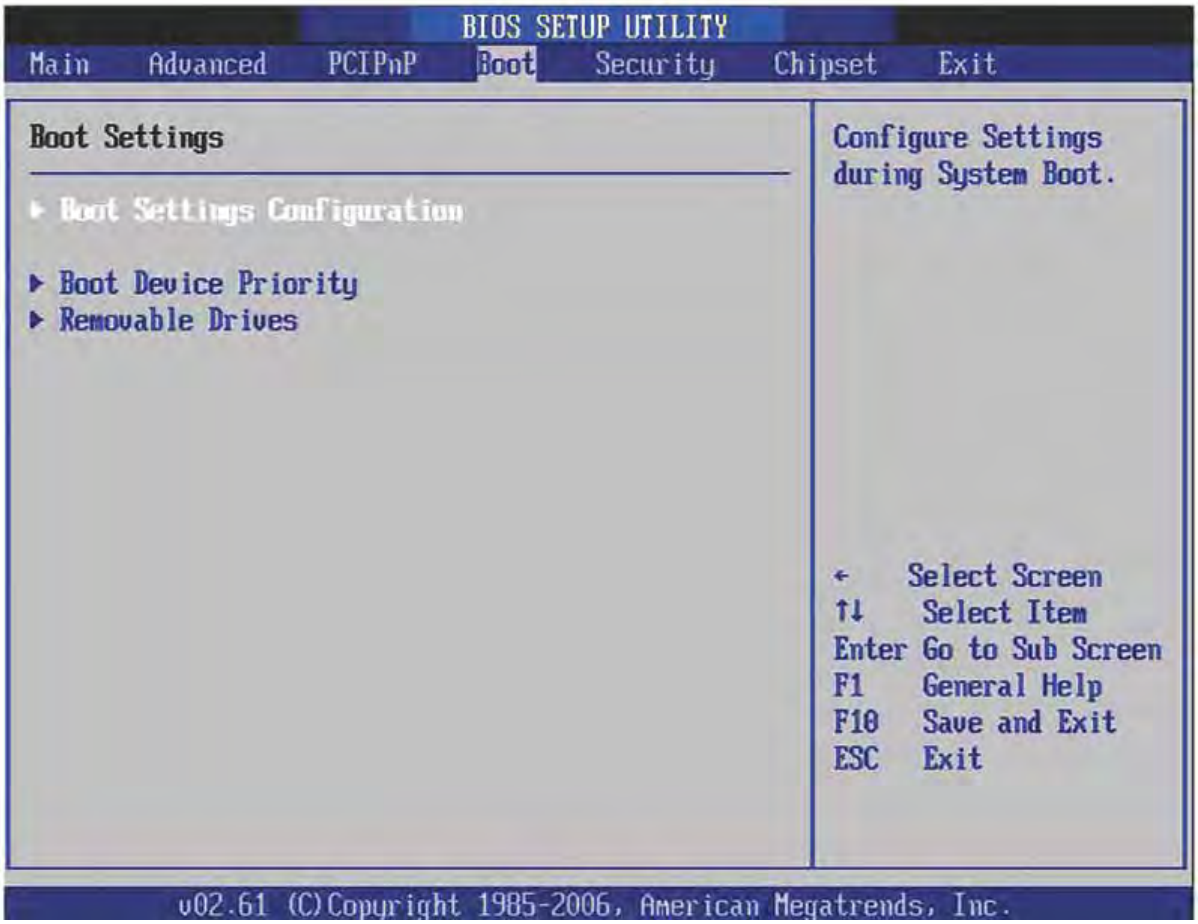


Figure C-17. Boot Settings

C.5.1 Boot Settings Configuration

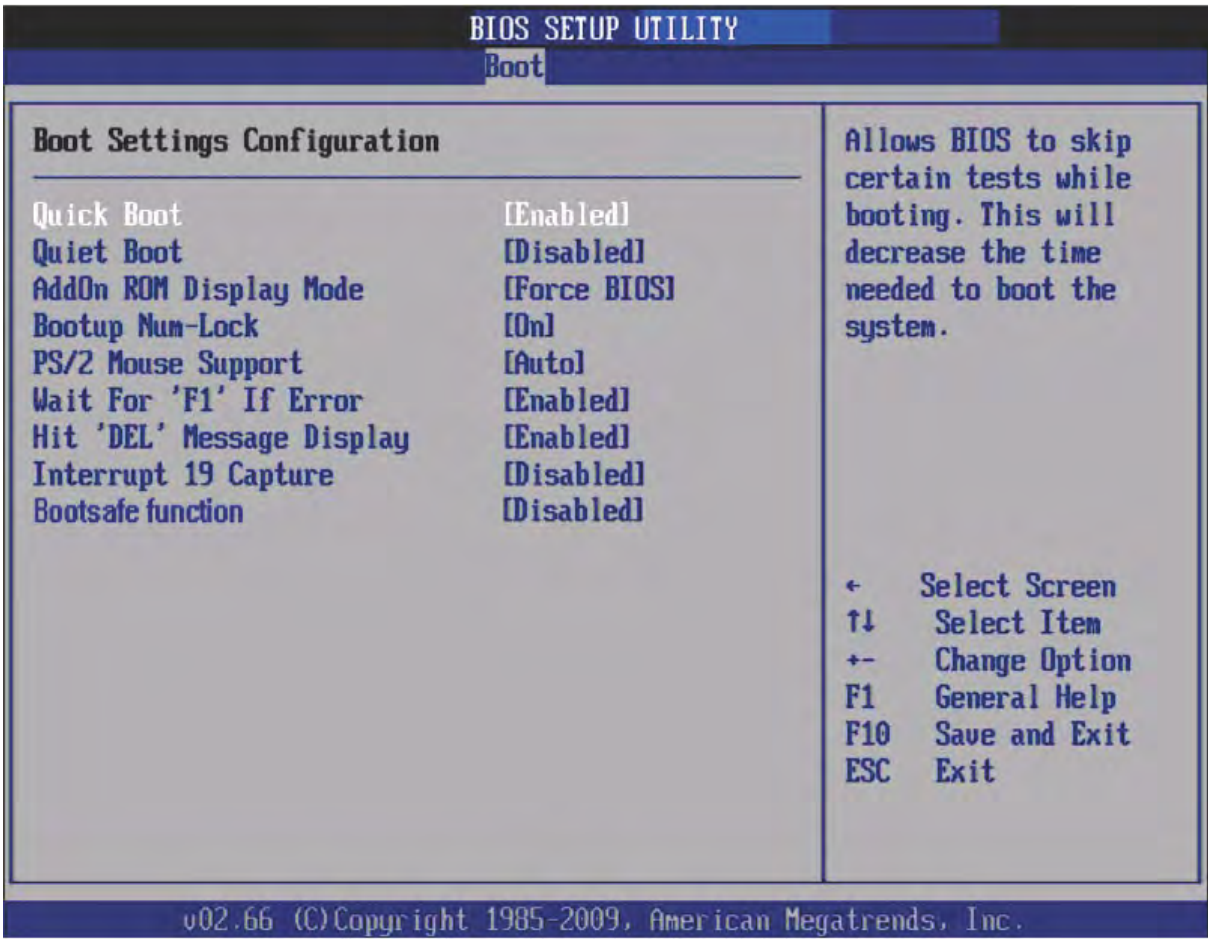


Figure C-18. Boot Settings Configuration

- Quick Boot = **Enabled**
  This item allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
- Quiet Boot = **Disabled**
  If this option is set to Disabled, the BIOS displays normal POST messages. If enabled, an OEM Logo is shown instead of POST messages.
- AddOn ROM Display Mode = **Force BIOS**
  Set display mode for option ROM.
- Bootup Num-Lock = **ON**
  Select the Power-on state for Num-Lock.

- PS/2 Mouse Support = **Auto**
  Select support for PS/2 Mouse.
- Wait for “F1” If Error = **Enabled**
  Wait for the F1 key to be pressed if an error occurs.
- Hit “DEL” Message Display = **Enabled**
  Displays “Press DEL to run Setup in POST.”
- Interrupt 19 Capture = **Disabled**
  This item allows option ROMs to trap interrupt 19.

C.6 Security Setup

Select Security from the main BIOS setup menu. All Security Setup options, such as

password protection and virus protection are described in this section.

