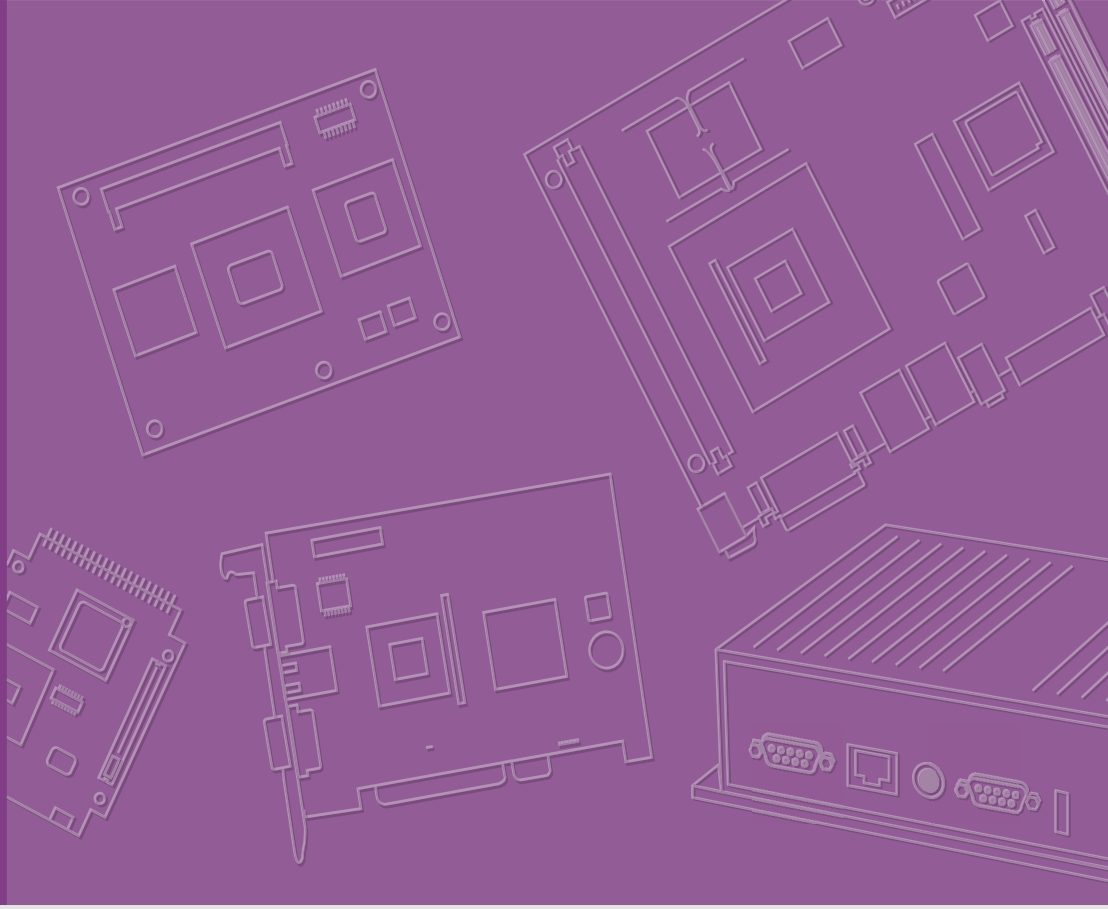

# User Manual

# ASMB-585

## LGA 1151 Intel® Xeon® E3-1200 v5 and 6th Gen Core i3/i5/i7 series Micro ATX Server Board with 4 PCIe slots, USB 3.0, Quad LANs

ADVANTECH

*Enabling an Intelligent Planet*

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# A Message to the Customer

## Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known.

Your satisfaction is our primary concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

## Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

So please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

# Declaration of Conformity

## FCC

This device complies with the requirements in part 15 of the FCC rules:

Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

***Caution!*** *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

# Peripheral Compatibility

| Category | Advantech PN | Vendor | Part Description | Remarks |
|---|---|---|---|---|
| MB | ASMB-585G2-00A1E | Advantech | Two lan ports sku | - |
| | ASMB-585G4-00A1E | Advantech | Four lan ports sku | - |
| CPU | TBD | Intel | Xeon E3-1220 v5 / 3.0GHz / 4 Cores | 80W (No processor graphics equipped) |
| | 96MPXES-3.3-8M11T | Intel | Xeon E3-1225 v5 / 3.3GHz / 4 Cores | 80W |
| | TBD | Intel | Xeon E3-1230 v5 / 3.3GHz / 4 Cores | 80W (No processor graphics equipped) |
| | TBD | Intel | Xeon E3-1235L v5 / 2.0GHz / 4 Cores | 25W |
| | TBD | Intel | Xeon E3-1240 v5 / 3.5GHz / 4 Cores | 80W (No processor graphics equipped) |
| | TBD | Intel | Xeon E3-1240L v5 / 2.1GHz / 4 Cores | 25W (No processor graphics equipped) |
| | TBD | Intel | Xeon E3-1245 v5 / 3.5GHz / 4 Cores | 80W |
| | TBD | Intel | Xeon E3-1260L v5 / 2.9GHz / 4 Cores | 45W (No processor graphics equipped) |
| | 96MPXES-3.6-8M11T | Intel | Xeon E3-1270 v5 / 3.6GHz / 4 Cores | 80W (No processor graphics equipped) |
| | 96MPXES-3.6-8M11T | Intel | Xeon E3-1275 v5 / 3.6GHz / 4 Cores | 80W |
| | 96MPI7S-2.4-8M11T1 | Intel | Core i3-6100TE / 2.7GHz / 2 Cores | 35W |
| | TBD | Intel | Core i3-6100 / 3.7GHz / 2 Cores | 47W |
| | 96MPI5S-2.3-6M11T1 | Intel | Core i5-6500TE / 2.3GHz / 4 Cores | 35W |
| | 96MPI5S-3.2-6M11T | Intel | Core i5-6500 / 3.2GHz / 4 Cores | 65W |
| | 96MPI7S-2.4-8M11T1 | Intel | Core i7-6700TE / 2.4GHz / 4 Cores | 35W |
| | 96MPI7S-3.4-8M11T | Intel | Core i7-6700 / 3.4GHz / 4 Cores | 65W |
| | TBD | Intel | Core i7-6700K / 4.0GHz / 4 Cores | 91W |
| Memory | DDR4 288PIN 1600/1866/2133 ECC/Non-ECC DIMM, capacity up to 16GB per DIMM | | | |
| Cooler / Heatsink | 1960049408N001 | CoolJag | LGA 1151 CPU heat-sink for 1U chassis | Support up to 91W processor |
| | 1960052651N021 | CoolJag | LGA 1151 CPU cooler for 2U/4U chassis | Support up to 91W processor |

| | | | | |
|---|---|---|---|---|
| Riser Card* | AIMB-RF10F-01A1E | Advantech | AIMB-RF10F (1U riser card) | 1*PCIe x16 slot |
| | AIMB-R431F-21A1E | Advantech | AIMB-R43PF (2U riser card) | 1*PCIe x16 slot |
| | AIMB-RP3P8-12A1E | Advantech | AIMB-RP3P8 (2U riser card) | 2*PCIe x8 slot |
| | ASMB-RF348-21A1E | Advantech | ASMB-RF348 (2U riser card) | 1*PCIe x4(slot 1) + 1*PCIe x8(slot3) Slot6 need to be configured as x8x8 link via jumper "JPEG1" and "JPEG2" |
| | ASMB-RF3X8-21A1E | Advantech | ASMB-RF3X8 (2U riser card) | 1*PCIe x8(slot 1) + 2*PCI-X(slot2 & 3) Slot6 need to be configured as x8x8 link via jumper "JPEG1" and "JPEG2" |
| | ASMB-RF388-21A1E | Advantech | ASMB-RF388 (2U riser card) | 1*PCIe x8 + 2*PCIe x4 slot. Slot6 need to be configured as x8x4x4 via jumper "JPEG1" and "JPEG2" |

***Note!***

1. *We strongly recommend to purchase all peripheral parts from Advantech to avoid any compatibility issues.*
2. *Please refer to the table 1.8.1.7 for detail JPEG jumper setting.*

## ASMB-585 Ordering Information

| Part Number | Chipset | Memory | LAN | Display | IPMI |
|---|---|---|---|---|---|
| ASMB-585G4-00A1E | C236 | DDR4 288pin ECC/Non-ECC unbuffer DIMM | 4 | 2*DVI + 1* VGA | N/A |
| ASMB-585G2-00A1E | C236 | DDR4 288pin ECC/Non-ECC unbuffer DIMM | 2 | 2*DVI + 1* VGA | N/A |

# Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

# Initial Inspection

Before you begin installing your motherboard, please make sure that the following materials have been shipped:

- 1 ASMB-585 Startup Manual
- 1 Driver CD (user's manual is included)
- 2 Serial ATA HDD data cables
- 2 Serial ATA HDD power cables
- 1 I/O port bracket
- 1 Warranty card

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the ASMB-585 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the ASMB-585, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

# Contents

# Chapter 1

## Hardware Configuration

## 1.1 Introduction

ASMB-585 motherboard is designed with the most advanced Intel® C236 PCH for industrial server grade applications that require high-performance. The motherboard supports Intel® Xeon® E3-1200 v5 & 6th Gen Core i3/i5/i7 processor with DDR4 288-pin 1600/1866/2133 MHz ECC/Non-ECC memory for up to 64 GB. ASMB-585 also provides cost-effective Intel HD graphics integrated on processor, and the graphics VRAM is 1 GB maximum shared memory with 2 GB and above system memory installed. There is one PCIe x16 slot (Gen3 x16 link), and two PCIe x4 slots (Gen3 x4 link), and one PCIe x4 slot (Gen3 x1 link) to fulfill multi-PCIe demands from video surveillance and factory automation markets. In addition, ASMB-585 also comes with four Gigabit Ethernet LAN (G4 version) via dedicated PCIe bus, which offers bandwidth up to 300 MB/s eliminating network bottlenecks.

By using the Intel® C236 chipset, the ASMB-585 offers a variety of features such as seven onboard SATA III interfaces (bandwidth = 600 MB/s) with software RAID; 6 x USB 3.0 and 7 x USB 2.0 connectors. These powerful I/O capabilities ensure even more reliable data storage capabilities and high-speed I/O peripheral connectivity.

The ASMB-585 also adopts Advantech's unique, patented Sleep Mode Control Circuit for AT Power Mode. With all these excellent features and outstanding performance, ASMB-585 is the ideal platform for today's industrial applications.

## 1.2 Features

- **Triple Display:** ASMB-585 has one VGA, two DVI-D ports. Users are able to use all display outputs to implement triple display functions.
- **PCIe architecture:** There are one PCIe x16 slots (x16 link) from Intel processor, and three x4 slot from Intel C236 PCH.
- **High Performance I/O capability:** 4 x Gigabit LAN via PCIe bus, 6 x USB 3.0, 7 x USB 2.0 ports. (1*Type-A USB 2.0), 7 x SATA III connectors.
- **Standard Micro-ATX form factor with industrial features:** ASMB-585 provides industrial features like longevity, wide temperature range operation, watchdog timer functions, and more.
- **Automatic power on after power failure:** It is often necessary to have an unattended system come back into operation when power resumes after a power failure. Advantech's industrial motherboard allows users to set the system to power on automatically without anyone hitting power button. Please refer to the detailed "AT" mode settings in Table 1.8 of Section 1.8.1.5.
- **Active Management Technology 9.0:** The hardware and firmware base solution is powered by the system auxiliary power plane to remotely monitor networked systems. Intel AMT (iAMT) stores hardware and software information in non-volatile memory. Built-in management provides out-of-band management capabilities, allowing remote discovery and KVM to repair systems after OS failures or when a system has crashed. Alert and event logging features detect problems and quickly reduce downtime, pro-actively blocking incoming threats, containing infected clients before they impact the network, and proactively notifying the user when critical software agents are removed. To enable iAMT, please refer 3.3.7 AMT Configuration.

# 1.3 Specifications

## 1.3.1 CPU

- Supports one E3-1200 v5 Series and 6th Gen. Core i3, i5 & i7 CPU in an LGA1151 socket.
- Max. TDP support up to 91 W.

## 1.3.2 PCH

- **System Chipset:** Intel® C236
- **SATA hard disk drive interface:** Six on-board SATA III connectors support Advanced Host Controller Interface (AHCI) technology, and Intel Rapid Storage Technology (IRST) supports software RAID 1, 0, 10 and 5 with data transmission rates up to 600 MB/s.

## 1.3.3 Memory

- **RAM:** Up to 64 GB in four 288-pin DIMM sockets. Supports dual-channel DDR4 ECC/Non-ECC 1600/1866/2133 unbuffered DIMM.

***Note!***

*1. Due to the inherent limitations of PC architecture, the system may not fully detect 64 GB RAM when 64 GB RAM is installed.*

*2. A 32-bit OS may not fully detect 4 GB of RAM when 4 GB is installed.*

## 1.3.4 Input/Output

- **PCIe slot:** 1 x PCIe x16 expansion slots (Gen3 x16 link) and 2 PCIe x4 expansion slots (Gen3 x4 link) and 1 PCIe x4 expansion slot (Gen3 x1 link)
- **Serial port:** Five serial ports (on board pin headers), only supports RS-232
- **PS/2 Keyboard and mouse connector:** To save rear I/O space, ASMB-585 reserve a 6-pins header on board (KBMS1) and via a cable kit to build two 6-pin mini-DIN connectors for easy connection to PS/2 keyboard and mouse.
- **USB port:** Supports up to 6 USB 3.0 ports with transmission up to 5Gbps and 7 USB 2.0 ports with transmission rates up to 480 Mbps.
- **LPC:** One LPC connector supports Advantech TPM LPC modules and COM 232/485 modules.
- **GPIO:** ASMB-585 supports 8-bit GPIO from super I/O for general purpose control applications.

## 1.3.5 Graphics

Integrated Intel HD Graphics.

- **Display memory:** 1 GB maximum shared memory with 2 GB and above system memory installed
- **DVI-D:** Up to resolution 1920 x 1200 @ 60 Hz refresh rate
- **D-Sub:** Up to 1920 x 1200 resolution @ 60 Hz refresh rate

## 1.3.6 Ethernet LAN

Supports four 10/100/1000 Mbps Ethernet port (s) via PCIe bus which provides a 300 MB/s data transmission rate.

- **Interface:** 10/100/1000 Mbps
- **Controller:** LAN1: Intel I219-LM; LAN2 ~ 4: Intel I210-AT (G4 sku: 4 lan ports; G2 sku: 2 lan ports).

### 1.3.7 Industrial Features

- **Watchdog timer:** Can generate a system reset or NC. The watchdog timer is programmable, with each unit equal to one second (255 levels).

### 1.3.8 Mechanical and Environmental Specifications

- **Operating temperature:** 0 ~ 60° C (32 ~ 140° F, Depending on CPU)
- **Storage temperature:** -40 ~ 85° C (-40 ~ 185° F)
- **Humidity:** 5 ~ 95% non-condensing
- **Power supply voltage:** +3.3 V, +5 V, ±12 V, 5 VSB
- **Power consumption:**
  Max. load: +3.3 V @ 17.57 A, +5 V @ 20.5 A, +12 V @ 40.01 A, +5 VSB @ 2 A, -12 V @ 0.5 A
- **Board size:** 228.6 x 228.6 mm (9.6" x 9.6")
- **Board weight:** 0.5 kg (1.68 lb)

## 1.4 Jumpers and Connectors

Connectors on the ASMB-585 motherboard link it to external devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers that are used to configure your system for your application.

The tables below lists the functions of each of the jumpers and connectors. Later sections in this chapter give instructions on setting jumpers. Chapter 2 gives instructions for connecting external devices to your motherboard.

**Table 1.1: Jumper list**

| Label | Function |
|---|---|
| JCMOS1 | CMOS clear |
| JME1 | Intel ME Disable Jumper for ME/BIOS update |
| JWDT1 | Watch Dog Reset |
| CPUFAN_SEL1, SYSFAN_SEL1 | FAN PWM(1-2)/DC mode selection(2-3) |
| PSON1 | AT(1-2) / ATX(2-3) |
| JCASE1 | Case Open |
| JPEG1, JPEG2 | PCIEX16_SLOT6 PCIe Link switch between x16 or x8x8 or x8x4x4 |
| JPEG3 | Default (1-2)/reserve for debug(2-3) |
| JTHR_SEL1 | To select on board or external thermometer |
| JGREEN1 | Enable/Disable deep sleep mode |
| JUSB1 | Rear window USB2.0/3.0 port power source switch between +5 VSB and +5 V |
| JUSB2 | On board USB2.0/3.0 port power source switch between +5 VSB and +5 V |

**Table 1.2: Connector list**

| Label | Function |
|---|---|
| ATXPWR1 | ATX 24 Pin main power connector (for System) |
| ATX12V1 | Processor power connector (for CPU) |
| SATA0~6 | SATA III (6Gb/s) |
| USB7_8, USB9_10, USB11_12 | USB 2.0 Port (Header) |
| USB13 | USB 2.0 Port (USB Type A) |
| USB3_4 | USB 3.0 Port (Header) |
| PCIEX4_SLOT4 | PCIe x4 slot (Gen3 x4 link) |
| PCIEX4_SLOT5 | PCIe x4 slot (Gen3 x1 link) |
| PCIEX16_SLOT6 | PCIe x16 slot (Gen3 x16 link) |
| PCIEX4_SLOT7 | PCIe x4 slot (Gen3 x4 link) |
| DIMMA0,DIMMA1, DIMMB0,DIMMB1 | DDR4 288pin slot |
| CPUFAN0 | CPU FAN connector |
| SYSFAN0,SYSFAN1, SYSFAN2,SYSFAN3 | System FAN connector |
| LAN1_USB1_2, LAN2_USB5_6 | LAN1 / USB 3.0 port 1, 2 stack connector |
| | LAN2 / USB 3.0 port 5, 6 stack connector |
| LAN3_4 | LAN3 & LAN4 connector |
| VGA1_COM1 | VGA connector |
| DVI1_DVI2 | DVI-D connector |
| KBMS1 | External keyboard and mouse connector (6 pin) |
| SPI_CN1 | SPI flash card pin header |
| LANLED1 | LAN LED extension connector |
| SMBUS1 | SM Bus From PCH |
| GPIO1 | 8-bit GPIO header |
| FPAUD1 | Audio front panel header |
| COM2, COM3_4, COM5_6 | Serial port: RS-232 |
| LPC1 | Low pin count connector for Advantech TPM LPC and RS232/422/485 modules. |
| VOLT1 | Voltage Display |
| AUDIO1 | Audio Connector |
| EX_THR1 | For thermometer kit |
| JFP1 | Power Switch / Reset connector |
| JFP2 | External speaker / HDD LED connector/ SM Bus connector |
| JFP3 | Keyboard Lock and Power LED |
| SPDIF_OUT1 | SPDIF Audio output pin header |
| PMBUS1 | PMBUS connector to communicate with power supply |

## 1.5 Board Layout: Jumper and Connector Locations

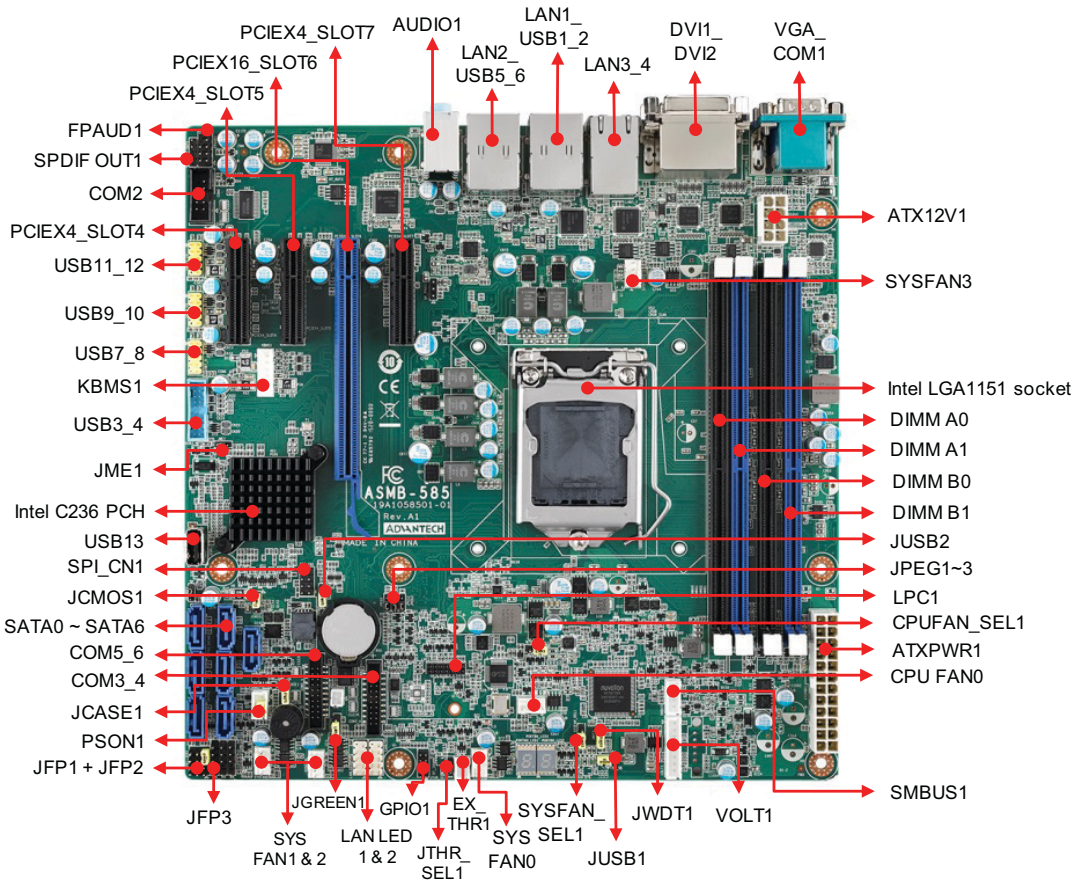
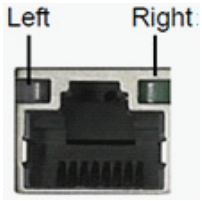



**Figure 1.1 Jumper and Connector Locations**

### 1.5.1 Onboard LAN LED Definition

**Table 1.3: Onboard LAN LED Definition**

| 10/100/1000 Mbps LAN Link/Activity LED Scheme | | | |
|---|---|---|---|
|   | | LAN1 ~ LAN4 | |
| | | Left LED | Right LED |
| 10 Mbps | Link<br>Active | Off<br>Off | Green<br>Blinking green |
| 100 Mbps | Link<br>Active | Amber<br>Amber | Green<br>Blinking green |
| 1000 Mbps | Link<br>Active | Green<br>Green | Green<br>Blinking green |
| No Link | | Off | Off |

### 1.5.2 Onboard LED (LED2, LED3, LED4)

The ASMB-585 has onboard power LED for 5V Power, 5V Standby and 3.3V AUX.