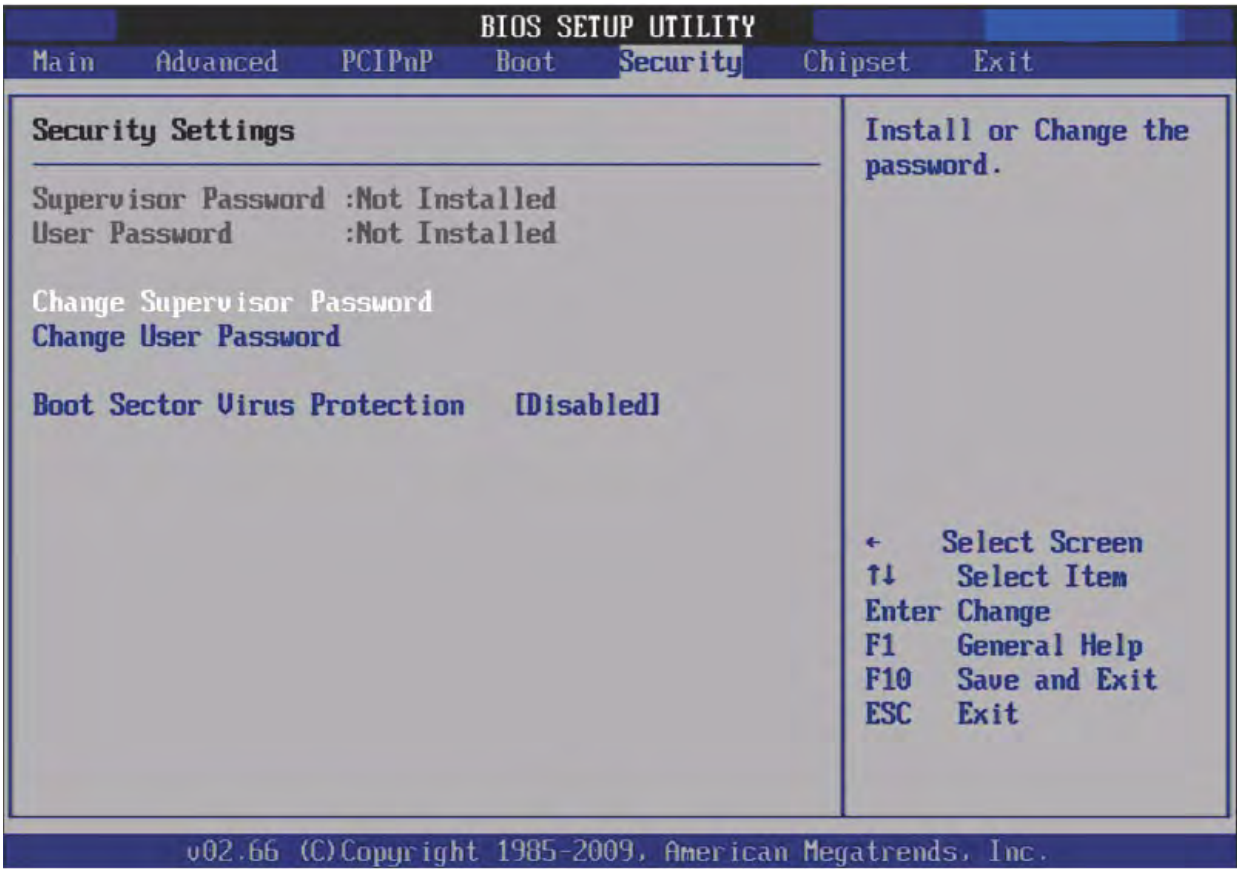


Figure C-19. Security Settings

- Change supervisor / User Password
  Select this option and press <ENTER> to access the sub menu, and then type in the password.
- Boot Sector Virus Protection = **Disabled**
  The boot sector virus protection will warn if any program tries to write to the boot sector.