**Table 1.4: Onboard LED**

| LED | Description | LED Definition | |
|---|---|---|---|
| 5V_LED2 | Power on LED | Off:<br>Power off | On (Green):<br>System is On |
| 5VSB_LED3 | Standby LED | Off:<br>No input AC Power | On (Green):<br>System is ON, in sleep mode, or in soft-off mode |
| 3V3DSW_LED4 | Deep sleep well LED | Off: No input AC Power, Deep sleep mode enable | On (Green): System is ON, in sleep mode, in soft-off mode, or deep sleep mode disable |

## 1.6 ASMB-585 Block Diagram

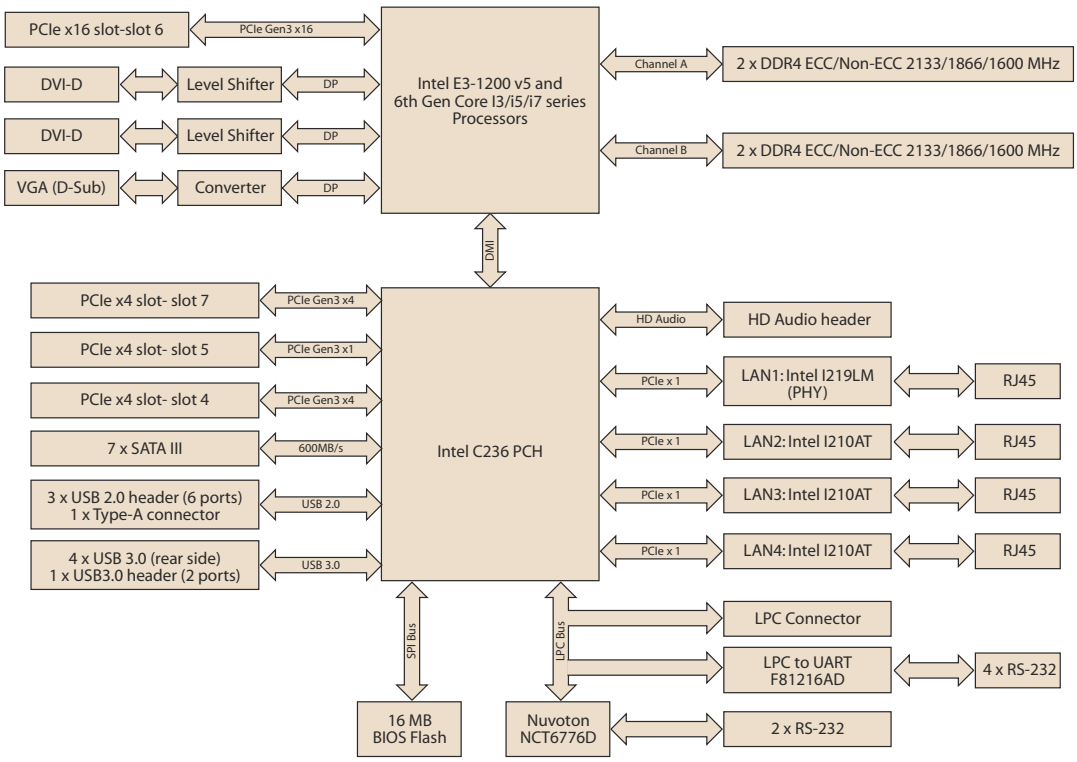



**Figure 1.2 ASMB-585 Block Diagram**

## 1.7 Safety Precautions

***Warning!*** *Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.*

***Caution!*** *Always ground yourself to remove any static charge before touching the motherboard. Modern electronic devices are very sensitive to static electric discharges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.*

***Caution!*** *The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to manufacturer's instructions.*

***Caution!*** *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

## 1.8 Jumper Settings

This section provides instructions on how to configure your motherboard by setting the jumpers. It also includes the motherboard default settings and your options for each jumper.

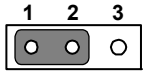
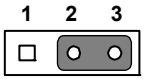
### 1.8.1 How to set jumpers

You can configure your motherboard to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" (or turn on) a jumper, you connect the pins with the clip. To "open" (or turn off) a jumper, you remove the clip. Sometimes a jumper consists of a set of three pins, labeled 1, 2, and 3. In this case you connect either pins 1 and 2, or 2 and 3. A pair of needle-nose pliers may be useful when setting jumpers.

#### 1.8.1.1 CMOS and ME clear (JCMOS1)

The ASMB-585 motherboard contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset the CMOS data, set JCMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

**Table 1.5: JCMOS1**

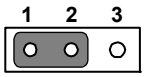
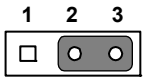
| Function | Jumper Setting | |
|---|---|---|
| * Keep CMOS data |   | 1-2 closed |
| Clear CMOS data |   | 2-3 closed |

* default setting

### 1.8.1.2 ME update (JME1)

The ASMB-585 contains a jumper that can update for ME firmware. Normally this jumper should be set with pin 1-2 closed. If you want to update ME firmware, set JME1 to 2-3 closed to disable ME for new ME firmware update.

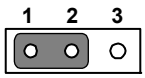
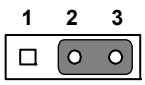
**Table 1.6: JME1**

| Function | Jumper Setting | |
|---|---|---|
| *Lock ME update |   | 1-2 closed |
| ME update |   | 2-3 closed |

### 1.8.1.3 Watchdog timer output (JWDT1)

The ASMB-585 contains a watchdog timer that will reset the CPU. This feature means the ASMB-585 will recover from a software failure or an EMI problem. The JWDT1 jumper settings control the outcome of what the computer will do in the event the watchdog timer is tripped.

**Table 1.7: Watchdog timer output (JWDT1)**

| Function | Jumper Setting | |
|---|---|---|
| *Reset |   | 1-2 closed |
| NC |   | 2-3 closed |

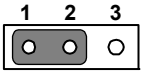
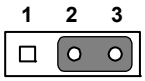
* default setting

***Note!*** *The interrupt output of the watchdog timer is a low level signal. It will be held low until the watchdog timer is reset.*

#### 1.8.1.4 USB power switch (JUSB1/JUSB2)

The ASMB-585 contains a jumper that can support on board USB ports power source from +5Vsb or +5V. The JUSB1 jumper controls the USB2.0 and 3.0 ports of rear window. The JUSB2 jumper controls the USB2.0 and 3.0 ports of onboard header and connectors. The default setting is 1-2 closed which is supports USB stand-by power under S5. When the jumper is 2-3 closed, the on board USB ports power source will be switched to +5V if you want to disable USB stand-by power under S5, and under 2-3 closed, it won't support S3 and S4 modes.

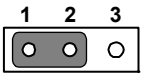
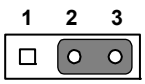
**Table 1.8: USB power switch (JUSB1/JUSB2)**

| Function | Jumper Setting | |
|---|---|---|
| *+5Vsb |  | 1-2 closed |
| +5V |  | 2-3 closed |

#### 1.8.1.5 CPU,SYSTEM fan PWM/DC mode selection (CPUFAN_SEL1, SYSFAN_SEL1)

The ASMB-585 contains a jumper that can support PWM or DC mode, Normally this jumper should be set with pin 1-2 closed. If you want to change to DC mode, set CPUFAN_SEL1, SYSFAN_SEL1 to 2-3 closed for disable.

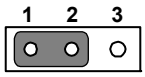
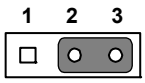
**Table 1.9: (CPUFAN_SEL1, SYSFAN_SEL1)**

| Function | Jumper Setting | |
|---|---|---|
| *PWM mode |  | 1-2 closed |
| DC mode |  | 2-3 closed |

#### 1.8.1.6 ATX/AT mode selector (PSON1)

The ASMB-585 contains a jumper that can support ATX or AT mode. Normally this jumper should be set with pin 2-3 closed. If you want to change to AT mode, set PSON to 1-2 closed.

**Table 1.10: ATX/AT mode selector (PSON1)**

| Function | Jumper Setting |
|---|---|
| AT Mode |  1-2 closed |
| * ATX Mode |  2-3 closed |

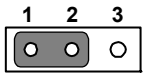
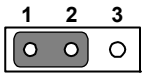
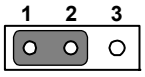
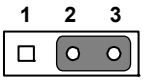
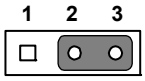
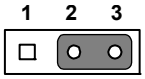
* default setting

### 1.8.1.7 PCIe link switch (JPEG1, JPEG2)

The ASMB-585 contains a jumper that can switch one PCIe x16 link on PCIEX16_SLOT6 to two PCIe x8 link or one PCIe x8 + two PCIe x4 link. Default setting with pin 1-2 closed is one x16 on PCIEX16_SLOT6.

Please refer to the below table for detail settings.

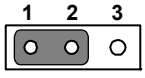
**Table 1.11: PCIEX16_Slot6 Configuration Table (JPEG2, JPEG1)**

| Function | Jumper Setting | |
|---|---|---|
| Slot6 PCIe x16 (Default) |  JPEG2: 1 & 2 |  JPEG1: 1 & 2 |
| Slot6 PCIe x8x8 |  JPEG2: 1 & 2 |  JPEG1: 2 & 3 |
| Slot6 PCIe x8x4x4 |  JPEG2: 2 & 3 |  JPEG1: 2 & 3 |

### 1.8.1.8 PEG training (JPEG3)

The ASMB-585 contains a jumper that can support PEG training with pin 1-2 closed as the default setting.

**Table 1.12: PEG training (JPEG3)**

| Function | Jumper Setting |
|---|---|
| * PEG training |  1-2 closed |

* default setting

## 1.9 System Memory

ASMB-585 has four 288-pin memory sockets for Unbuffered ECC/Non-ECC 1600/1866/2133 MHz memory modules with maximum capacity of 64 GB (Maximum 16 GB for each DIMM).

Please note that ASMB-585 series do NOT support registered DIMMs (RDIMMs).

## 1.10 Memory Installation Procedures

To install DIMMs, first make sure the two handles of the DIMM socket are in the “open” position. i.e. The handles lean outward. Slowly slide the DIMM module along the plastic guides on both ends of the socket, and then press the DIMM module right down into the socket, until you hear a click. This is when the two handles have automatically locked the memory module into the correct position of the DIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mechanism in the socket.

| **Quantity of memory module installed** | | | |
|---|---|---|---|
| | 1 | 2 | 4 |
| Socket / Color | | | |
| DIMM A0 (Black) | | | V |
| DIMM A1 (Blue) | V | V | V |
| DIMM B0 (Black) | | | V |
| DIMM B1 (Blue) | | V | V |

# Chapter 2

## Connecting Peripherals

## 2.1 Introduction

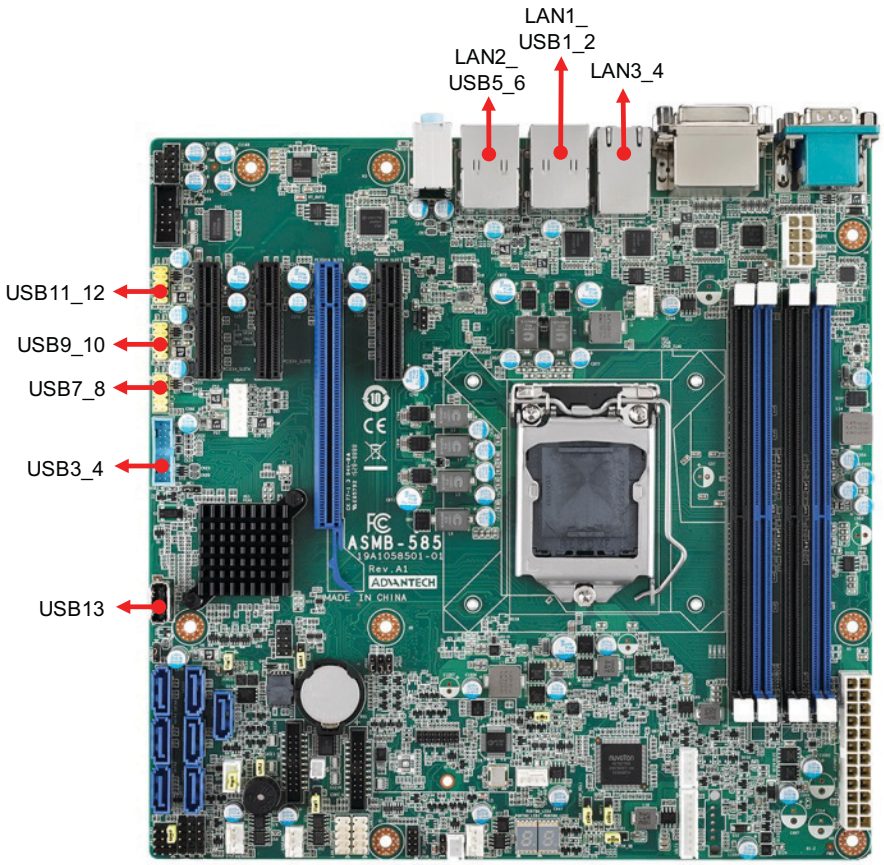
You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed, you may need to partially remove a card to make all the connections.

## 2.2 USB Ports (LAN1_USB1_2,LAN2_USB5_6, LAN3_4, USB7~13)

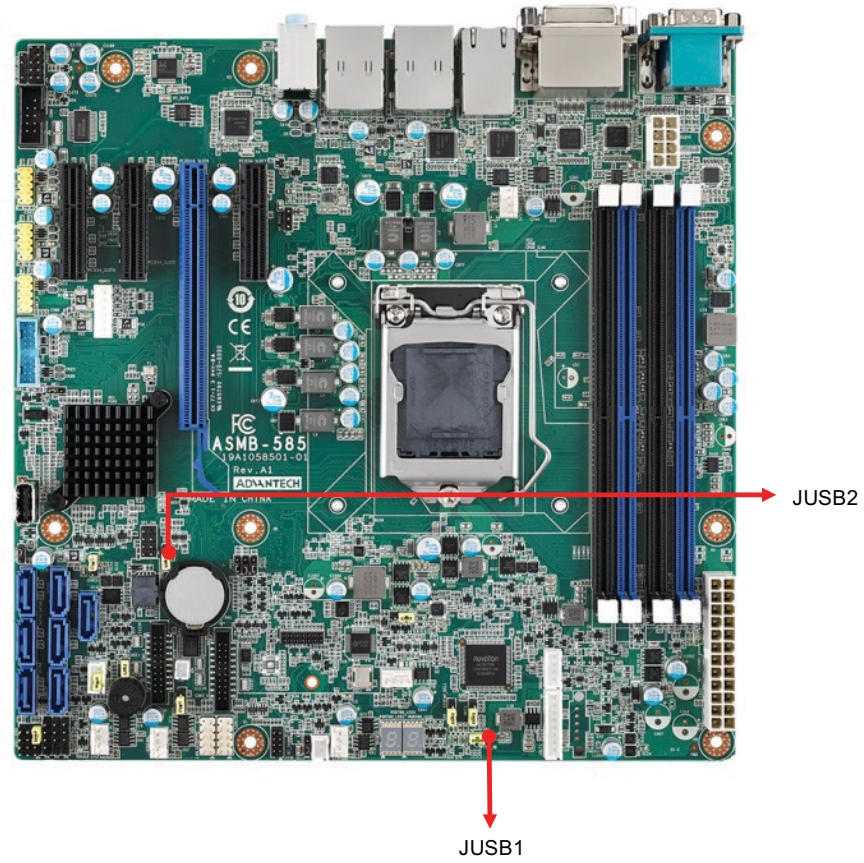
ASMB-585 provides up 13 USB ports. USB7~13 are USB 2.0 ports supporting transmission rates up to 480 Mbps, and USB1~6 are USB 3.0 ports supporting transmission rate up to 5Gbps.These ports support Plug & Play and hot swapping for up to 127 external devices and are able to be disabled in BIOS menu.

The ASMB-585 is equipped with two (G2 sku) or four (G4 sku) high-performance 1000 Mbps Ethernet LANs. They are supported by all major network operating systems. The RJ-45 jacks on the rear plate provide convenient 1000 Mbps operation.

If all USB ports will be used, USB power is recommended to switch to +5V instead of +5VSB.



## 2.3 USB Power Switch



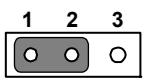
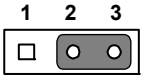

ASMB-585 allows user to set USB power between +5VSB and +5V.

When the jumper is set as +5V, the board doesn't support S3/S4.

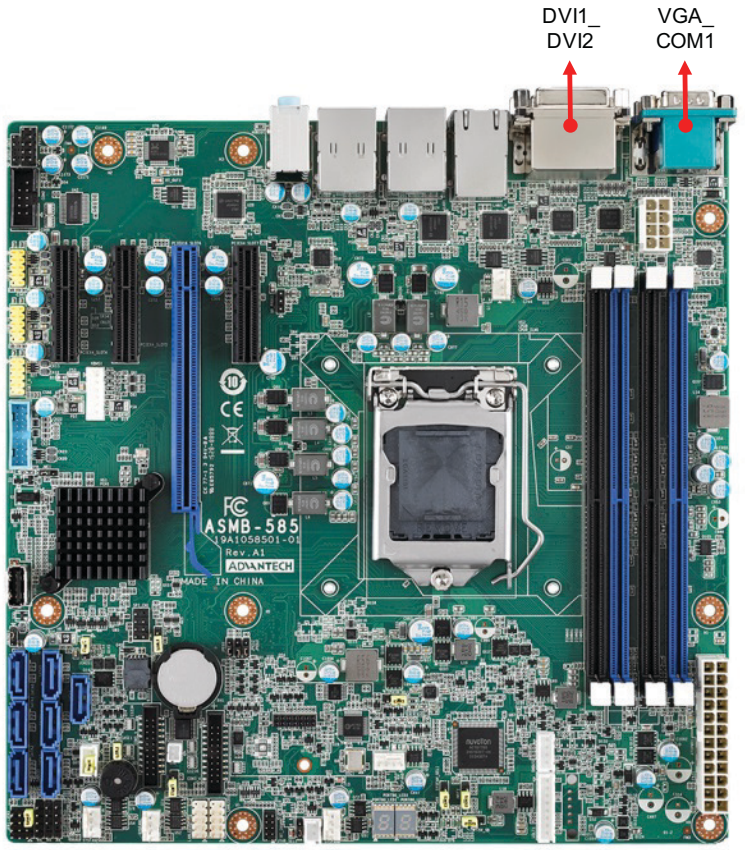
| Jumper | Function |
|---|---|
| JUSB1 | Rear window USB2.0/3.0 port power source switch between +5 VSB and +5 V |
| JUSB2 | On board USB2.0/3.0 port power source switch between +5 VSB and +5 V |

***Note!*** *When USB power is switched to +5V, it can't be connected to powered KVM.*

**Table 2.1: USB power switch (JUSB1/JUSB2)**

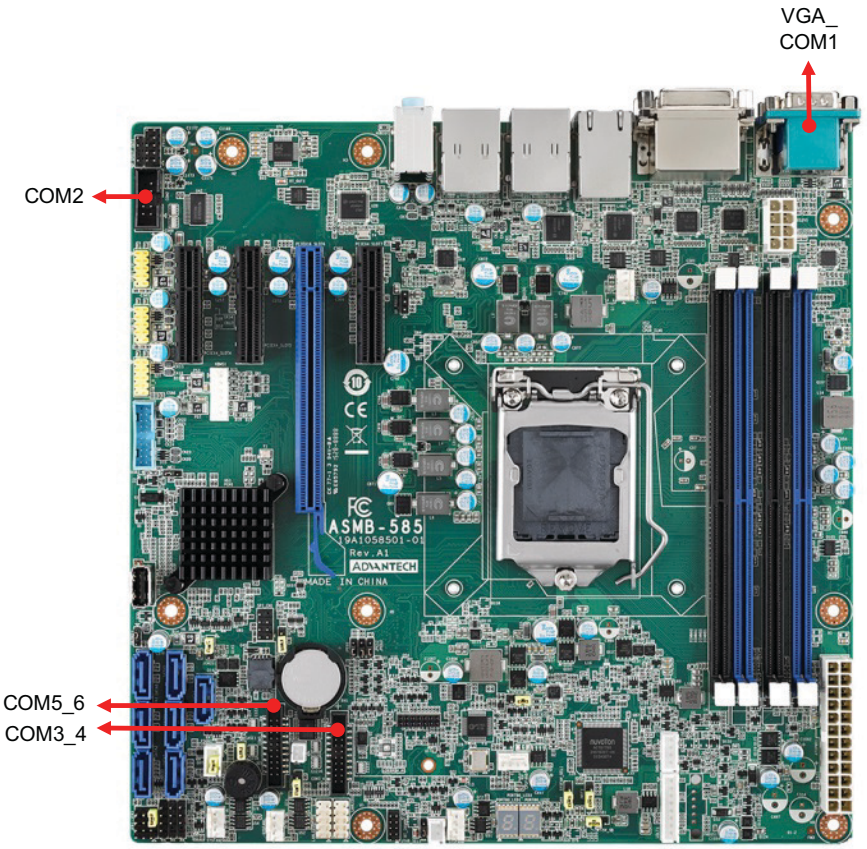
| Function | Jumper Setting |
|---|---|
| *+5Vsb |  1-2 closed |
| +5V |  2-3 closed |

## 2.4 VGA and DVI1, DVI2 Connector



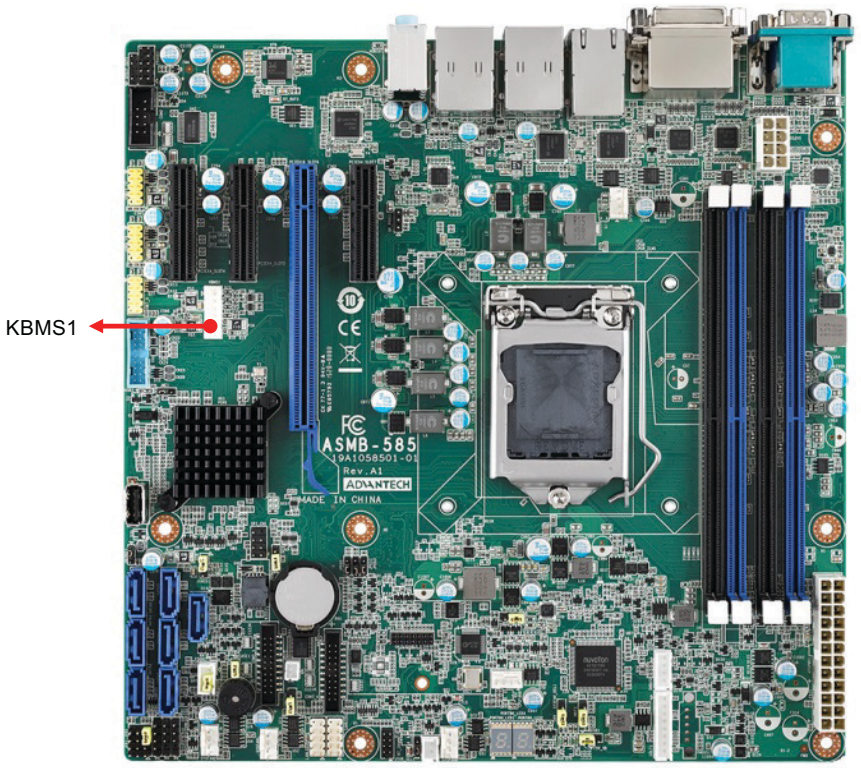

The ASMB-585 includes one VGA and two DVI-D connectors, users could display all ports at the same time (The result may different because of OS support limitation).