C.7 Advanced Chipset Settings

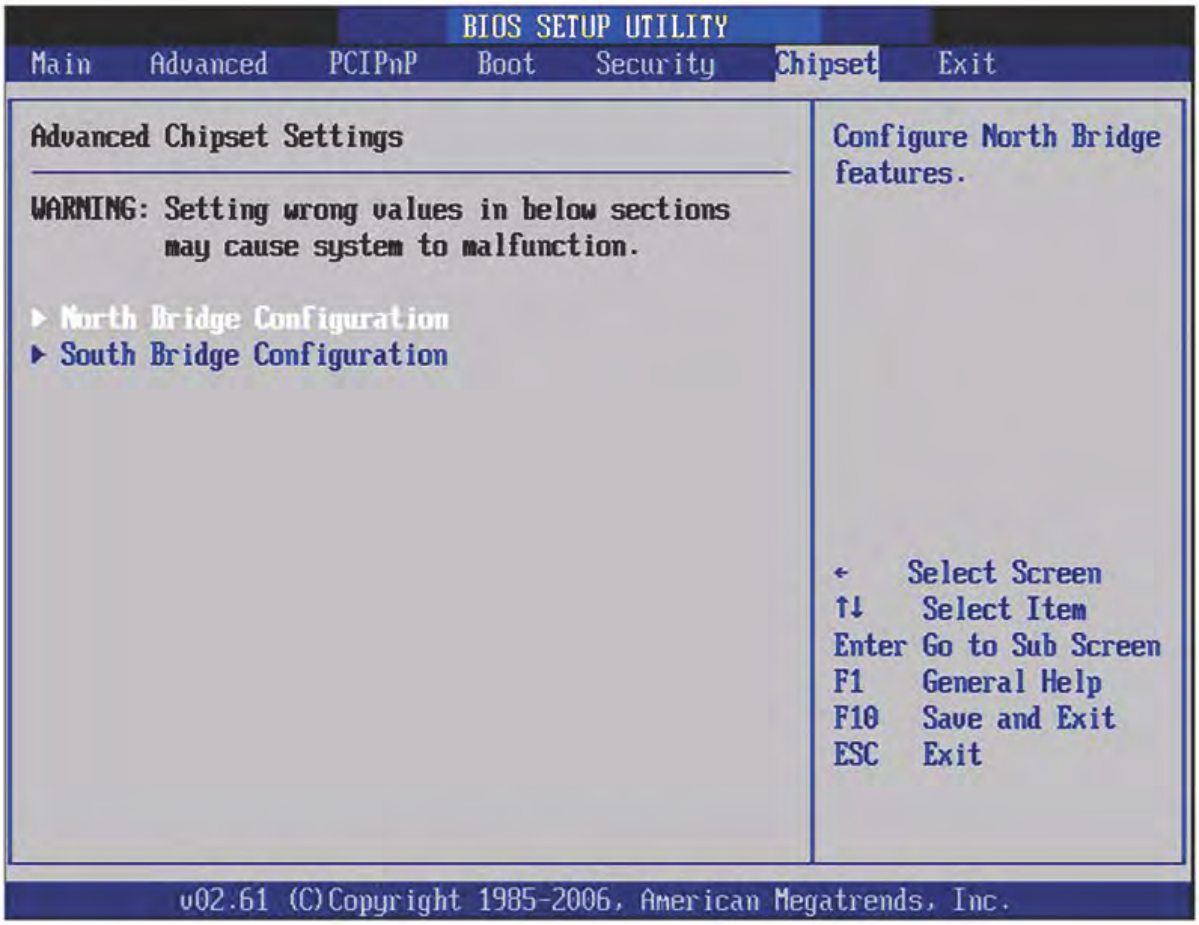


Figure C-20. Advanced Chipset Settings

C.7.1 North Bridge Chipset Configuration

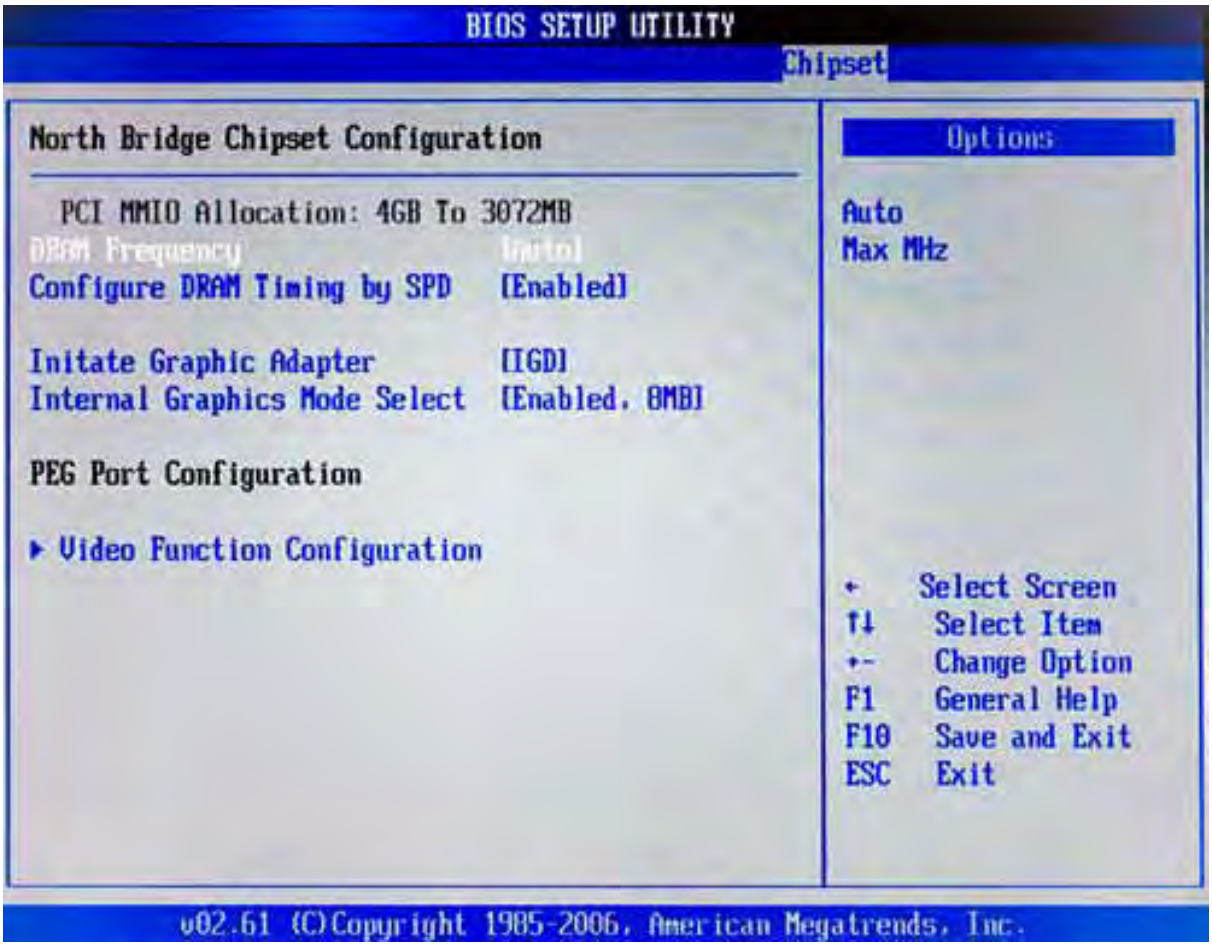


Figure C-21. North Bridge Configuration

- DRAM Frequency
  This item allows users to change DRAM frequency manually.
- Configure DRAM Timing by SPD
  This item allows users to Enable or Disable detect by DRAM SPD.
- Memory Hole
  This item allows users to free 15 MB to 16MB of memory size for some ISA devices.
- Imitate Graphics Adapter
  This item allows users to select which graphics controller to use as the primary boot device.

- Internal Graphics Mode Select
  Select the amount of system memory that can be used by the internal graphics device.
- DVMT Mode Select
  Displays the active system memory mode.
- DVMT / FIXED Memory
  Specify the amount of DVMT / FIXED system memory to allocate for video memory.
- Boot Display Device
  Select boot display device at POST stage.
- Flat Panel Type
  This item allows users to select panel resolution.
- Spread Spectrum Clock
  This item allows users to Enable or Disable the Spread Spectrum clock.