## 2.5 Serial Ports (COM1 ~ COM6)



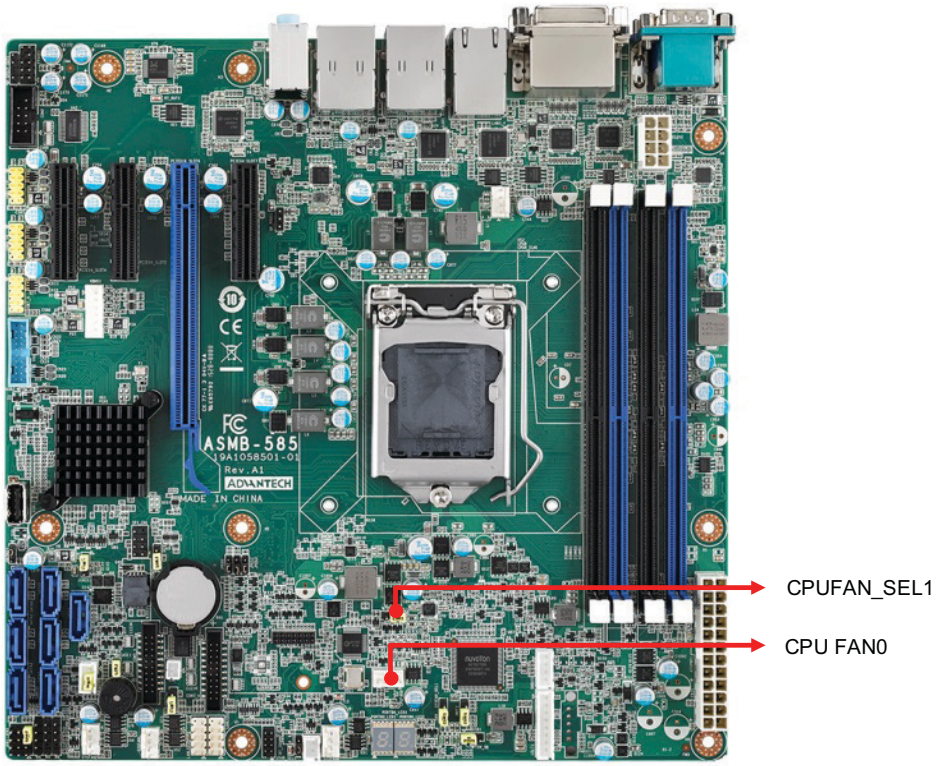

The ASMB-585 offers six serial ports. All ports can connect to a serial mouse, printer or communications network. The IRQ and address ranges for those ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup. Different devices implement the RS-232 standards in different ways.

## 2.6 External Keyboard & Mouse (KBMS1)



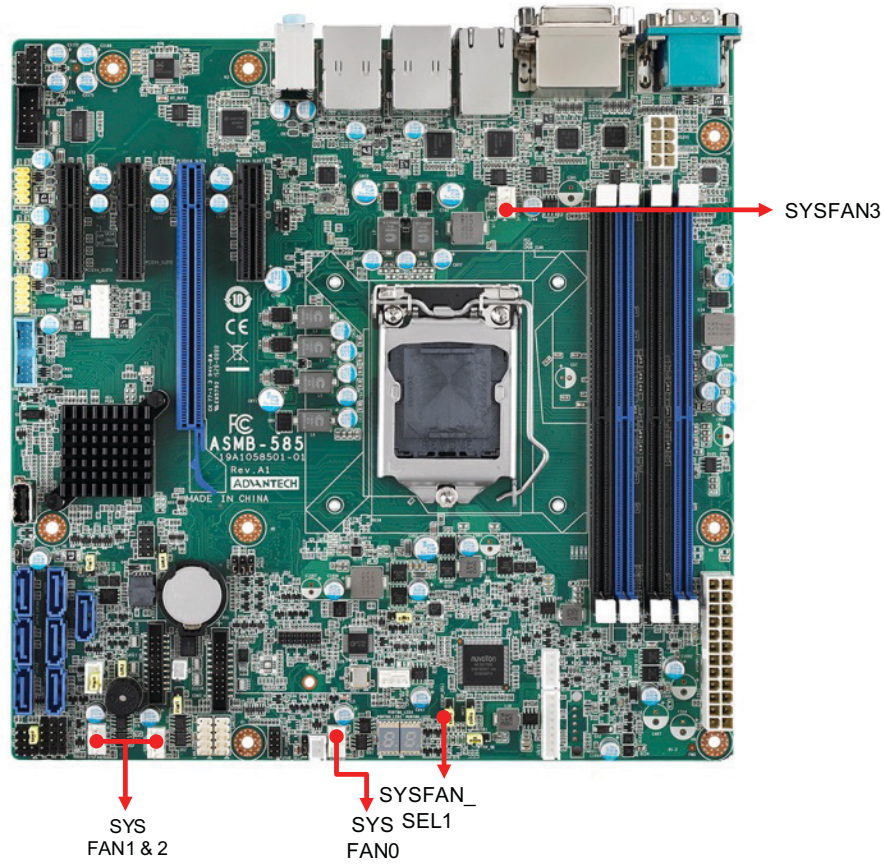

There is also an extra onboard external keyboard and mouse connector on the motherboard. This gives system integrators greater flexibility in designing their systems.

## 2.7 CPU Fan Connector (CPUFAN0)




If a fan is used, this connector supports cooling fans that draw up to 2.5A (30W).

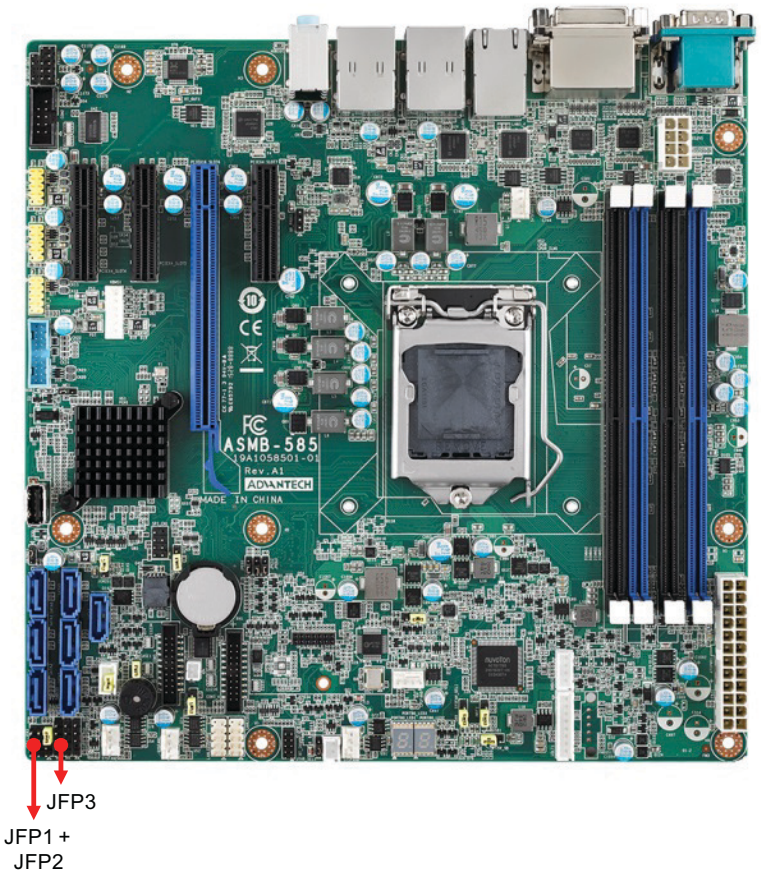
## 2.8 System FAN Connector (SYSFAN0, SYSFAN1, SYSFAN2 and SYSFAN3)




If a fan is used, this connector supports cooling fans that draw up to 2.5A (30W).

## 2.9 Front Panel Connectors (JFP1/2/3)

There are several external switches and LEDs to monitor and control the ASMB-585.



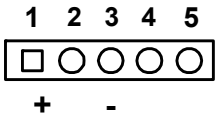

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| JFP1 & JPF2 | 3 | 6 | 9 | 12 | | PWRSW | RESET |
| | 2 | 5 | 8 | 11 | | HDDLED | SNMP SM_BUS |
| | 1 | 4 | 7 | 10 | | SPEAKER | |
| JFP3 | 1 | 2 | 3 | 4 | 5 | PWRLED & KEYLOCK | |

### 2.9.1 Power LED (JFP3 pins 1, 3)

JFP3 is a 5-pin connector for the power LED. Refer to Appendix B for detailed information on the pin assignments. If a ATX power supply is used, the system's power LED status will be as indicated as follows.

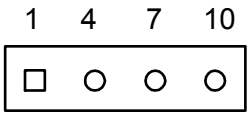
**Table 2.2: PS/2 or ATX power supply LED status**

| Power mode | LED |
|---|---|
| System On | On |
| System Suspend | Fast Flash |
| System Off | Off |
| System Off in deep sleep | Off |



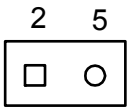

### 2.9.2 External Speaker (JFP2 pins 1, 4, 7, 10)

JFP2 pins 1, 4, 7, 10 connector for an external speaker. The ASMB-585 provides an onboard buzzer as an alternative. To enable the onboard buzzer, set pins 7-10 as closed.



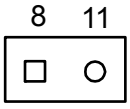

### 2.9.3 HDD LED Connector (JFP1 pins 2 & 5)

You can connect an LED to connector JFP1 to indicate when the HDD is active.



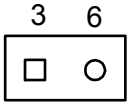

### 2.9.4 SNMP SMBus Connector (JFP2 pins 8 & 11)

ASMB-585 supports Advantech module for providing a platform independent system management. When you're installing module on ASMB-585, please connect it to pins 8 and 11 of JFP2. (Pin 8 is data pin, pin 11 is clock pin)



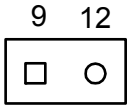

### 2.9.5 ATX Soft Power Switch (JFP1 pins 3 & 6)

If your computer case is equipped with an ATX power supply, you should connect the power on/off button on your computer case to pins 3 and 6 of JFP1. This connection enables you to turn your computer on and off.

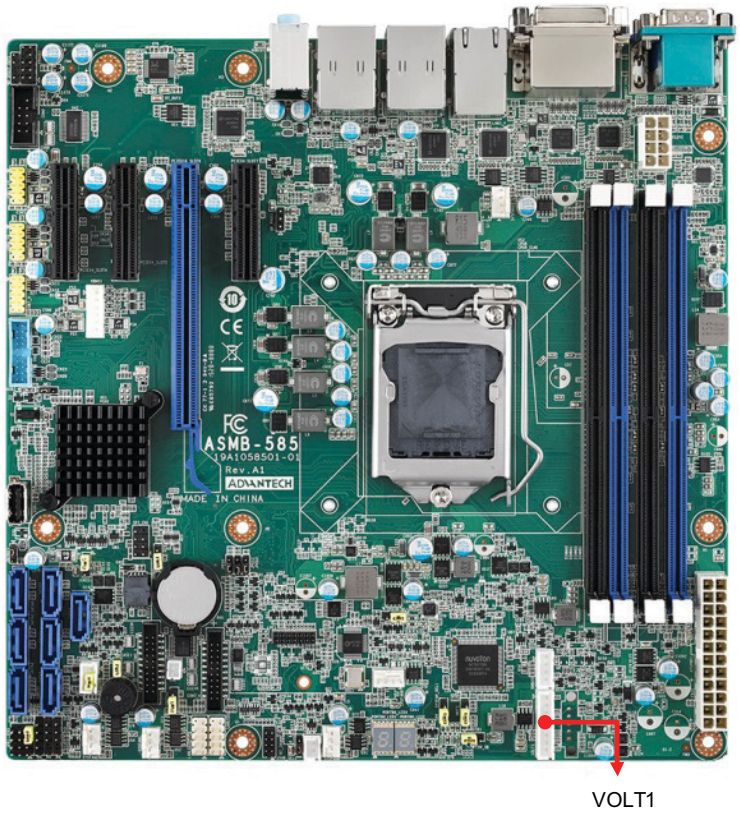


### 2.9.6 Reset Connector (JFP1 pins 9 & 12)

Many computer cases offer the convenience of a reset button.

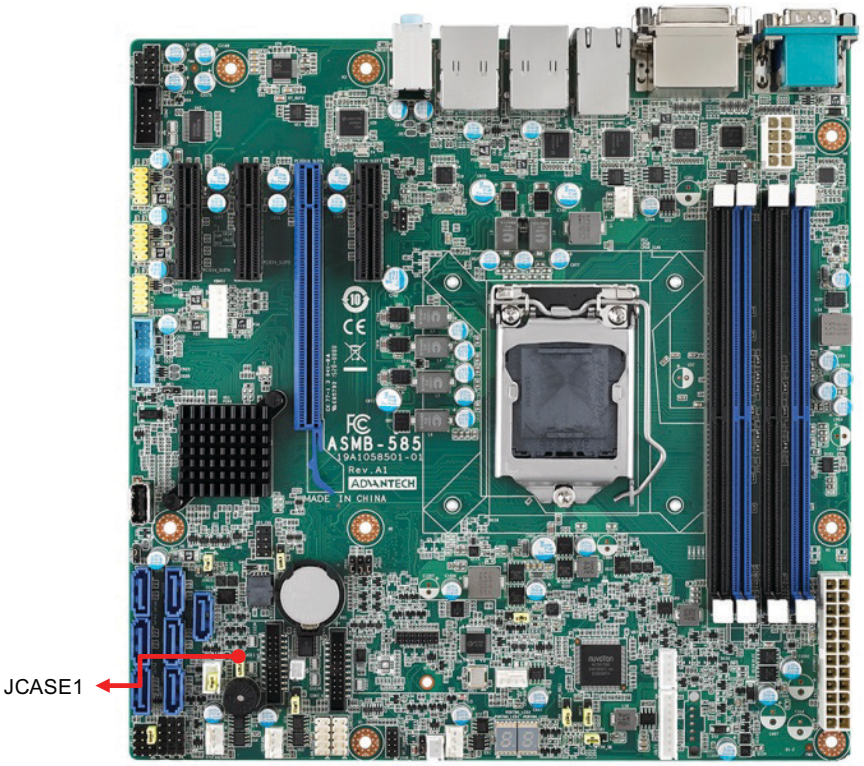



## 2.10 8-pin Alarm Board Connector (VOLT1)




VOLT1 connects to the alarm board of Advantech chassis. These alarm boards monitors the input voltage of +12V, +5V, +5Vsb, -5V +3.3V and -12V, and give warnings if a power supply fails.

## 2.11 Case Open Connector (JCASE1)




JCASE1 is for chassis with a case open sensor. The defaults setting of JCASE1 is shorted by jumper and disabled in the BIOS. Before using, please remove the jumper and attach the appropriate cable from the chassis. Then, change the BIOS setting to enable the function of case open. Please refer to the chapter of HW Monitor in BIOS setting. If chassis is opened, the BIOS will inform you the warning message of a chassis intrusion during system reboot and post screen.

## 2.12 Front Panel LAN Indicator Connector (LANLED1, LANLED2)

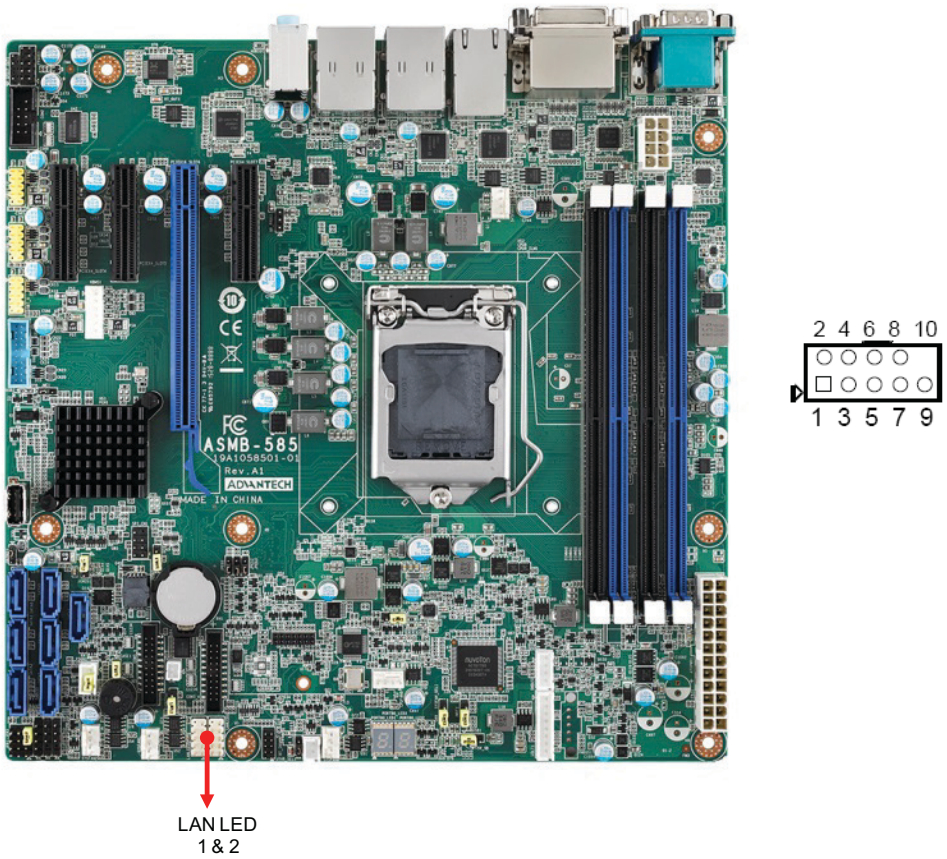
LANLED1 is extension connector of LAN1 & LAN2. LANLED2 is extension connector of LAN3 & LAN4 (G4 SKU only).

**Table 2.3: Front Panel LAN Indicator Connector (LANLED1)**

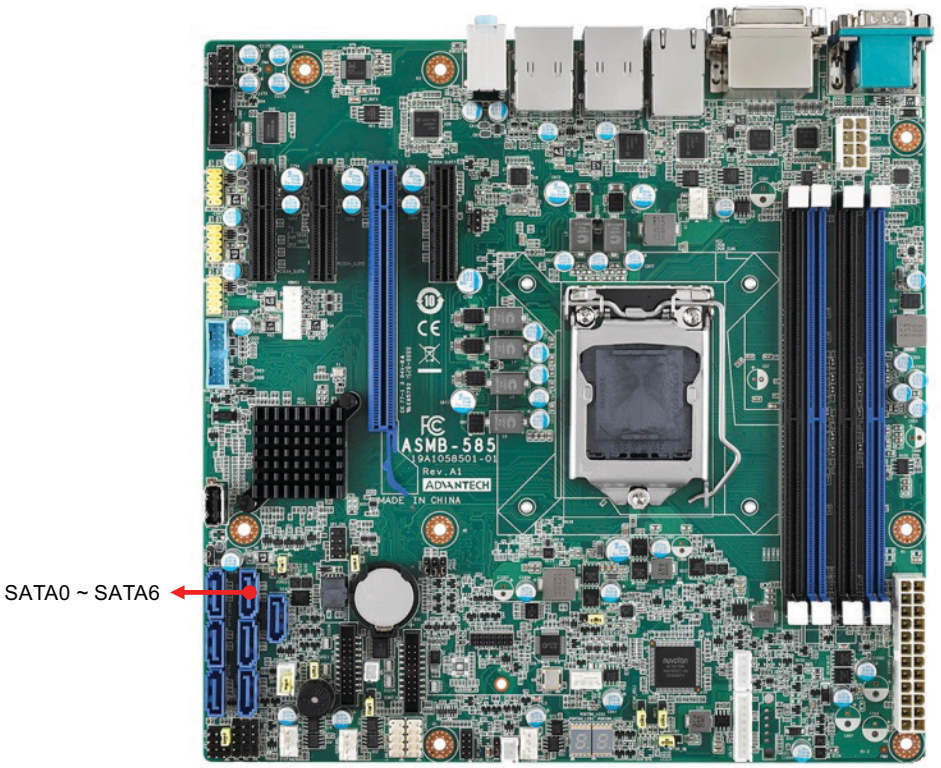
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | LAN1_LED0_ACT | 2 | LAN2_LED1_ACT |
| 3 | VCC3_LAN1LED | 4 | VCC3_LAN2LED |
| 5 | LAN1_LED1_1000M | 6 | LAN2_LED2_1000M |
| 7 | LAN1_LED2_100M | 8 | LAN2_LED0_100M |
| 9 | VCC3 | 10 | NC |

**Table 2.4: Front Panel LAN Indicator Connector (LANLED2)**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | LAN3_LED1_ACT | 2 | LAN4_LED1_ACT |
| 3 | VCC3_LAN3LED | 4 | VCC3_LAN4LED |
| 5 | LAN3_LED2_1000M | 6 | LAN4_LED2_1000M |
| 7 | LAN3_LED0_100M | 8 | LAN4_LED0_100M |
| 9 | VCC3 | 10 | NC |

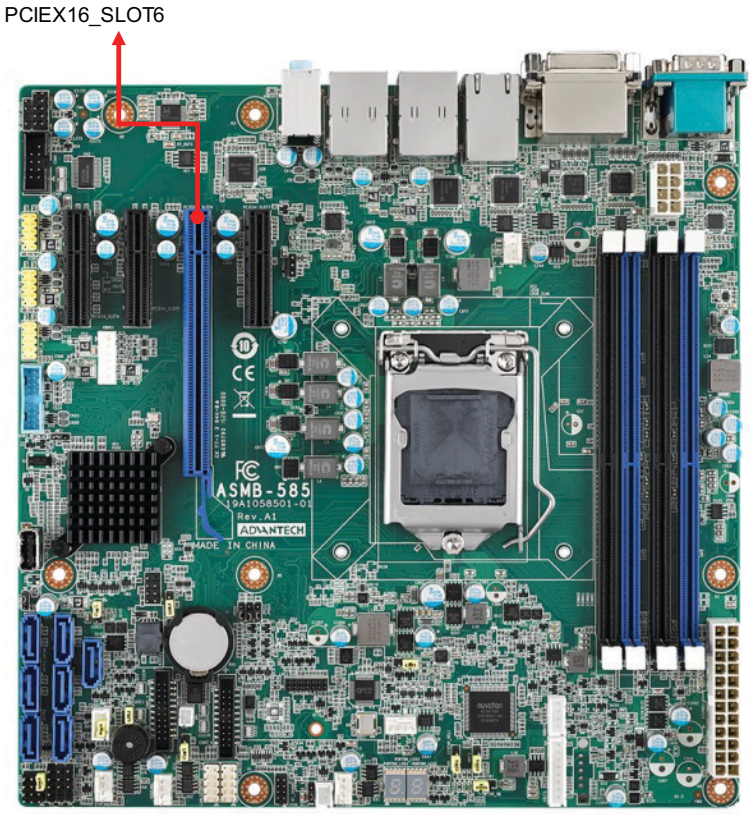


## 2.13 Serial ATA Interface (SATA0~6)



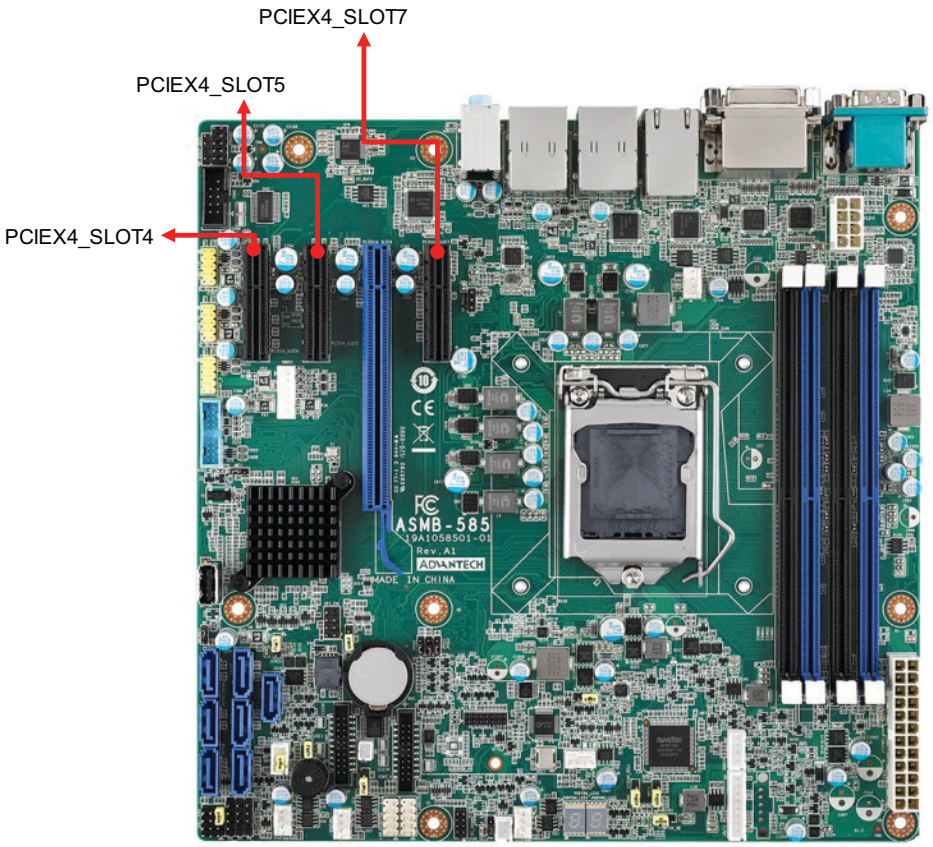

ASMB-585 features seven high performance serial ATA III interfaces (up to 600 MB/s, blue connector).

## 2.14 PCIe x16 slots (x16 link) Expansion Slot (PCIEX16_SLOT6)




The ASMB-585 provides one PCIe x16 slots (x16 link) for users to install add-on VGA cards when their applications require higher graphics performance than the CPU embedded graphics controller can provide, or high bandwidth demanded I/O card, such as frame grabber card, raid card and 10G LAN card.

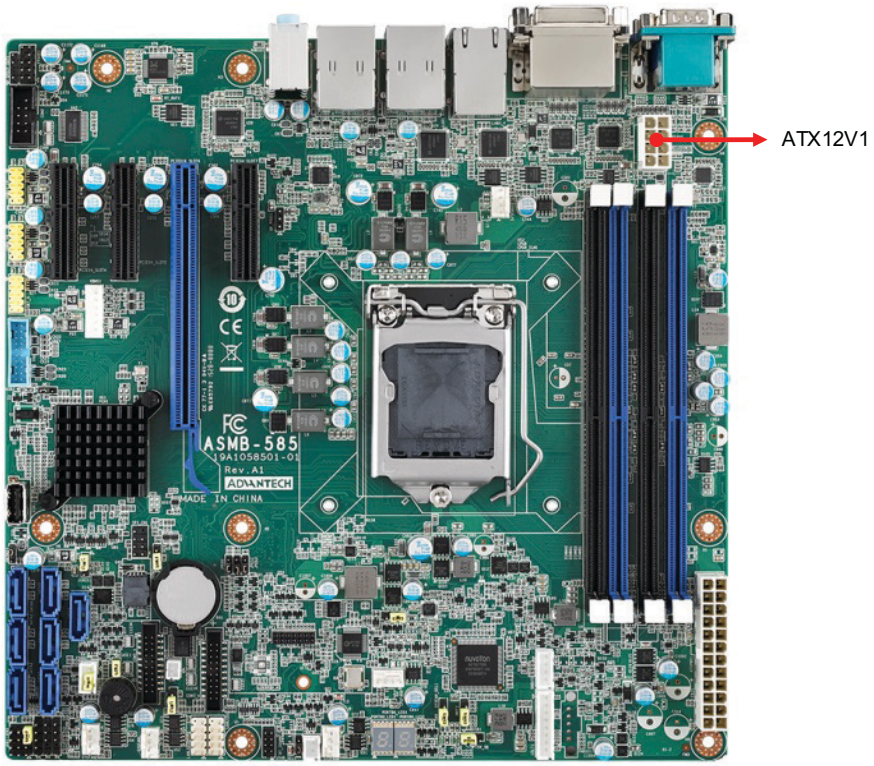
## 2.15 PCIe x4 Expansion Slot (PCIEX4_SLOT4/5/7)




PCIEX4_SLOT4 is Gen3 x4 link.
PCIEX4_SLOT5 is Gen3 x1 link.
PCIEX4_SLOT7 is Gen3 x4 link.

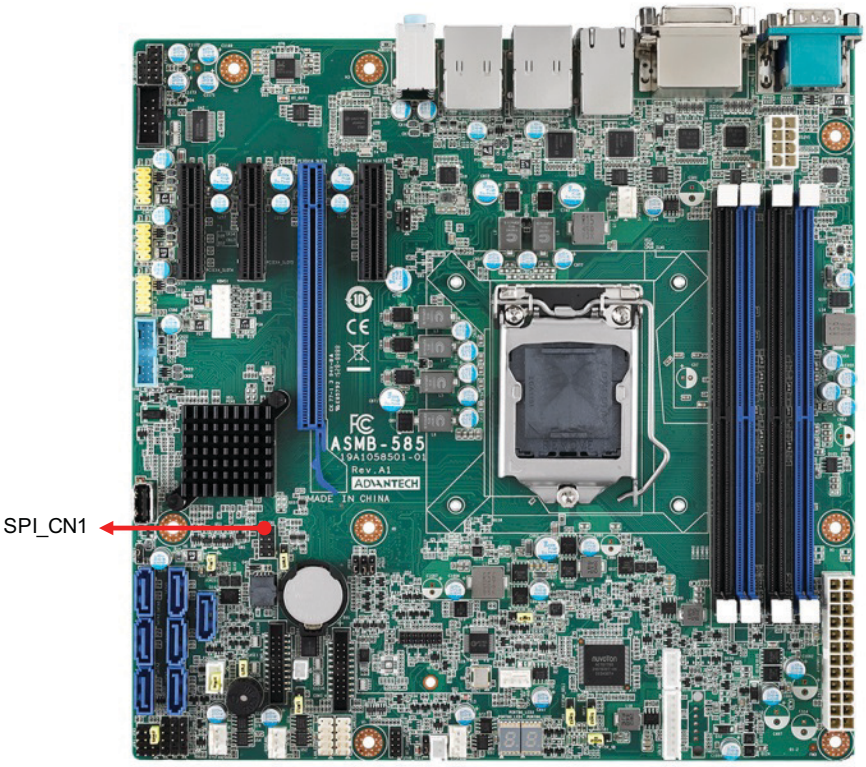
## 2.16 Auxiliary 8-pin power connector (ATX12V1)

For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12V Specification 2.0 (or later version). Do not forget to connect the 8-pin EATX12V power plug; otherwise, the system will not boot.

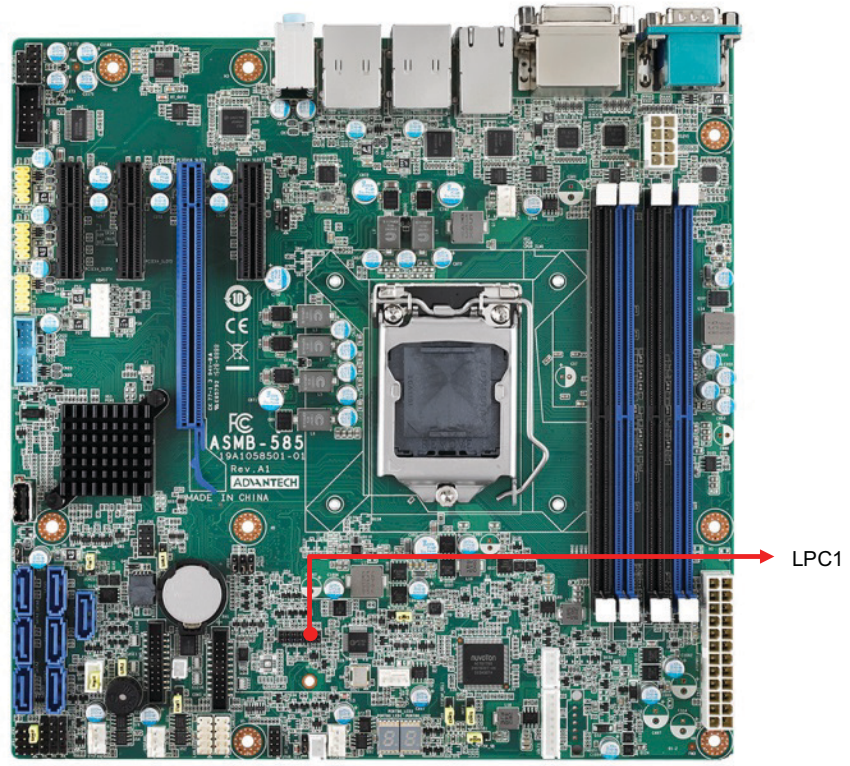


## 2.17 SPI Flash Connector(SPI_CN1)

SPI flash card pin header which can flash BIOS while ASMB-585 can not be power on and ensures platform integrity.



## 2.18 Low Pin Count Connector (LPC1)




LPC connector on AIMB-585 is reserved for Advantech TPM and COM 232/485 modules.

**Table 2.5: Advantech LPC Module List**

| Advantech P/N | Description |
|---|---|
| PCA-TPM-00A1E | TPM Module |
| PCA-COM232-00A1E | 4 ports RS-232 module connect to LPC connector |
| PCA-COM485-00A1E | 4 ports RS-485 module connect to LPC connector |

# Chapter 3

## BIOS Operation

# 3.1 Introduction

With the AMIBIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning the special features on or off. This chapter describes the basic navigation of the ASMB-585 setup screens.

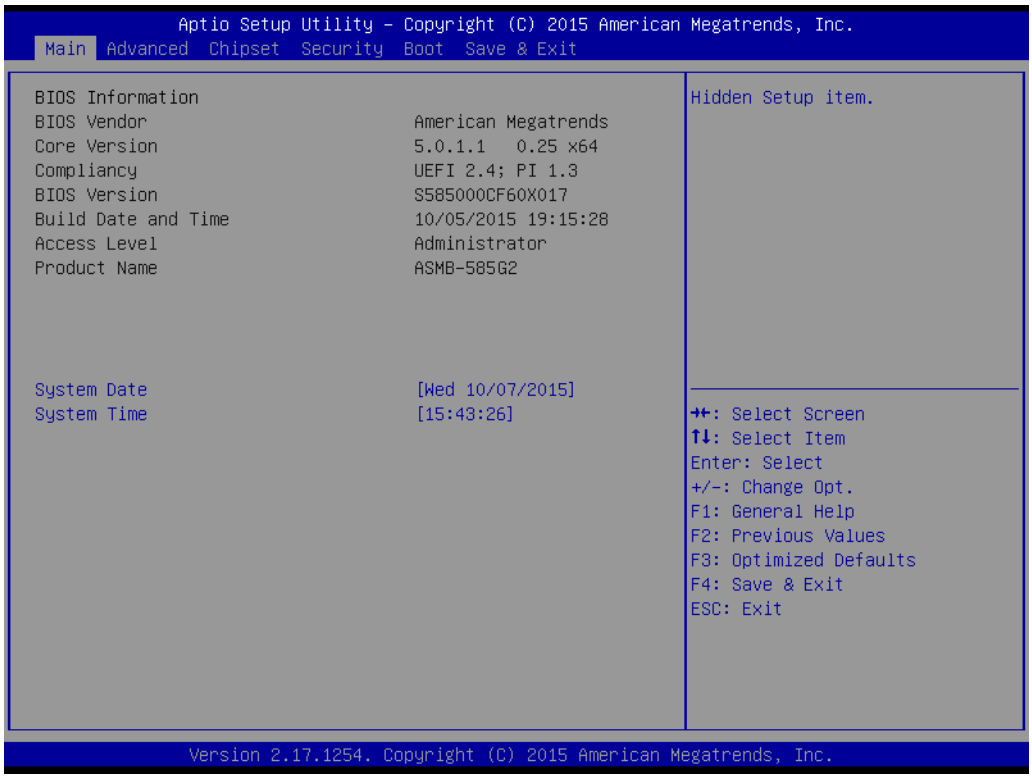



**Figure 3.1 Main setup screen**

AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in NVRAM area so it retains the Setup information when the power is turned off.

# 3.2 Entering BIOS Setup

Press <Del> or <Esc> at bootup to enter AMI BIOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

When users first enter the BIOS Setup Utility, they enter the Main setup screen. Users can always return to the Main setup screen by navigating to the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

## 3.2.1 Main Menu

Press <Del> or <Esc> at bootup to enter AMI BIOS CMOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.


**Figure 3.2 Main setup screen**

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend.

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

### 3.2.2 System time / System date

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

## 3.3 Advanced BIOS Features Setup

Select the Advanced tab from the ASMB-585 setup screen to enter the Advanced BIOS setup screen. You can select any of the items in the left frame of the screen, such as CPU configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

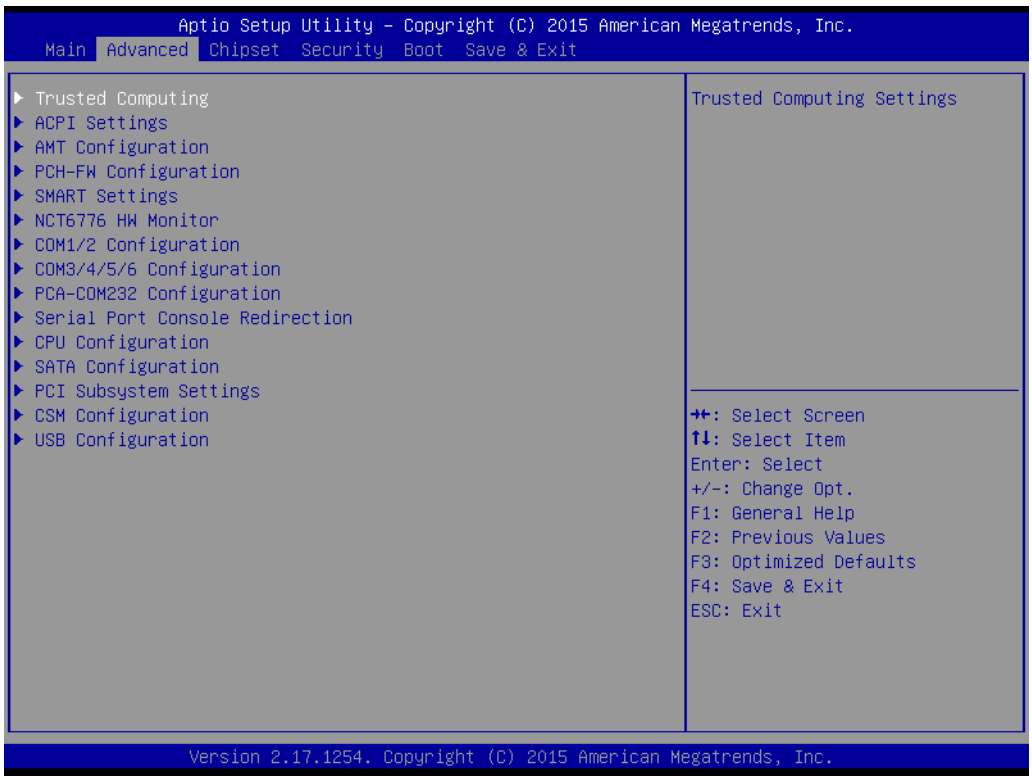



**Figure 3.3 Advanced BIOS features setup screen**

## 3.3.1 Trusted Computing

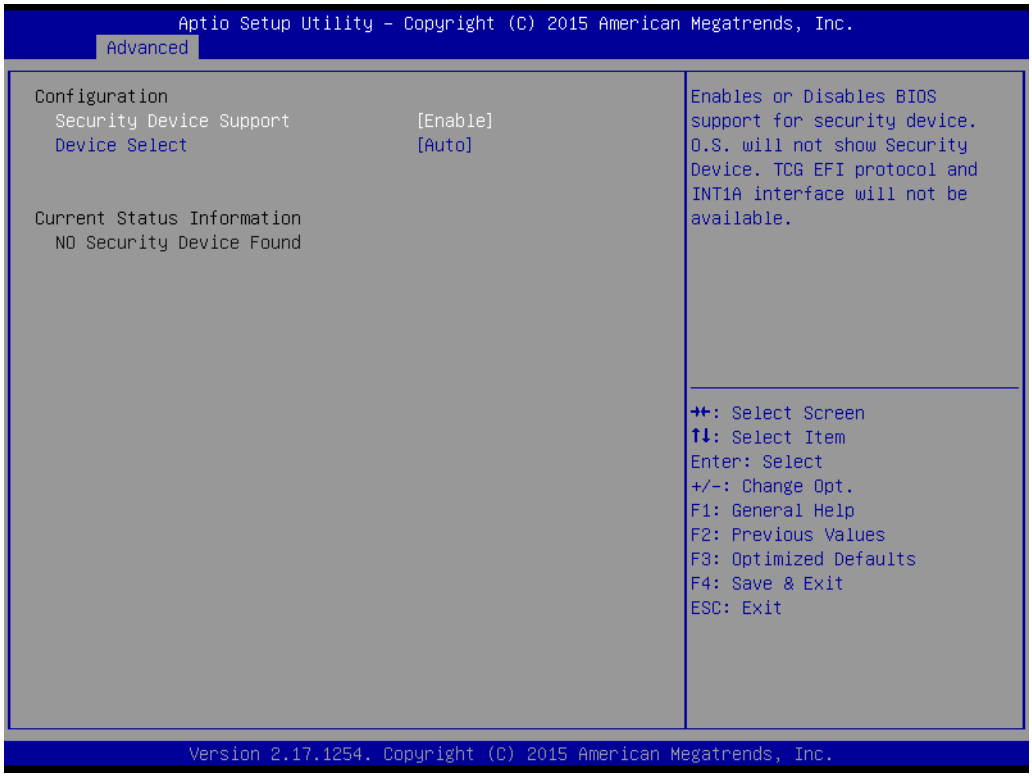



**Figure 3.4 TPM Settings**

- **Security Device Support**
  “Enable” or “disable” TPM Support. You can purchase Advantech LPC TPM module to enable TPM function. P/N: PCA-TPM-00A1E

### 3.3.2 ACPI Settings

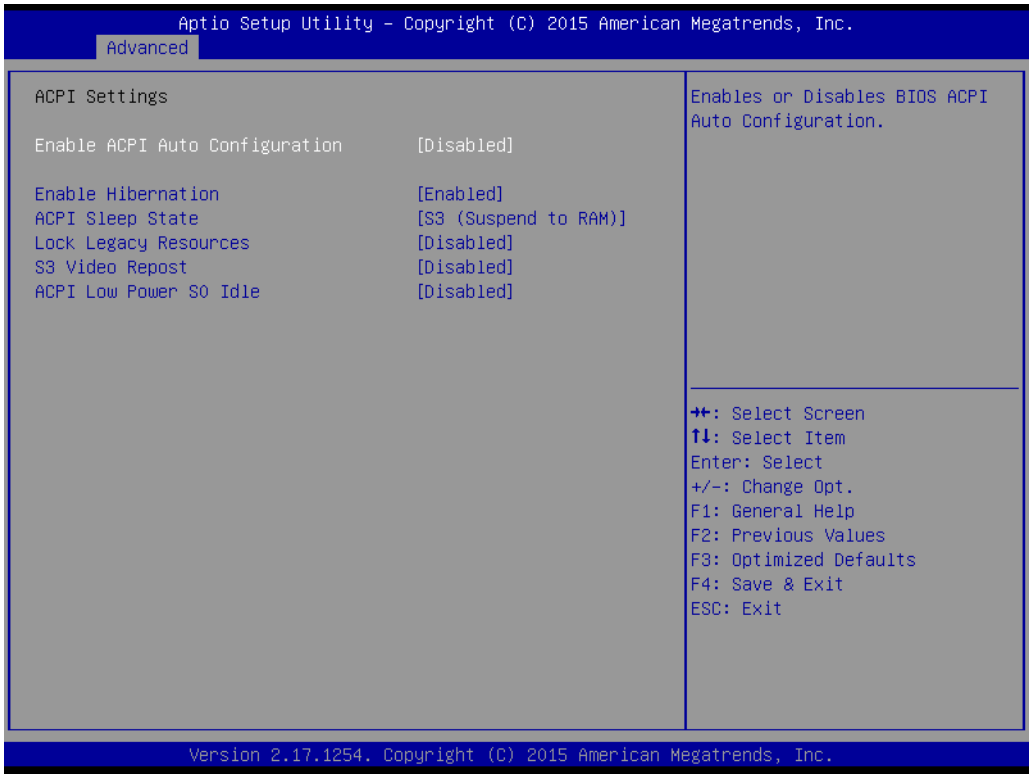



**Figure 3.5 ACPI Settings**

- **Enable ACPI Auto Configuration**
  "Enable" or "Disable" BIOS ACPI Auto Configuration.
- **Enable Hibernation**
  "Enable” or “Disable" Hibernation.
- **ACPI Sleep State**
  Specifies the ACPI sleep state when the system enters suspend.
- **Lock Legacy Resources**
  "Enable" or "Disable" Lock Legacy Resources.
- **S3 Video Repost**
  This item is to enabled or disabled S3 video repost.
- **ACPI Low Power S0 Idle**
  "Enable" or "Disable" ACPI Low Power S0 Idle Support.