C.7.2 South Bridge Chipset Configuration

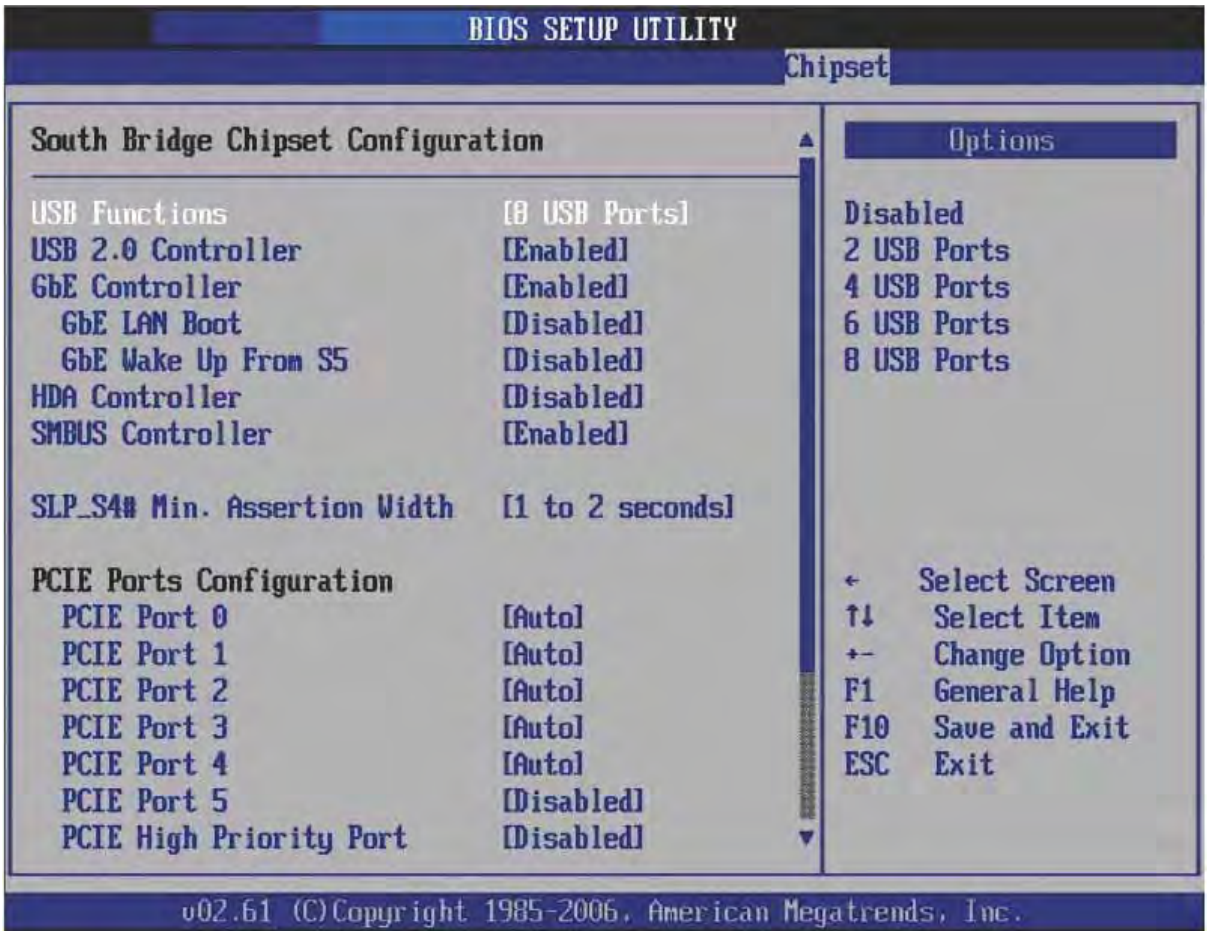


Figure C-22. South Bridge Configuration

- USB Functions
  Options are: Disabled, 2 USB Ports, 4 USB Ports, 6 USB Ports, or 8 USB Ports.
- USB2.0 controller = **Enabled**
  Enables or Disables the USB 2.0 Controller.
- GbE Controller = **Enabled**
  Enables or Disables the GbE Controller.
- GbE LAN Boot = **Disabled**
  Enables or Disables GbE LAN boot.
- GbE Wake Up from S5 = **Disabled**
  Enables or Disables GbE LAN wake up from S5 function.

- HDA Controller = **Disabled**
  Enables or Disables the HDA Controller
- SMBUS Controller = **Disabled**
  Enables or Disables the SMBUS Controller
- SLP_S4# Min. Assertion Width
  This item allows users to set a delay of sorts.
- PCIE Port 0 / 1 / 2 / 3 / 4
  This item allows users to configure PCIE Ports.
- PCIE High Priority Port = **Disabled**
  This item allows users to set the highest priority PCIE port.
- PCIE Port 0 / 1 / 2 / 3 / 4 IOxAPIC
  This item allows users to Enable or Disable PCIE port's IOxAPIC