### 3.3.3 AMT Configuration

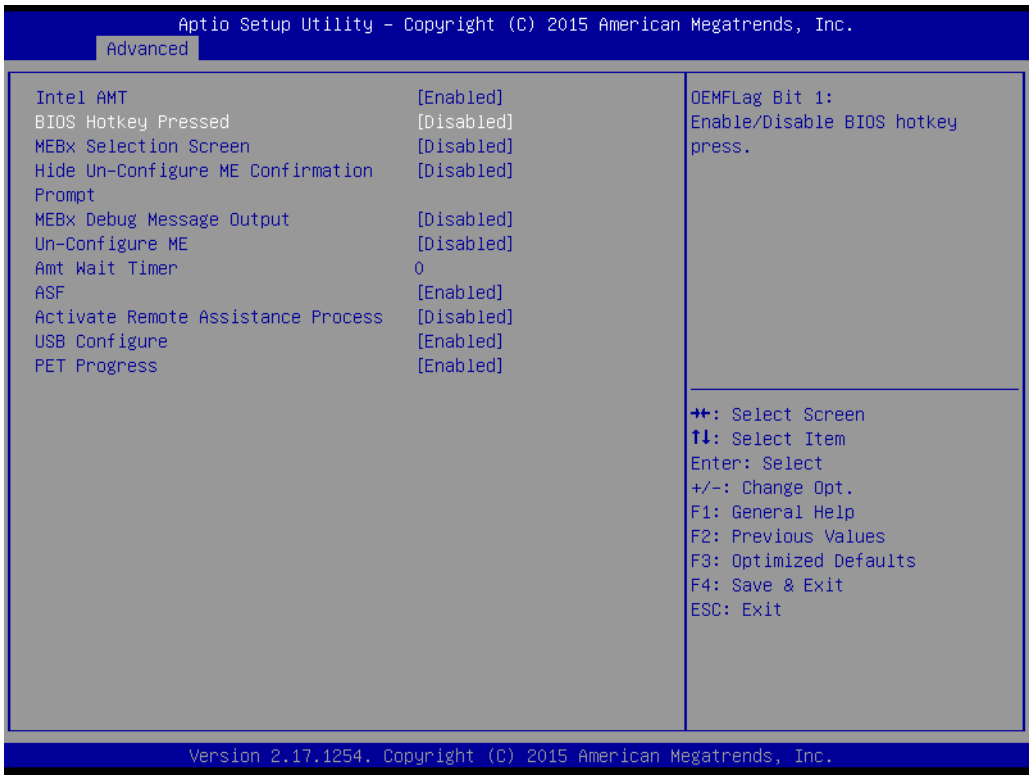
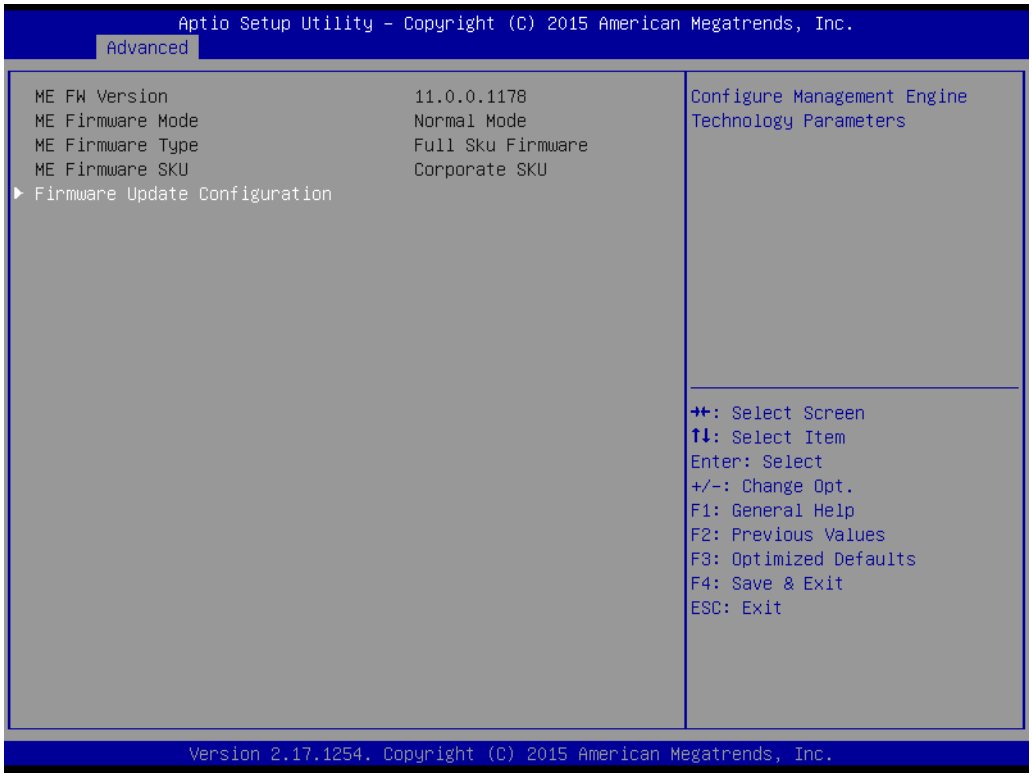



**Figure 3.6 AMT Configuration**

- **Intel AMT**
  Enable or Disable Intel Active Management Technology BIOS Extension.
- **BIOS Hotkey Pressed**
  To enable or disable BIOS hotkey press.
- **MEBx Selection Screen**
  “Enable or Disable” MEBx selection screen.
- **Hide Un-Configure ME Confirmation Prompt**
  Hide un-configuration ME without password confirmation prompt.
- **MEBx Debug Message Output**
  Enable MEBx debug message output.
- **Un-Configure ME**
  To un-configure ME without password.
- **AMT Wait Timer**
  To set a waiting time before sending ASF_BOOT_OPTIONS.
- **Disable ME**
  Set ME to Soft temporary disable.
- **ASF**
  Enable or disable Alert Specification format.
- **Activate Remote Assistance Process**
  To trigger CIRA boot.
- **USB Configure**
  To enable or disable USB configure function.
- **PET Progress**
  Enable or disable PET event progress to receive PET events.

### 3.3.4 PCH-FW Configuration



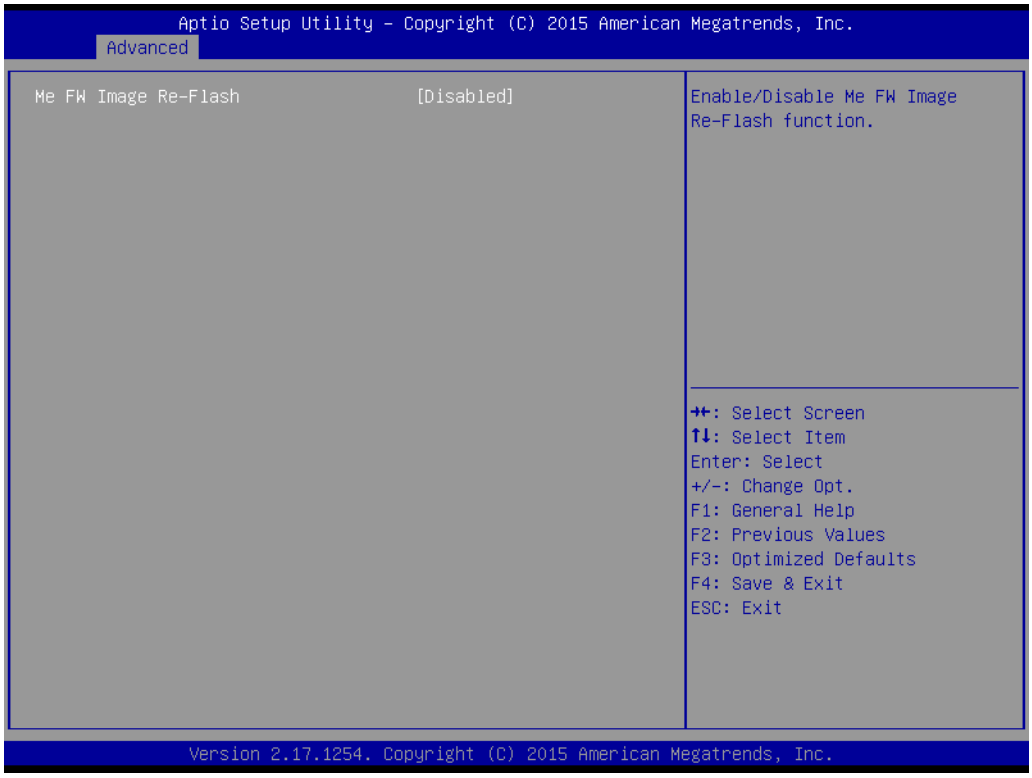




**Figure 3.7 Intel ME FW Configuration Information**

This page shows the Intel ME configuration.

- **ME FW Image Re-flash**
  "Enable" or "Disable" ME FW Image Re-Flash function.

### 3.3.5 SMART Settings

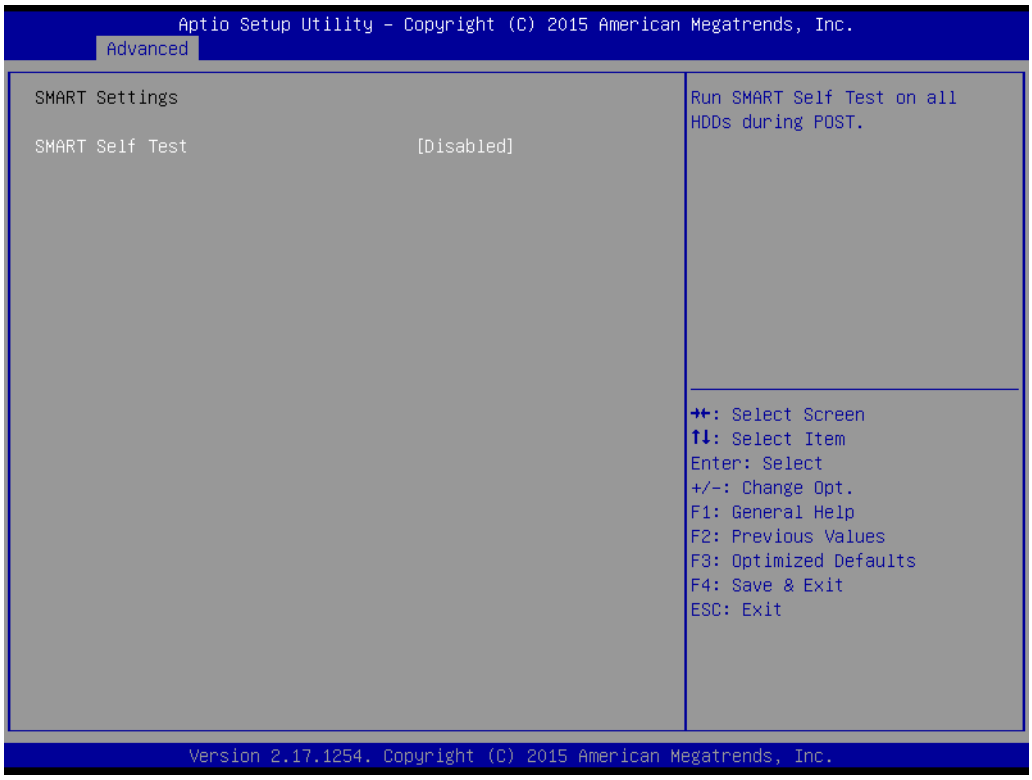



**Figure 3.8 SMART Setting**

- **SMART Self Test**
  This item is to enable or disable SMART self test on all HDDs during post.

### 3.3.6 NCT6776 HW Monitor

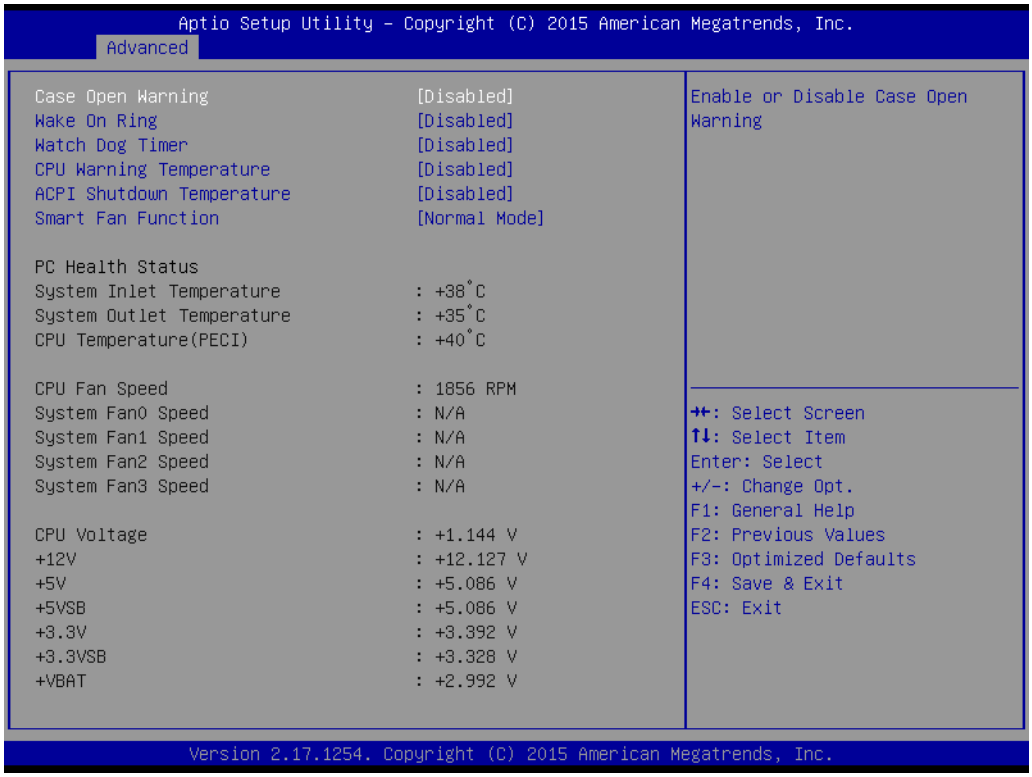



**Figure 3.9 PC Health Status**

- **Case Open Warning**
  Enable/Disable the chassis Intrusion monitoring function. When enabled and the case is opened, a warning message will show in post screen.
- **Wake On Ring**
  Enable/Disable Wake On Ring Function.
- **Watch Dog Timer**
  Enable/Disable Watch Dog Timer Function.
- **CPU Warning Temperature**
  Use this to set the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.
- **ACPI Shutdown Temperature**
  Use this to set the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheat damage.
- **Smart Fan Function**
  ASMB-585 offers three different fan curves:
  1.Normal Mode - Enable smart fan for normal system configuration.
  2.Quiet Mode - Enable smart fan for quiet system with no expansion cards.
  3.Disable - All fans run as full speed.

### 3.3.7 COM1/2 Configuration

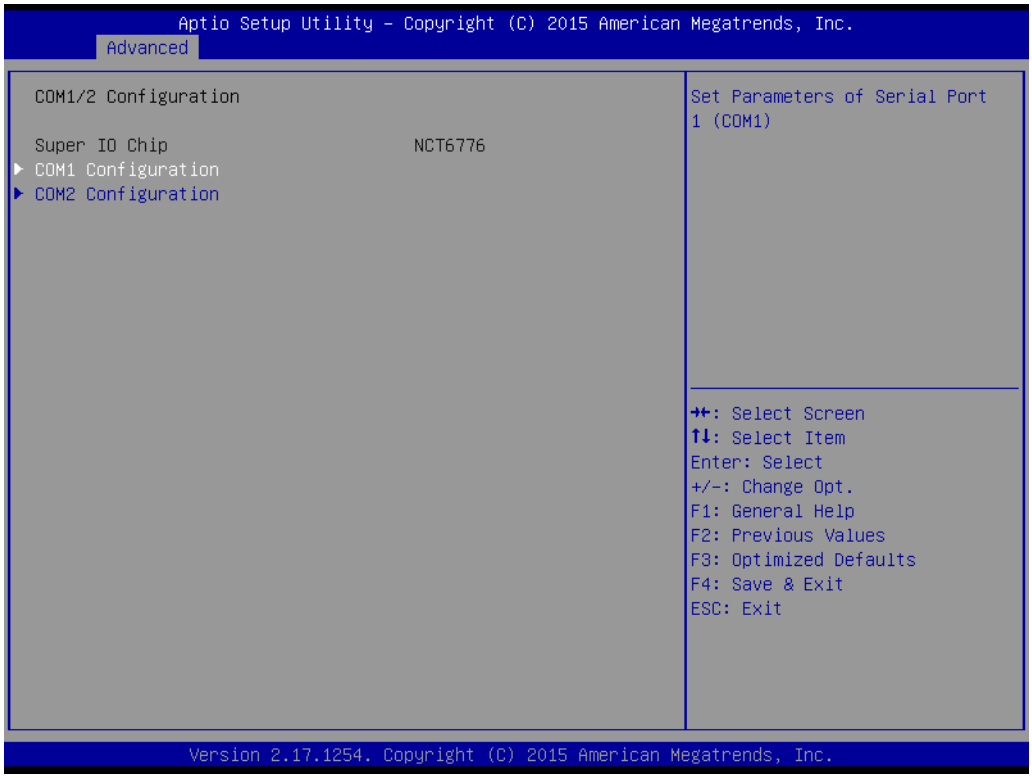



**Figure 3.10 COM1/2 Configuration**

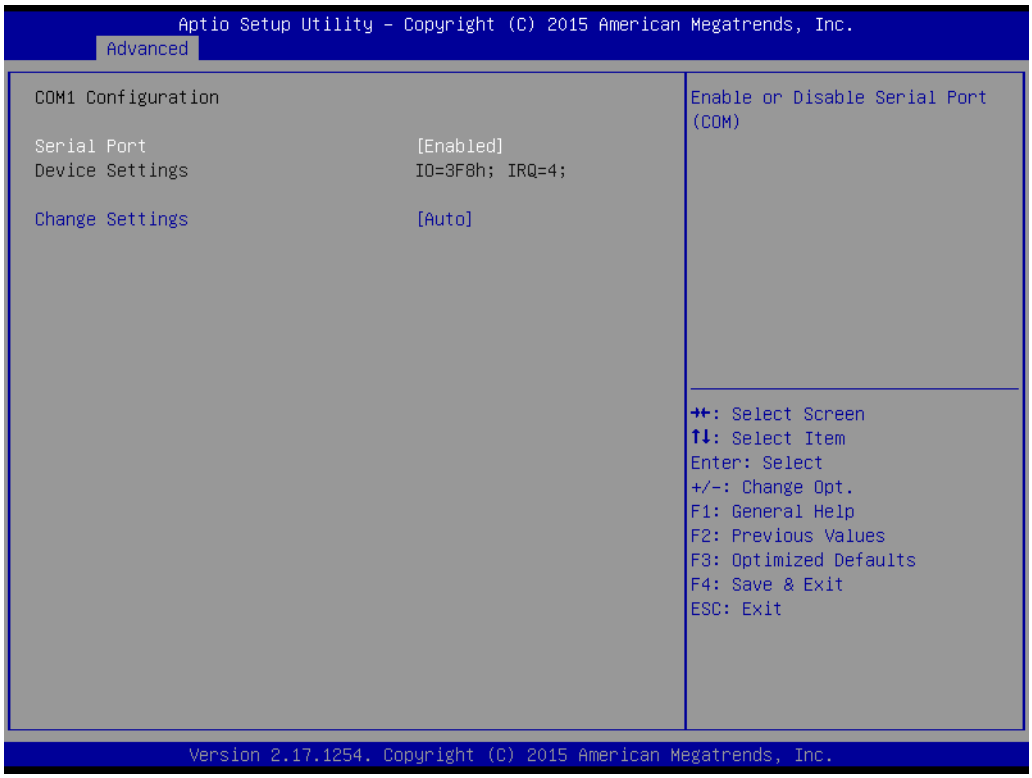



**Figure 3.11 COM1 Configuration**

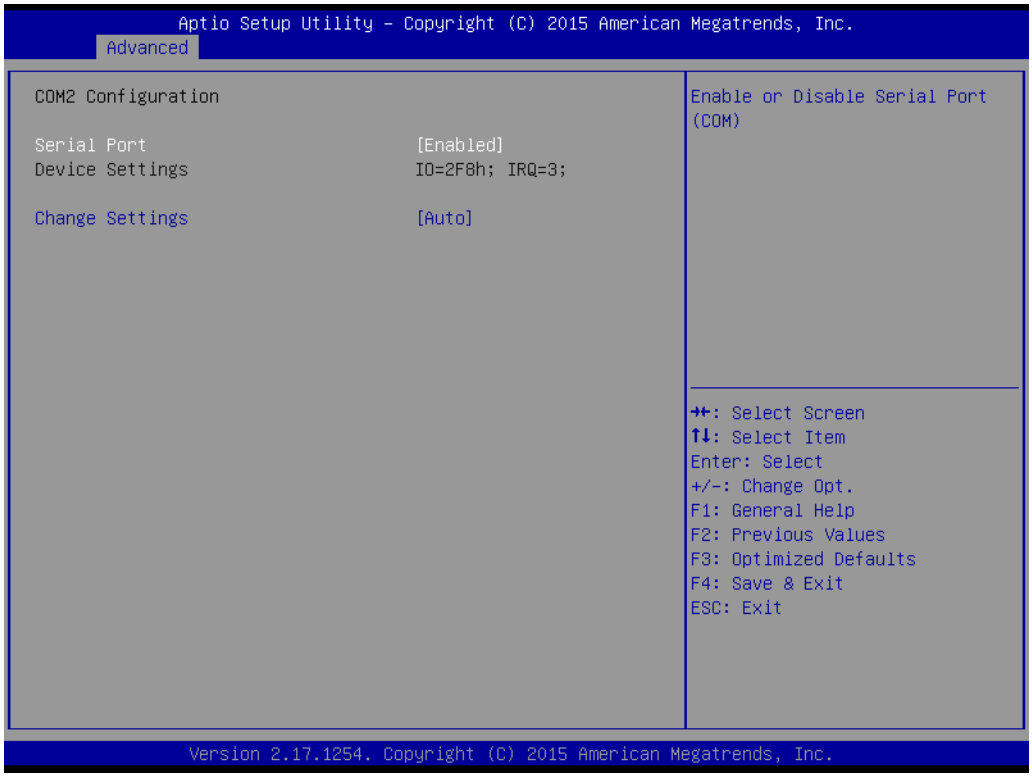



**Figure 3.12 COM2 Configuration**

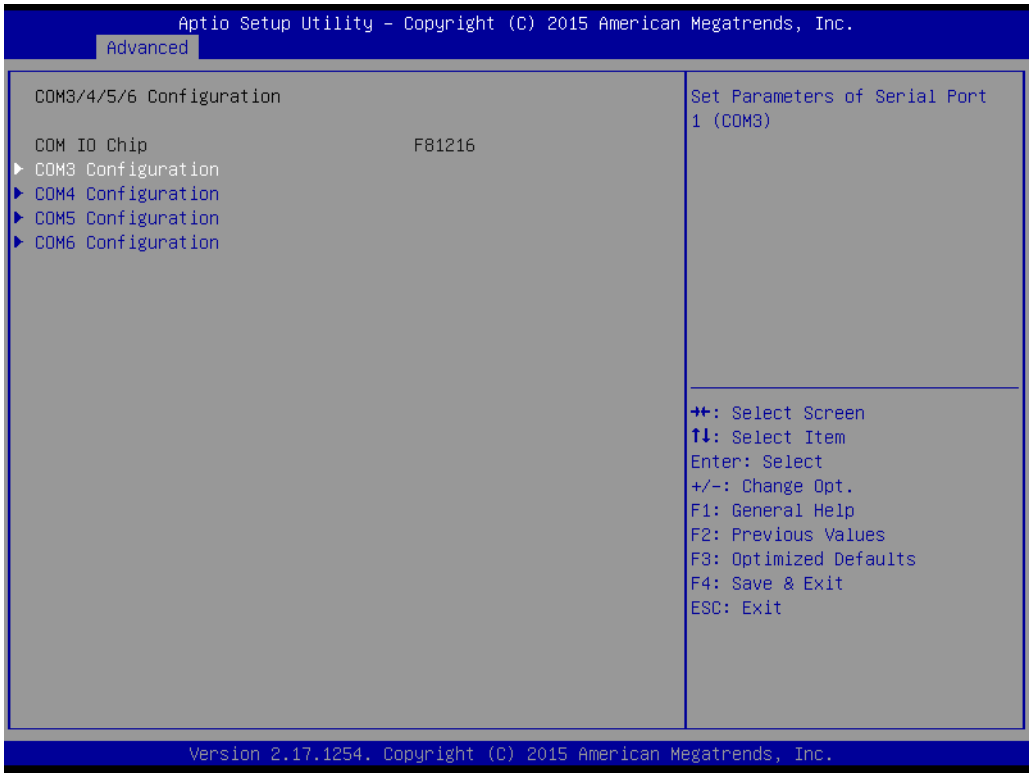
**COM1 Configuration**

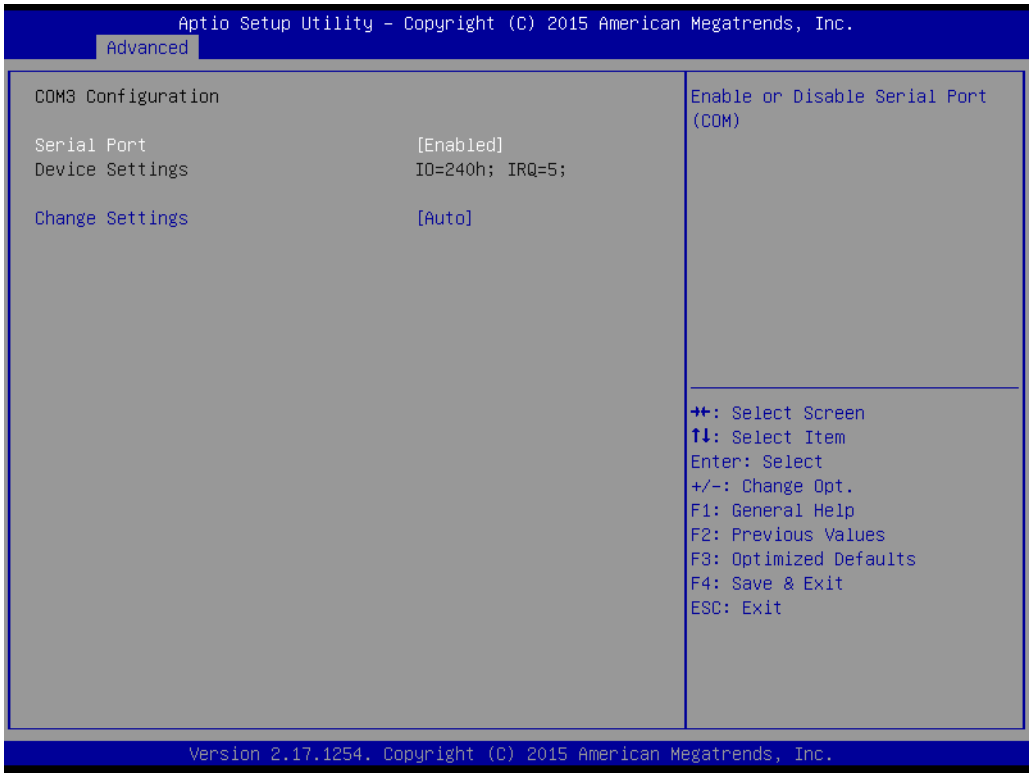
- **Serial Port**
  "Enable" or "disable" COM1.
- **Change Settings**
  Select optimal settings for COM1.

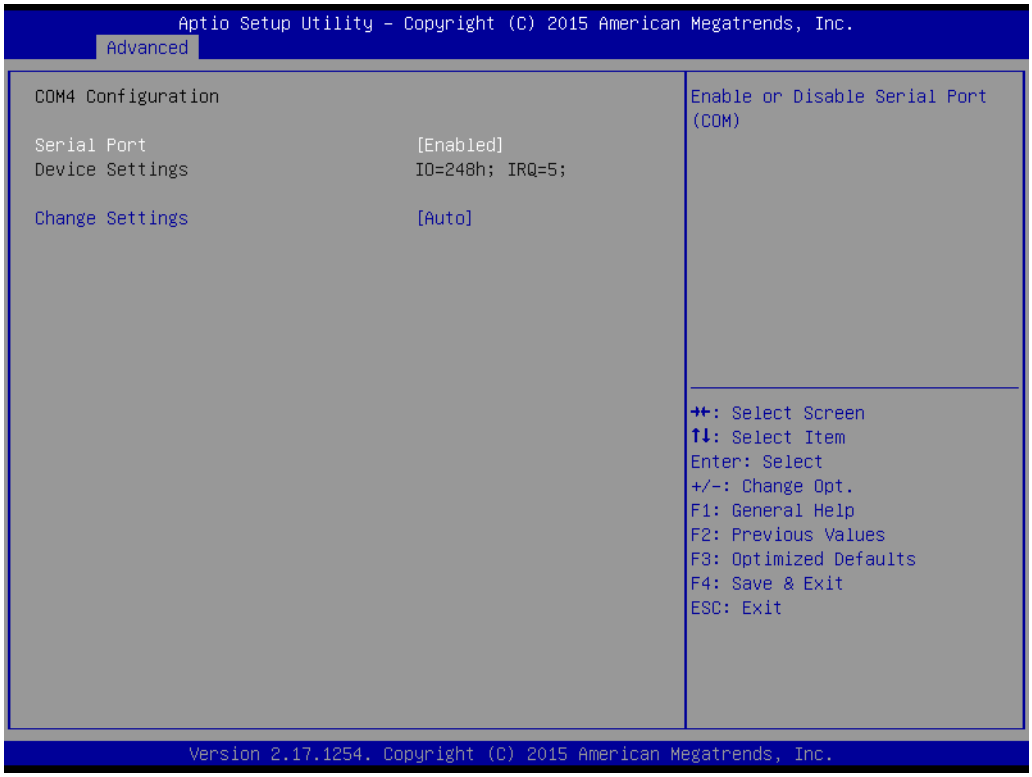
**COM2 Configuration**

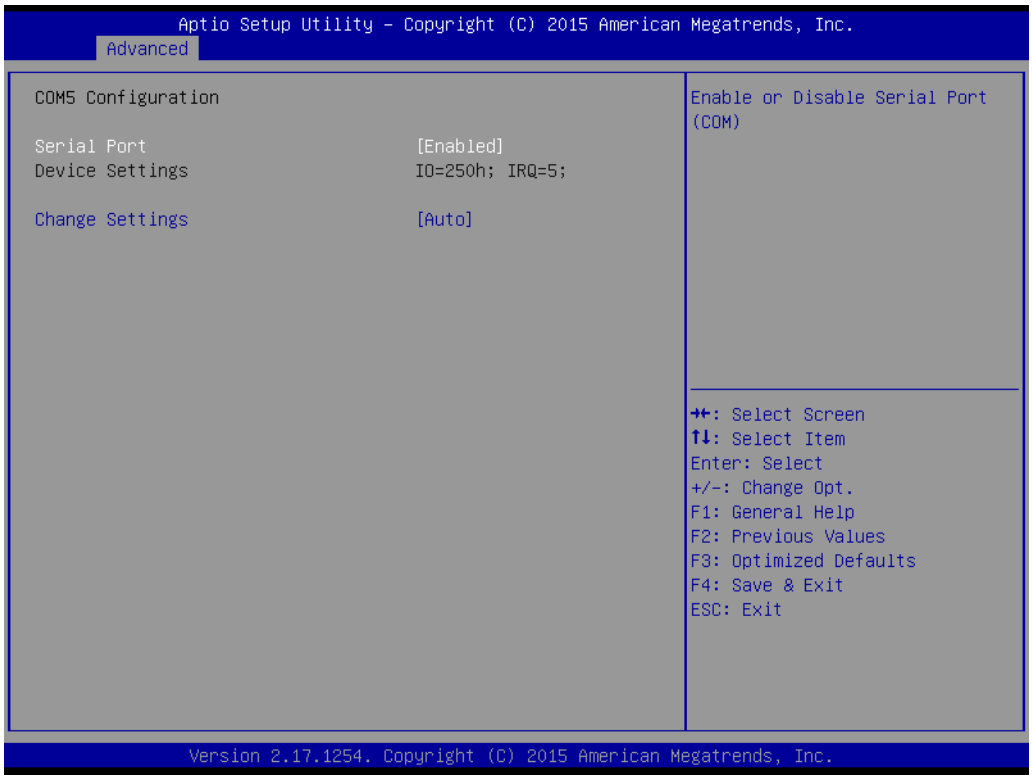
- **Serial Port**
  "Enable" or "disable" COM2.
- **Change Settings**
  Select optimal settings for COM2.

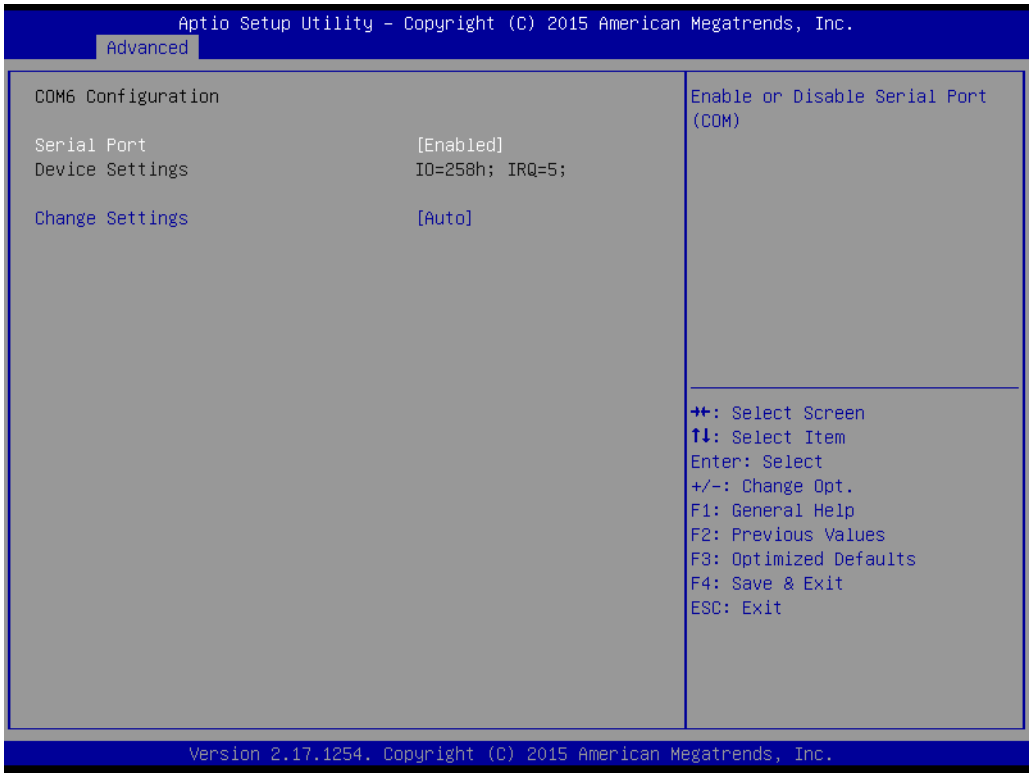
## 3.3.8 COM3/4/5/6 Configuration




Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
Advanced
COM4 Configuration
Serial Port [Enabled]
Device Settings IO=248h; IRQ=5;
Change Settings [Auto]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
Advanced
COM5 Configuration
Serial Port [Enabled]
Device Settings IO=250h; IRQ=5;
Change Settings [Auto]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.




**COM3 Configuration**

- **Serial Port**
  "Enable" or "Disable" COM3.
- **Change Settings**
  Select optimal settings for COM3.

**COM4 Configuration**

- **Serial Port**
  "Enable" or "Disable" COM4.
- **Change Settings**
  Select optimal settings for COM4.

**COM5 Configuration**

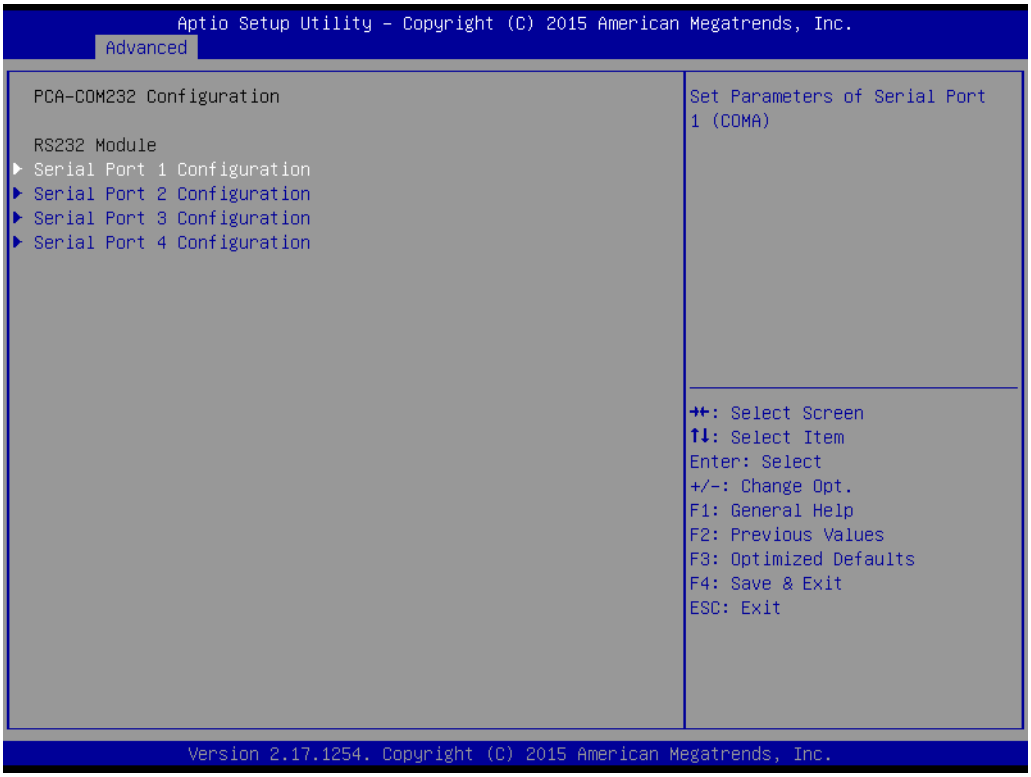
- **Serial Port**
  "Enable" or "Disable" COM5.
- **Change Settings**
  Select optimal settings for COM5.

**COM6 Configuration**

- **Serial Port**
  "Enable" or "Disable" COM6.
- **Change Settings**
  Select optimal settings for COM6.

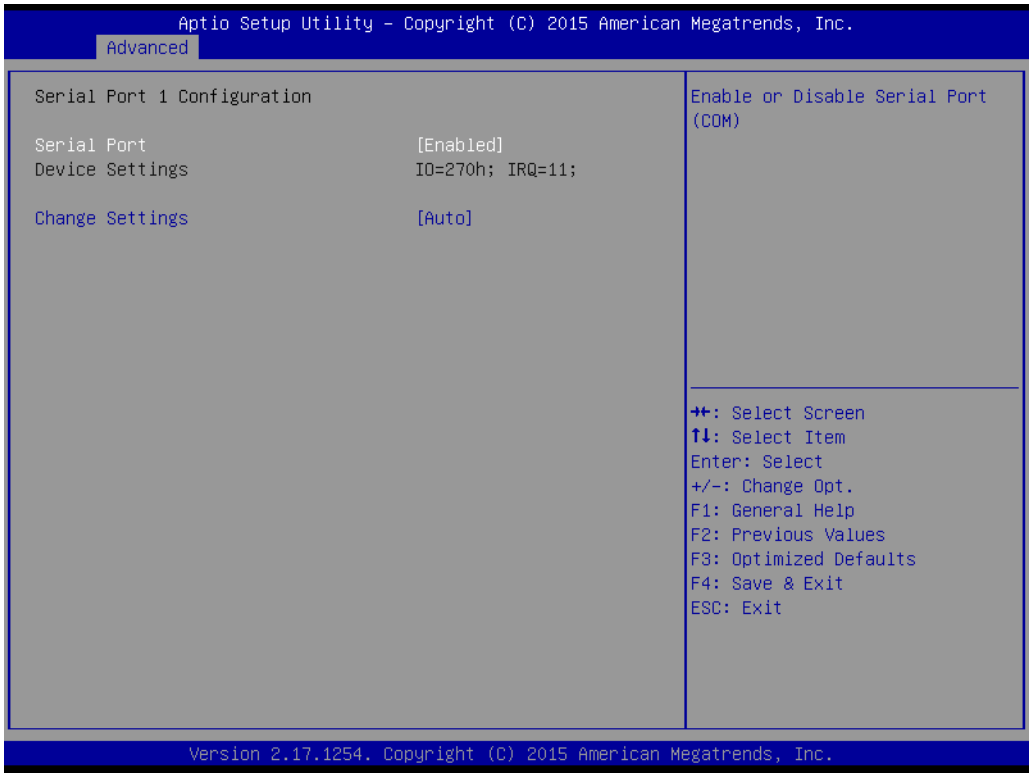
### 3.3.9 PCA-COM232/COM485 Configuration

***Note!*** *(This item only shows when a PCA COM module is installed)*




ASMB-585 offers extra four COM ports through LPC connector.

You need to purchase "PCA-COM232-00A1E" or "PCA-COM485-00A1E" then install it in the LPC connector.




**Serial Port 1 Configuration**

- **Serial Port**
  "Enable" or "Disable" Serial Port 1.
- **Change Settings**
  Select optimal settings for Serial Port 1.

**Serial Port 2 Configuration**

- **Serial Port**
  "Enable" or "Disable" Serial Port 2.
- **Change Settings**
  Select optimal settings for Serial Port 2.

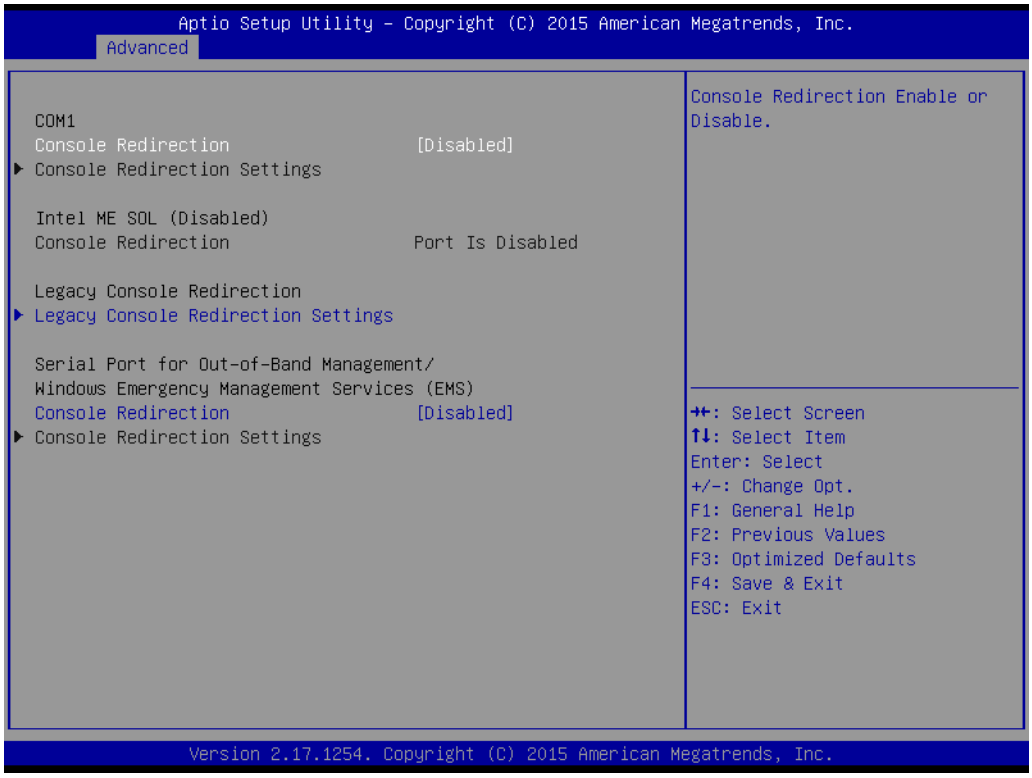
**Serial Port 3 Configuration**

- **Serial Port**
  "Enable" or "Disable" Serial Port 3.
- **Change Settings**
  Select optimal settings for Serial Port 3.

**Serial Port 4 Configuration**

- **Serial Port**
  "Enable" or "Disable" Serial Port 4.
- **Change Settings**
  Select optimal settings for Serial Port 4.