C.8 Exit Options

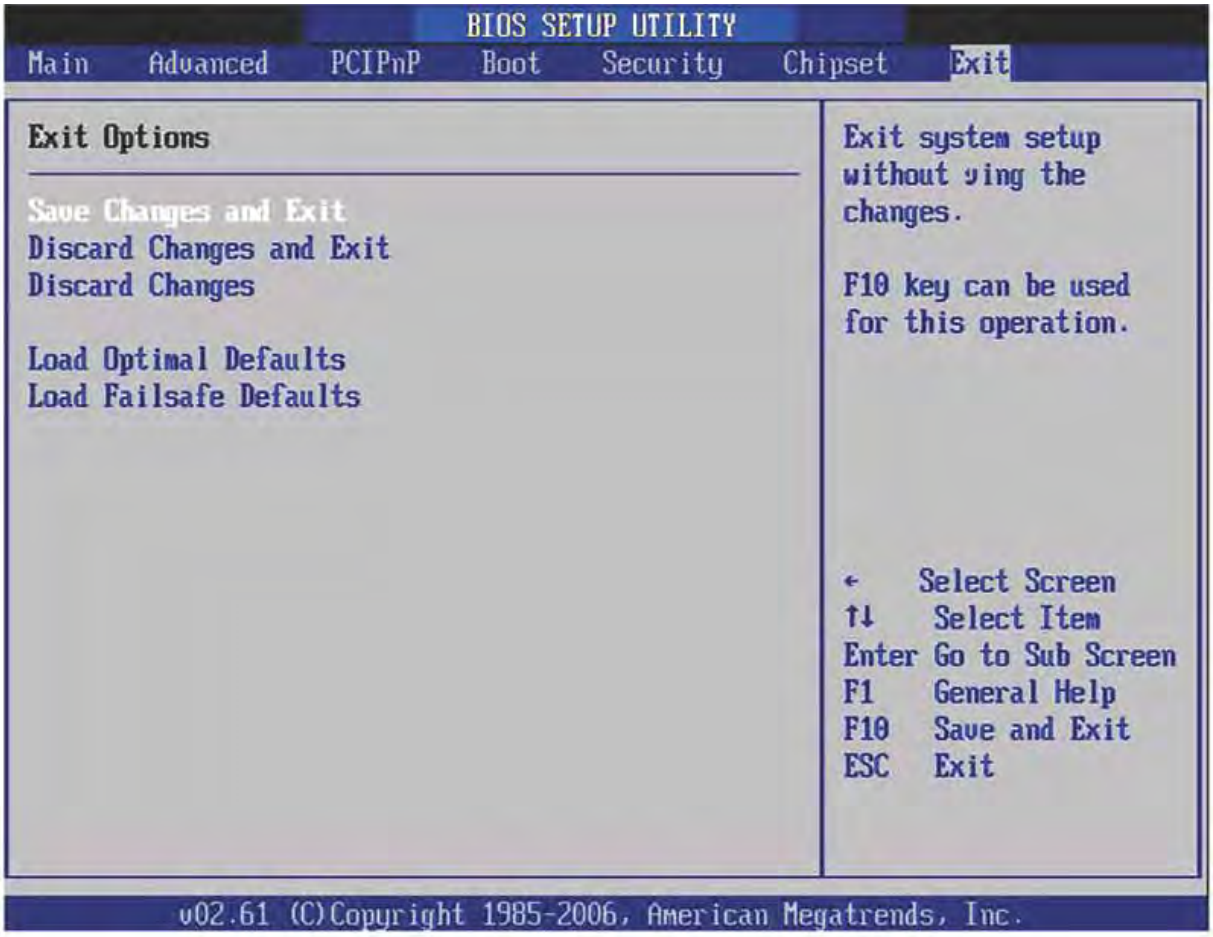


Figure C-23. Exit Options Screen

C.8.1 Save Changes and Exit

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect of all system configuration parameters.

1. Select Save Changes and Exit from the Exit menu and press <Enter>. The following message appears: Save Configuration Changes and Exit Now? [Ok] [Cancel]

2. Select [Ok] or [Cancel].

C.8.2 Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

1. Select Discard Changes and Exit from the Exit menu and press <Enter>. The following message appears: Discard Changes and Exit Setup Now? [Ok] [Cancel].
2. Select [Ok] or [Cancel].

C.8.3 Load Optimal Defaults

The BIOS automatically configures all setup items to optimal settings when users select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if the user's computer is experiencing system configuration problems.

1. Select Load Optimal Defaults from the Exit menu and press <Enter>. The following message appears: Load Optimal Defaults? [Ok] [Cancel].
2. Select [Ok] to load Optimal defaults

C.8.4 Load Fail-Safe Defaults

The BIOS automatically configures all setup options to fail-safe settings when users select this option. Fail-Safe Defaults are designed for maximum system stability, but not maximum performance. Select Fail-Safe Defaults if the user's computer is experiencing system configuration problems.

1. Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The following message appears: Load Fail-Safe Defaults? [OK] [Cancel].
2. Select [Ok] to load Fail-Safe defaults.

Appendix D

Repackaging Instructions

D.1 Repackaging for Shipment

If it becomes necessary for any reason to return your NanoSWITCH™ unit back to Themis, it is very important that the original packaging materials be used according to the repackaging instructions found in this appendix. Themis has qualified all of its shipping materials to meet the highest of standards and the rigors of today's shipping methods, thus insuring total protection of the product during delivery. Failure to use original packaging materials, exactly as described in this appendix **may invalidate the warranty**. If the original packaging is no longer serviceable, or no longer available, please contact Themis Customer Support for a new shipping box to send back your XV1. When using the original packaging, please remember to place your NanoSWITCH™ back into the static protection bag.

Caution: Failure to use the original Themis packaging materials, and failure to follow the instructions of this Appendix C, **may invalidate the warranty**.

The following instructions assume the original packaging components are still available, and in serviceable condition. If not, please contact Themis for a new shipping box and packaging components for your NanoSWITCH™.

D.2 Packaging Components

The original packaging components are shown in *Figure D-1*. They comprise a packaging box, perimeter crush resistant foam, and upper (perimeter) crush-resistant removable foam pieces to accommodate all NanoSWITCH™ variations. The top and bottom crush-resistant foam layers are identical components, placed so that the flat side is always facing up (opening of box).