## 3.3.10 Serial Port Console Redirection



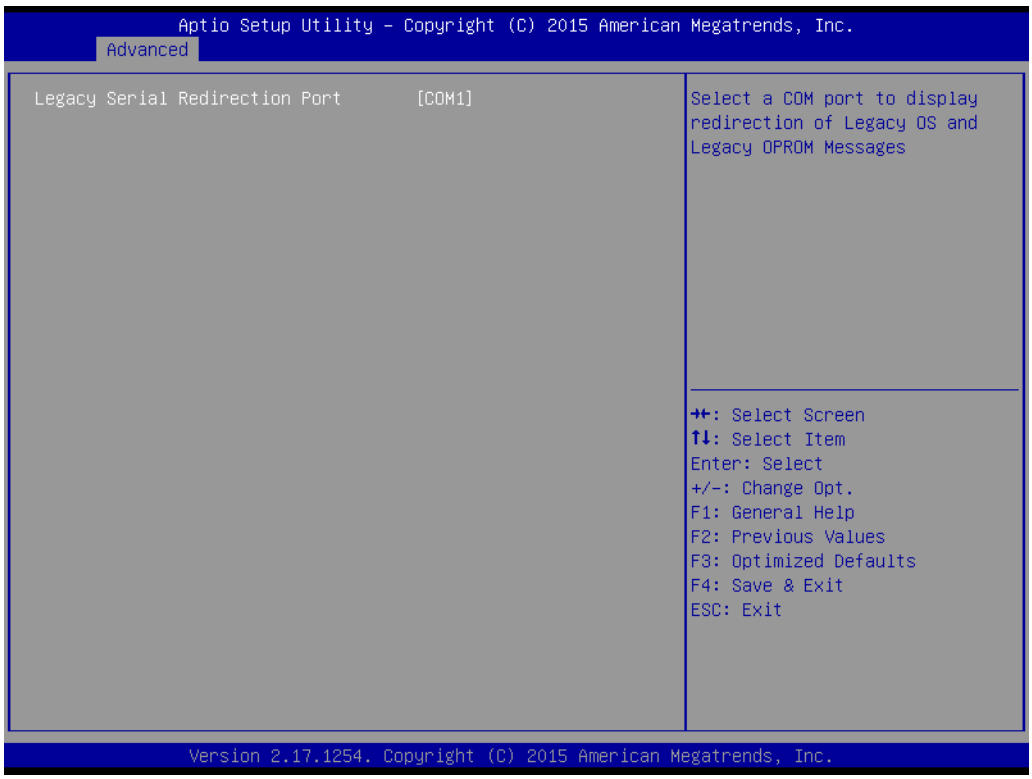




**Figure 3.13 Serial Port Console Redirection**

- **Console Redirection**
  Enable or disable the console redirection feature.

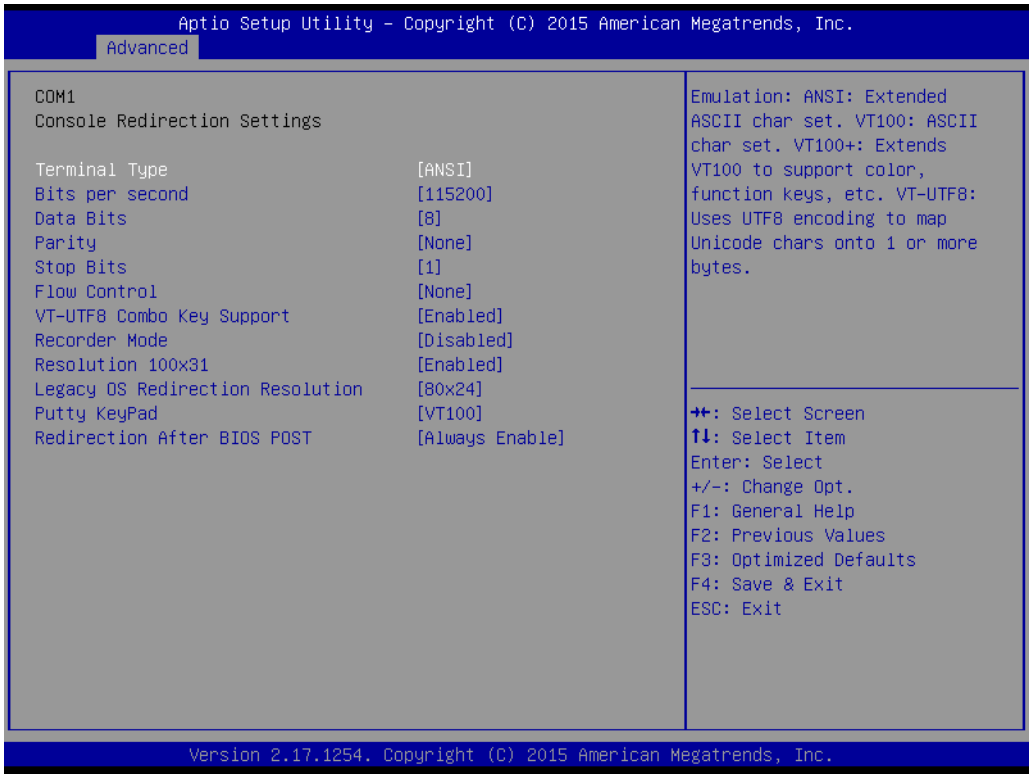



**Figure 3.14 Console Redirection Setting**

- **Terminal Type**

  Select a terminal type to be used for console redirection.

  Options available: VT100/VT100+/ANSI /VT-UTF8.

- **Bits per second**

  Select the baud rate for console redirection.

  Options available: 9600/19200/57600/115200.

- **Data Bits**

  This item is to set data bits between [8] or [7].

- **Parity**

  A parity bit can be sent with the data bits to detect some transmission errors.

  Even: parity bit is 0 if the num of 1's in the data bits is even.

  Odd: parity bit is0if num of 1's the data bits is odd.

  Mark: parity bit is always 1. Space: Parity bit is always 0.

  Mark and Space Parity do not allow for error detection.

  Options available: None/Even/Odd/Mark/Space.

- **Stop Bits**

  Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

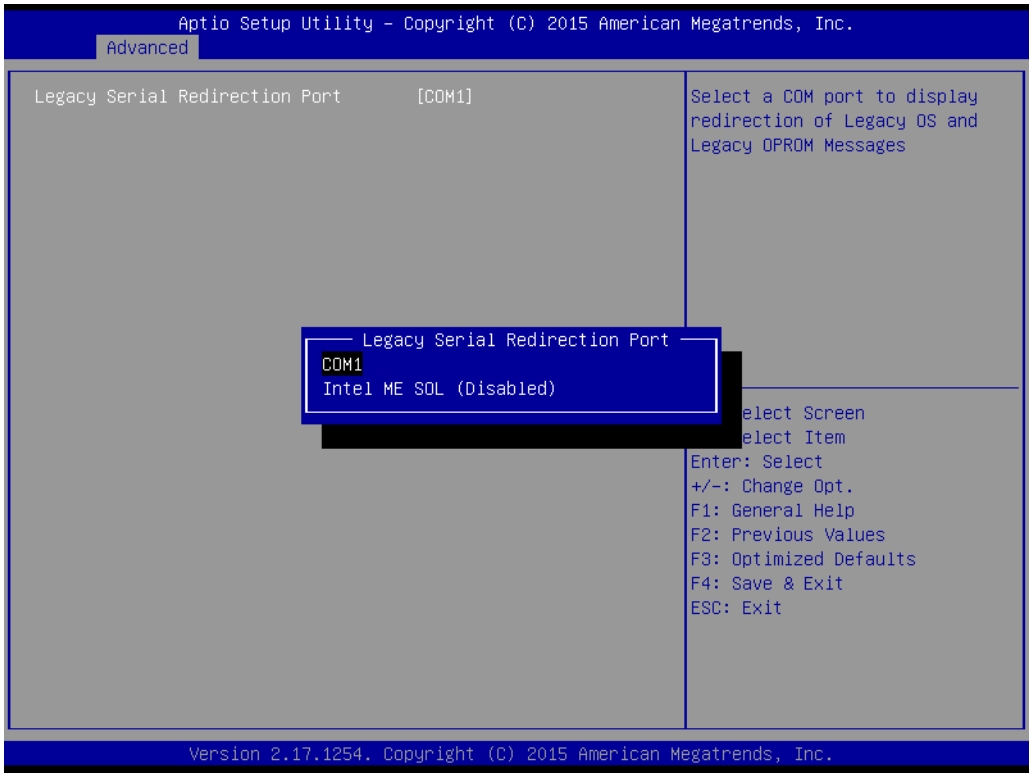
  Options available: 1/2.

- **Flow Control**

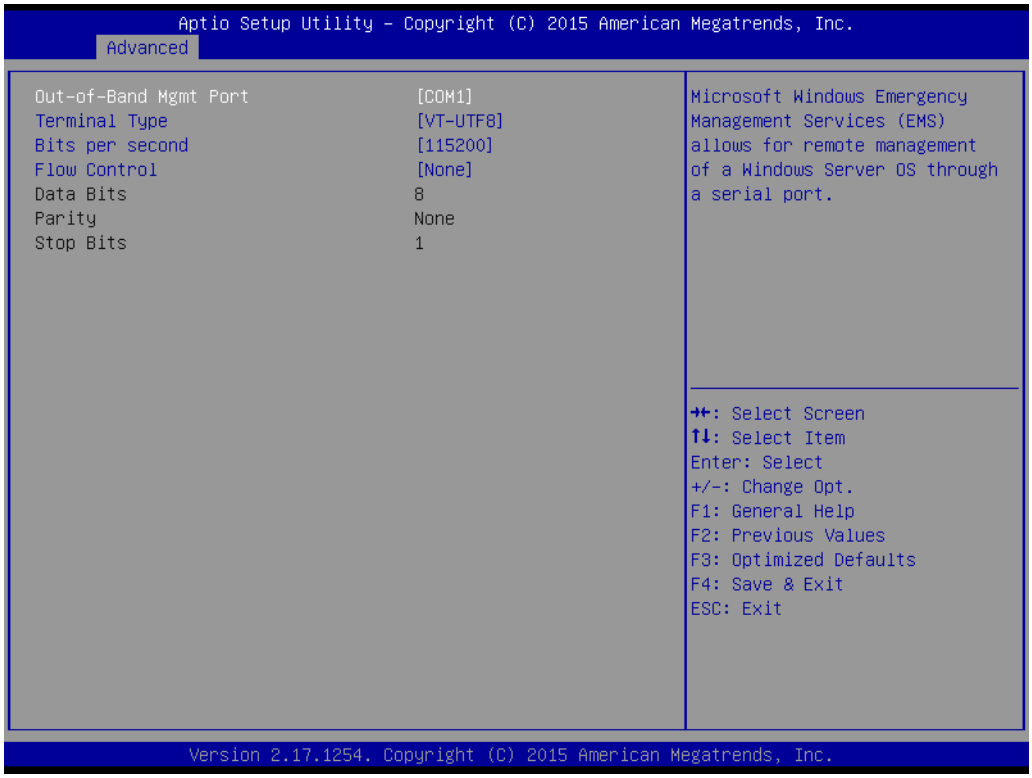
  Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

  Options available: None/Hardware RTS/CTS.

- **VT-UTF8 Combo Key Support**
  To enable VT-UTF8 combination key for supporting ANSI/VT100 terminals.
- **Recorder Mode**
  When this mode enabled, only text will be send. This is to capture Terminal data.
  Options available: Enabled/Disabled.
- **Resolution 100x31**
  Enables or disables extended terminal resolution.
  Options available: Enabled/Disabled.
- **Legacy OS Redirection Resolution**
  On Legacy OS, the number of Rows and Columns supported redirection.
  Options available: 80x24/80X25.
- **Putty Keypad**
  To support selection function key and keypad on Putty.
- **Redirection After BIOS POST**
  The settings specify if Bootloader is selected then legacy console redirection is disabled before booting to legacy OS.
  Default value is always enable which means legacy console redirection is enabled for legacy OS.




- **Legacy Console Redirection Settings**
  Select a COM port to display redirection of legacy OS and legacy OpROM messages.




Console Redirection Settings for EMS.

- **Out-of-Band Mgmt Port**

  Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

- **Terminal Type**

  Select a terminal type to be used for console redirection.

  Options available: VT100/VT100+/ANSI /VT-UTF8.

- **Bits per second**

  Select the baud rate for console redirection.

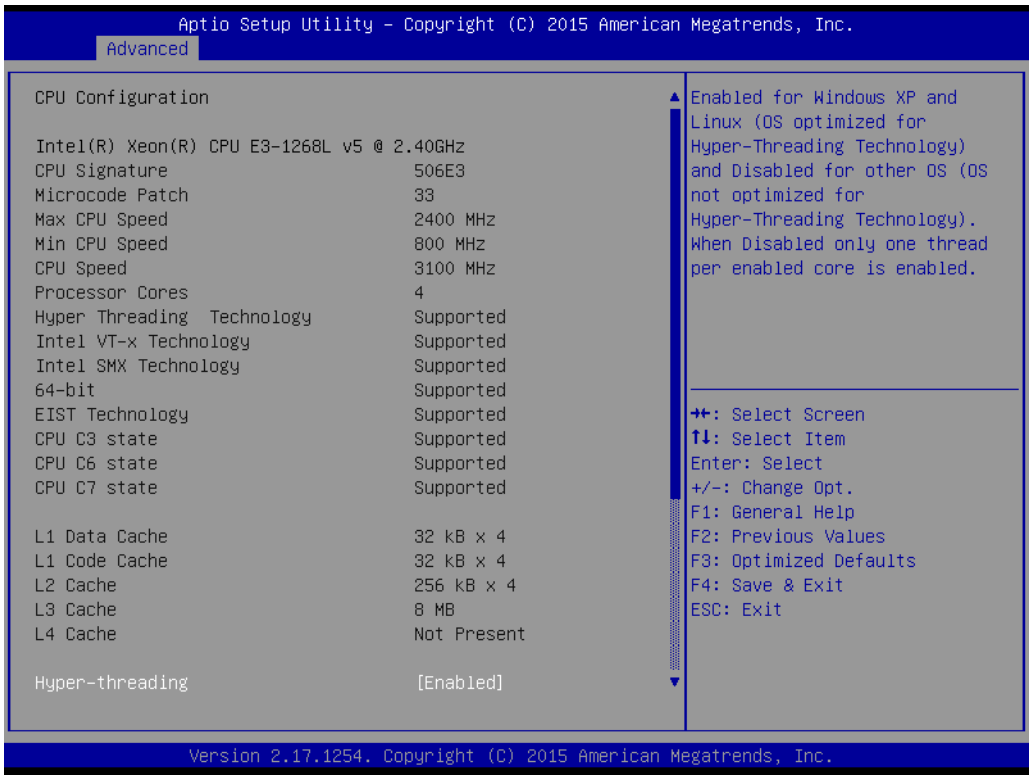
  Options available: 9600/19200/57600/115200.

- **Flow Control**

  Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

  Options available: None/Hardware RTS/CTS.

## 3.3.11 CPU Configuration



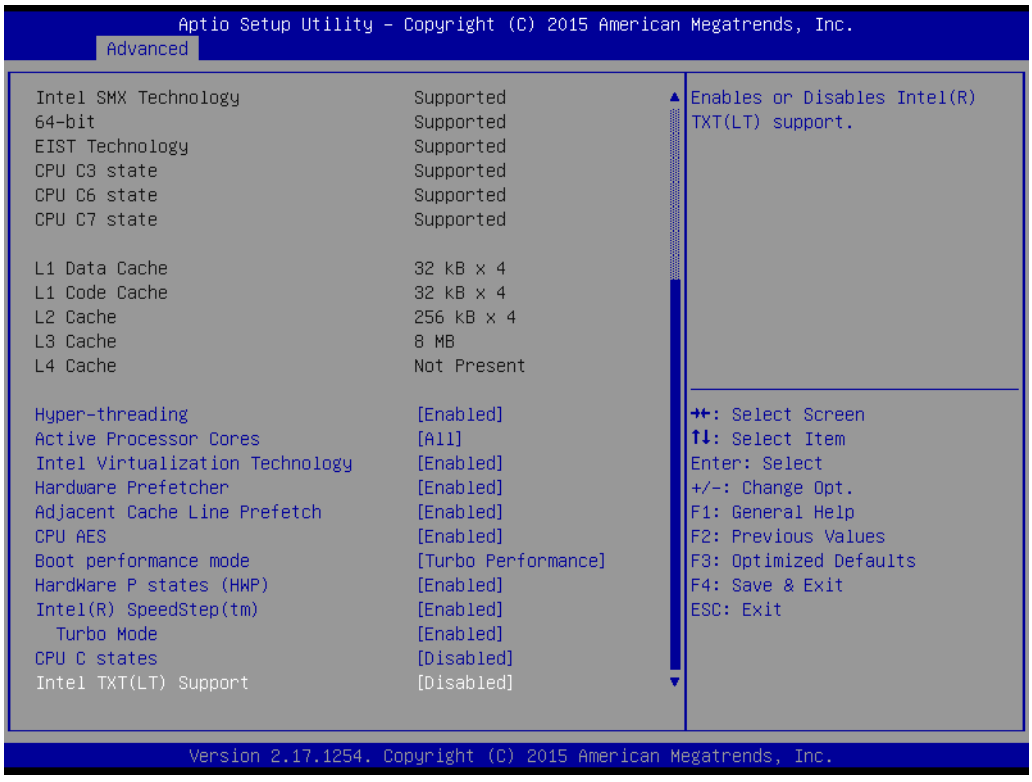




**Figure 3.15 CPU Configuration**

- **Hyper-threading**

  This item allows you to enable or disable Intel Hyper Threading technology.
- **Active Processor Core**

  Use this to select how many processor cores you want to activate when you are using a dual or quad core processor.
- **Intel Virtualization Technology**

  This feature is used to enable or disable the Intel Virtualization Technology (IVT) extension. It allows multiple operating systems to run simultaneously on the same system. It does this by creating virtual machines, each running its own x86 operating system.
- **Hardware Prefetcher**

  Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it, so that it can improve the load-to-use latency. You may choose to enable or disable it.
- **Adjacent Cache Line Prefetch**

  The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. You may choose to enable or disable it.
- **CPU AES**

  This item is to enable or disable CPU advanced encryption standard instructions.
- **Boot performance mode**

  Select the performance state that the BIOS will set before OS handoff.
- **Hardware P states (HWP)**

  Enable/Disable HWP function.
- **Intel SpeedStep (tm)**

  Allows more than two frequency ranges to be supported.
- **Turbo Mode**

  This item is to enable or disable turbo mode.
- **CPU C States**

  This item is to enable or disable CPU C states.

## 3.3.12 SATA Configuration

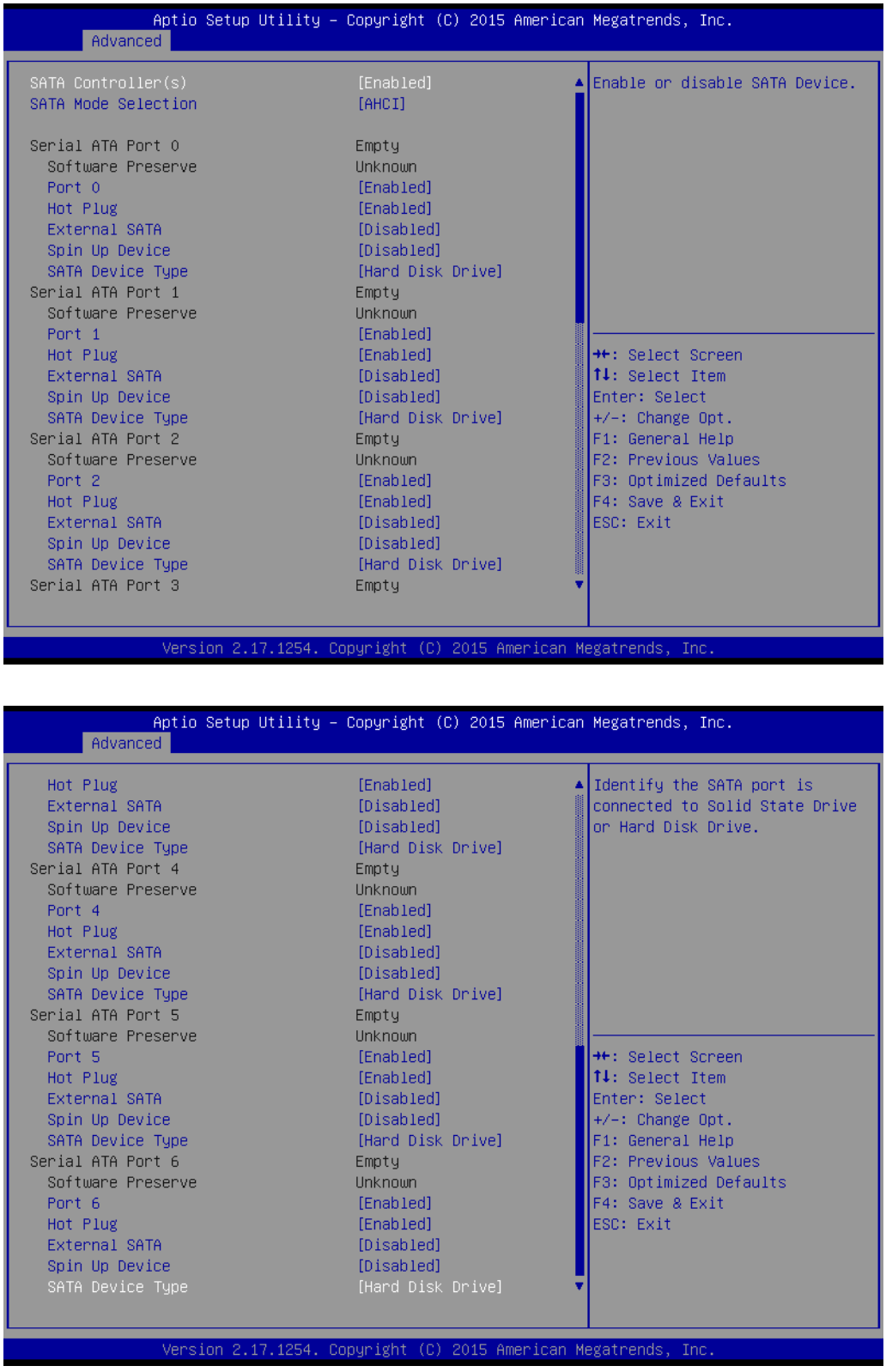



**Figure 3.16 SATA Configuration**

- **SATA Controller(s)**
  This item is to enable or disable SATA devices.
- **SATA Mode Selection**
  Set as IDE, AHCI, or RAID when SATA Controllers are enable.
- **Port 0~6**
  To enable or disable SATA port 0~5.
- **Hot Plug**
  Designates this port as Hot Pluggable.
- **External SATA**
  External SATA support.
- **Port 0~6 Device Type**
  To identify the SATA is connected to Solid State Drive or Hard Disk Drive.
- **Port 0~6 Spin Up Device**
  On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.