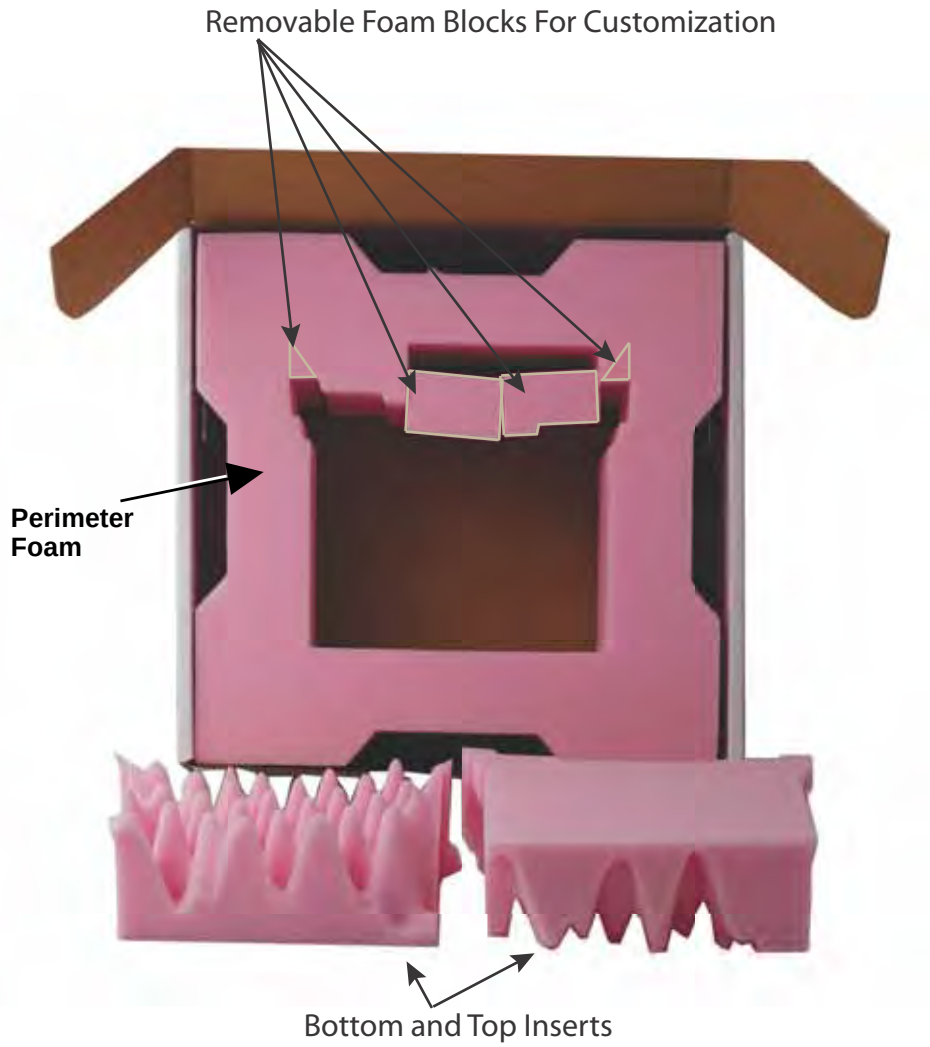


Figure D-1. Packaging Components

D.3 Instructions for Repackaging

Re-assemble the packaging material about the equipment in accordance with the following instructions (see *Figure D-2*):

1. Inspect the original packaging materials for serviceability.
2. Place perimeter crush-resistant layer into the shipping box, making sure the corners of the foam fit snugly into the corners of the box.
3. Place the first top/bottom layer into the box, centered into the perimeter foam cutout. Make sure the flat side of the foam is facing up (opening of box).
4. Place the wrapped (static protection bag) NanoSWITCH™ on top of the layer (top/bottom layer) that was just inserted into the middle of the shipping box.
5. Place the remaining top/bottom layer directly on top of the wrapped NanoSWITCH™ unit. Make sure the flat side of the foam is facing up (opening of box).
6. Make sure all components of the box are firmly in place, pressing down on the surface area of the foam to insure proper seating of the material.
7. Seal the top of the box with strong packaging tape, wrapping the tape completely around the box, both lengthwise, and crosswise.
8. Prepare for shipment in accordance with the instructions received from Themis Computer.

Note: Please contact Themis if new packaging material, or shipping instructions are required. You can reach Themis at 1 (510) 252-0870 Mon–Fri, 8am–5pm PST, or by Email to support@themis.com.

The order of assembly when repackaging the NanoSWITCH™ for shipment as shown in *Figure D-2*.

Figure D-2. Order of Assembly

Index

C

G

H

I

O

P

R

S

U

W

Place
Stamp
Here

Themis Computer

47200 Bayside Parkway

Fremont, CA 94538

Attn: Publications Department

Fold here; tape at top to seal

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