### 3.3.13 PCI Subsystem Settings

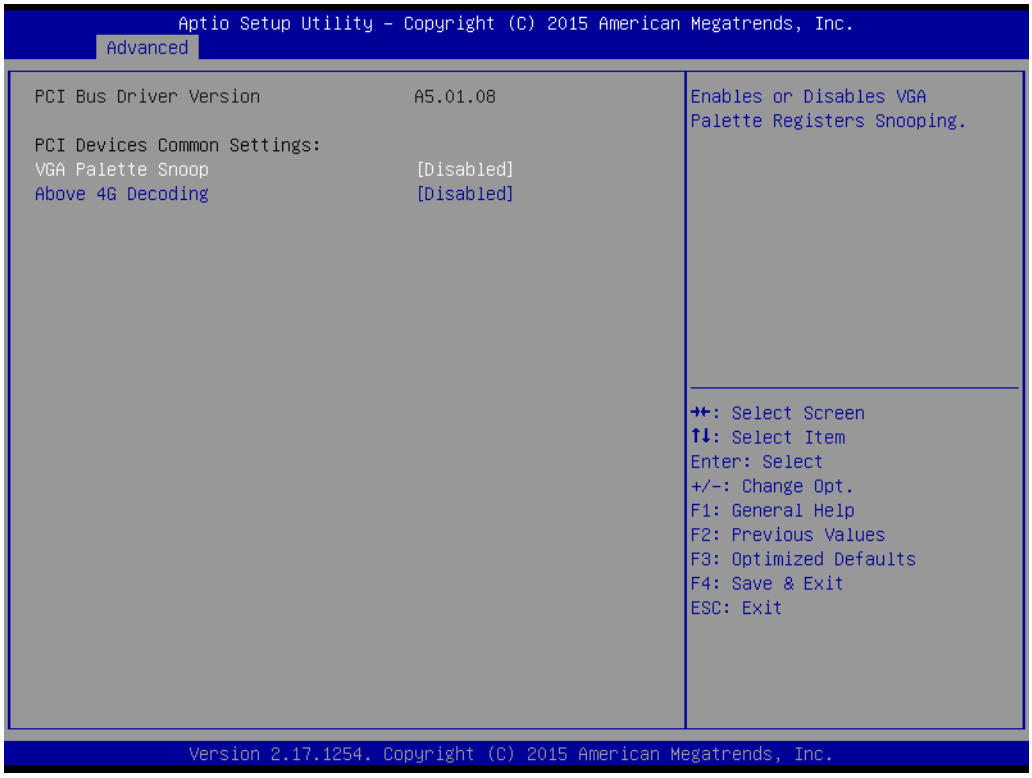



**Figure 3.17 PCI subsystem settings screen**

- **PCI Latency Timer**
  Value in units of PCI clocks for PCI device latency timer register.
- **VGA Palette Snoop**
  This item is designed to solve problems caused by some non-standard VGA cards.

## 3.3.14 USB Configuration

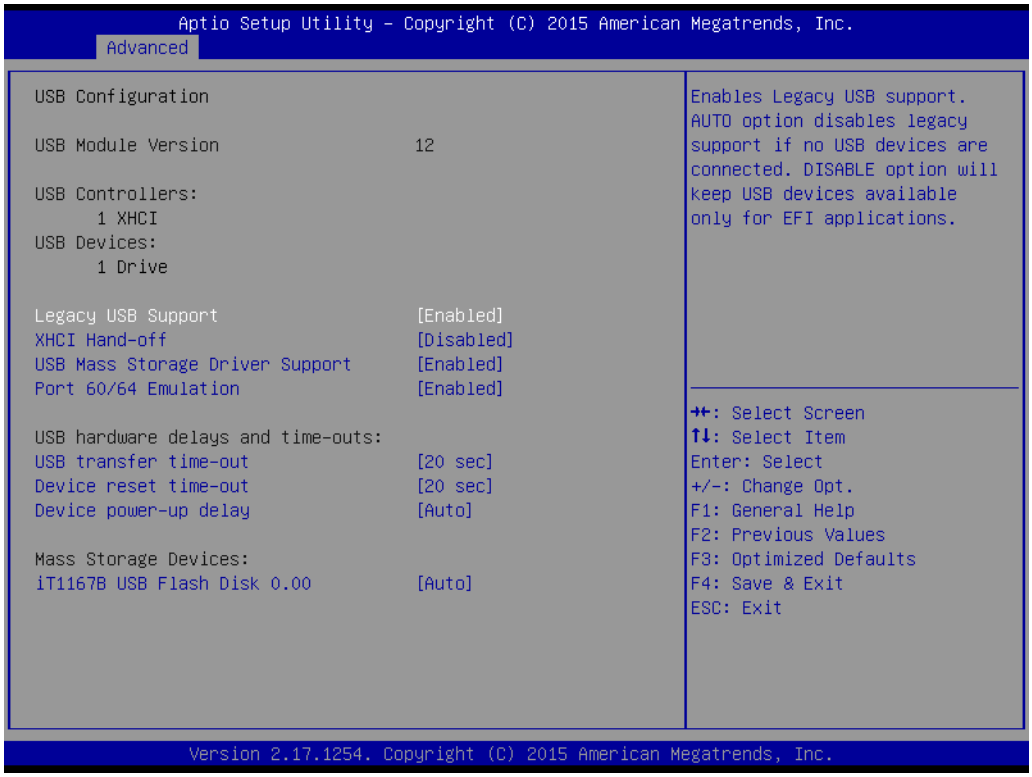



**Figure 3.18 USB Configuration**

- **Legacy USB Support**
  This is for supporting USB devices under legacy OS such as DOS. When choosing "AUTO", the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode and disable USB legacy mode when no USB device is plugged in.
- **XHCI Hand-off**
  Enables or disables support for OS without XHCI hand-off features.
- **USB Mass Storage Driver Support**
  To enable or disable USB mass storage driver support.
- **Port 60/64 Emulation**
  Enables IO port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OS.
- **USB transfer time-out**
  Allows you to select the USB transfer time-out value. [1,5,10,20sec]
- **Device reset time-out**
  Allows you to select the USB device reset time-out value. [10,20,30,40 sec]
- **Device power-up delay**
  This item appears only when you set the Device power-up delay item to [manual].

## 3.3.15 CSM Configuration

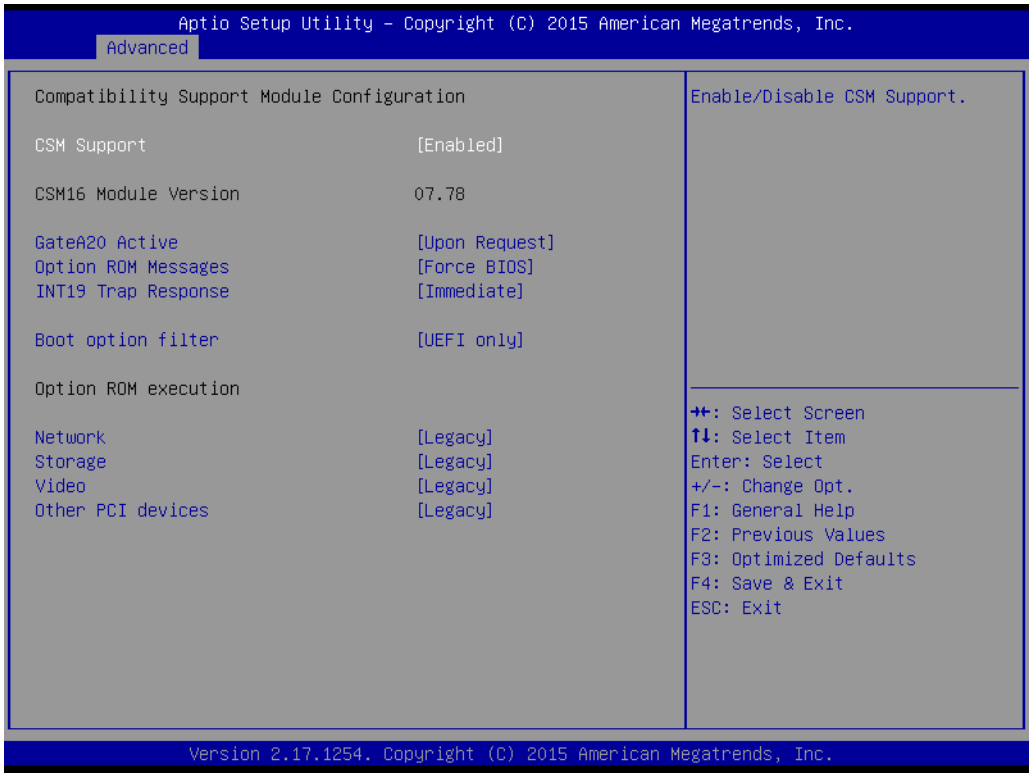



**Figure 3.19 CSM16 Parameters**

- **GateA20 Active**
  This items is useful When RT code is executed above 1MB. When this it's set as "Upon Request", GA20 can be disabled using BIOS services. When it's set as "Always", it does not allow disabling of GA20.
- **Option ROM Messages**
  “Force BIOS or Keep Current” to set the display mode for Option ROM
- **INT19 Trap Response**
  This item is a BIOS reaction on INT19 trapping by Option ROM. When it's set as "Immediate", the trap will be executed right away. When it's set as "Postponed", the trap will be executed during legacy boot.
- **Boot option filter**
  This option controls Legacy/UEFI ROMs priority.
- **Option ROM execution**
- **Network**
  Controls the execution of UEFI and Legacy PXE OpROM
- **Storage**
  Controls the execution of UEFI and Legacy Storage OpROM
- **Video**
  Controls the execution of UEFI and Legacy Video OpROM
- **Other PCI devices**
  Determines execution of OpROM policy for devices other than Network, Storage or Video.

# 3.4 Chipset

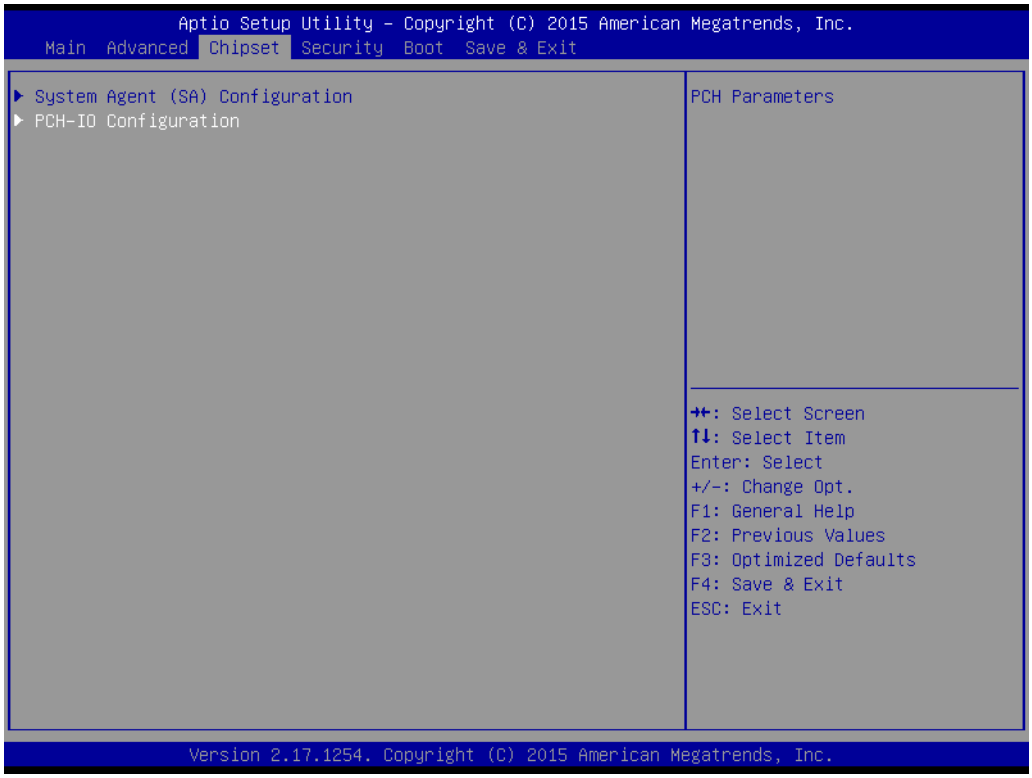



**Figure 3.20 Chipset**

## 3.4.1 System Agent (SA) Configuration

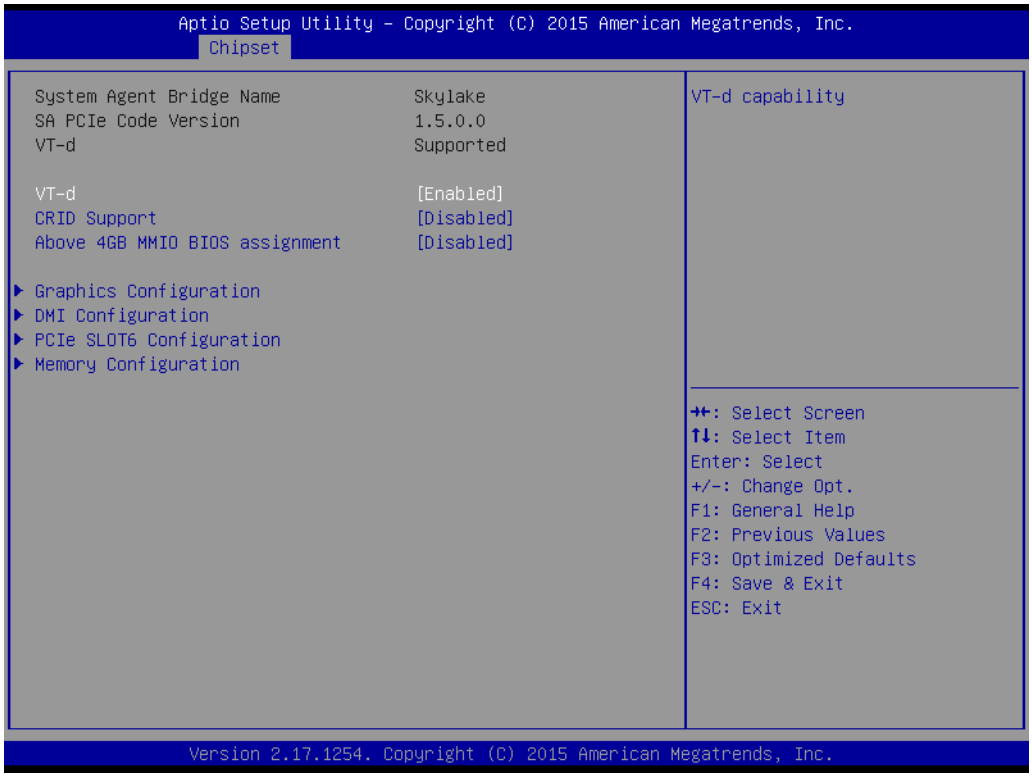



**Figure 3.21 System Agent (SA) Configuration**

- **VT-d**
  To enable or disable VT-d function on MCH.
- **CRID Support**
  Enable/Disable CRID control for Intel SIPP.
- **Above 4G MMIO BIOS assignment**
  Enable/Disable above 4GB Memory Mapped IO BIOS assignment.
  This is disabled automatically when Aperture Size is set to 2048MB

#### 3.4.1.1 Graphics Configuration

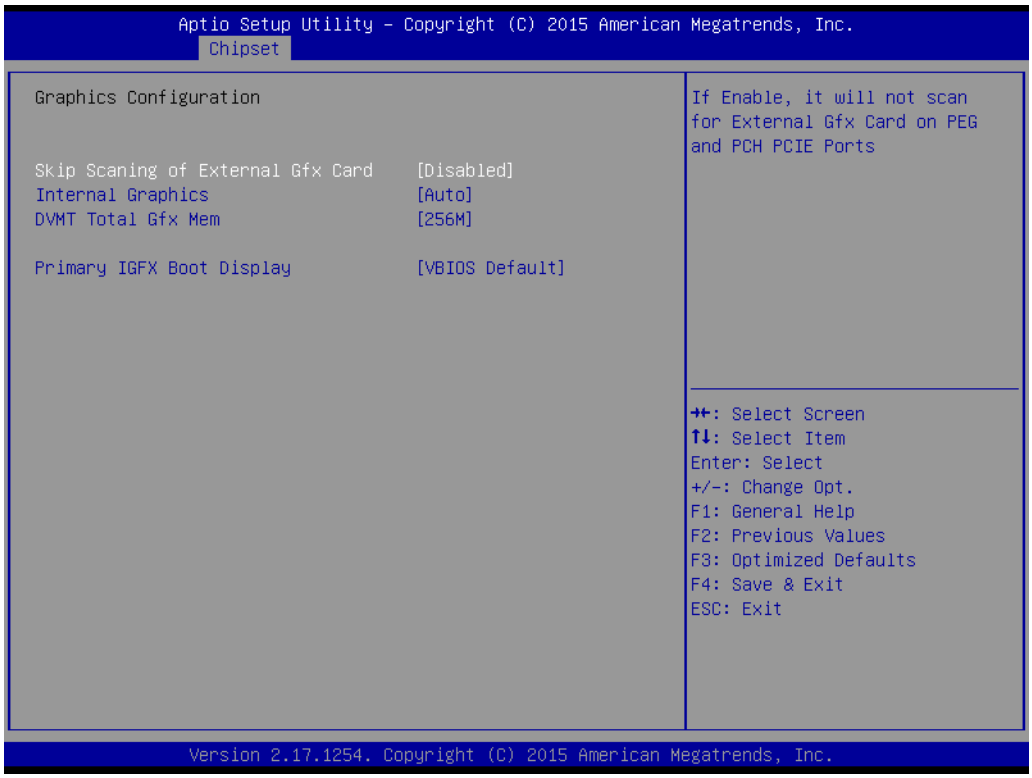
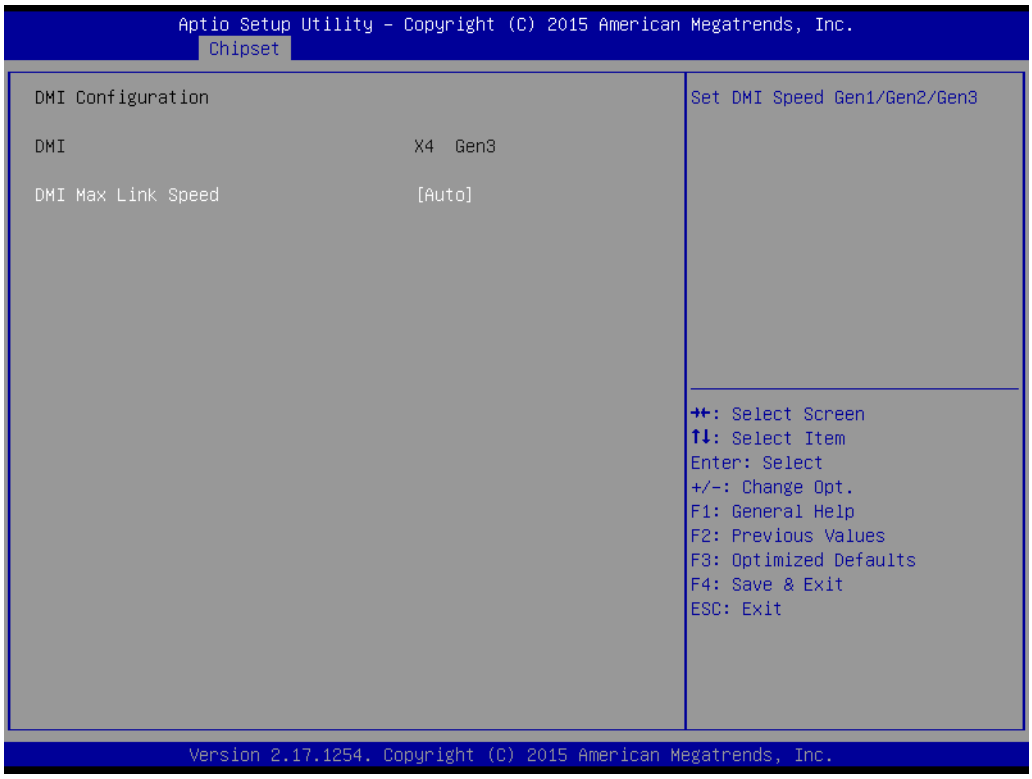



**Figure 3.22 Graphics Configuration**

- **Skip Scanning of External Gfx Card**
  If Enable, it will not scan for External Gfx Card on PEG and PCH PCIE Ports.
- **Internal Graphics**
  To enable/disable/Auto internal graphics.
- **DVMT Total Gfx Mem**
  This item is to select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
- **Primary IGFX Boot Display**
  Select the Video Device which will be activated during POST.
  This has no effect if external graphics present.
  Secondary boot display selection will appear based on your selection.
  VGA modes will be supported only on primary display.

### 3.4.1.2 DMI Configuration




- **DMI Max Link Speed**
  Set DMI speed Gen1/Gen2/Gen3.

### 3.4.1.3 PCIe SLOT6 Configuration

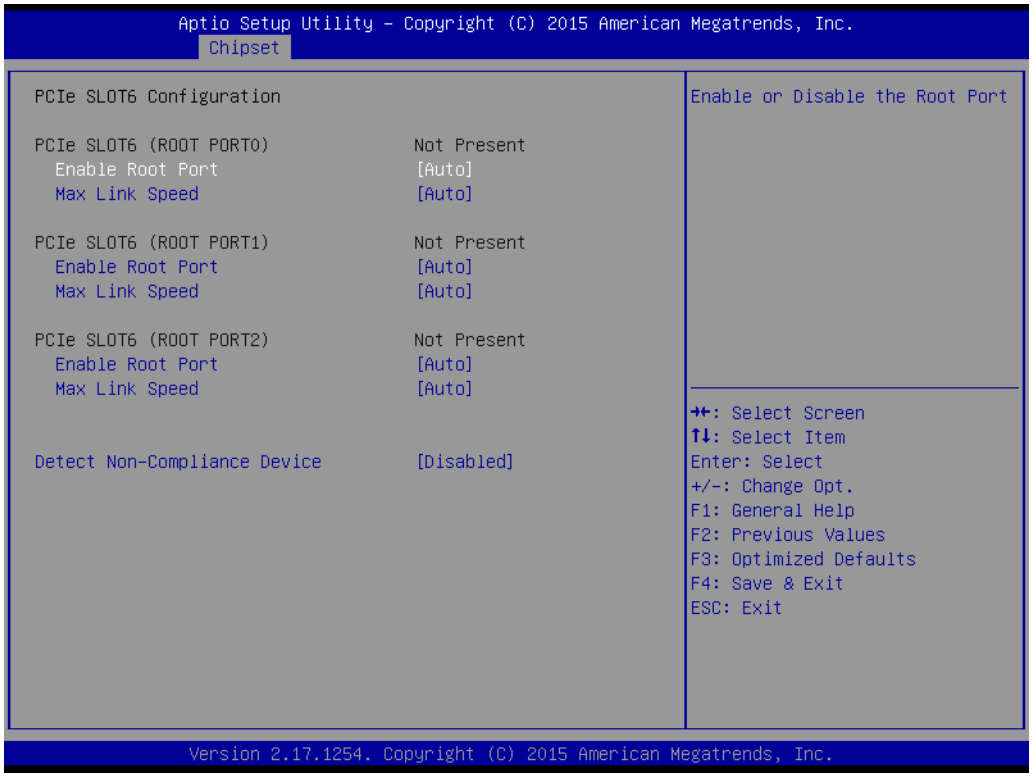



**Figure 3.23 NB PCIe Configuration**

- **PCIe SLOT6 (ROOT PORT0)**
  Enable Root Port.
  Enable or Disable the Root Port.
- **Max Link Speed**
  Configure PEG 0:1:0 Max Speed.
- **PCIe SLOT6 (ROOT PORT1)**
  Enable Root Port.
  Enable or Disable the Root Port.
- **Max Link Speed**
  Configure PEG 0:1:1 Max Speed.
- **PCIe SLOT6 (ROOT PORT2)**
  Enable Root Port.
  Enable or Disable the Root Port.
- **Max Link Speed**
  Configure PEG 0:1:2 Max Speed.
- **Detect Non-Compliance Device**
  Detect Non-Compliance PCI Express Device in PEG.

#### 3.4.1.4 Memory Configuration

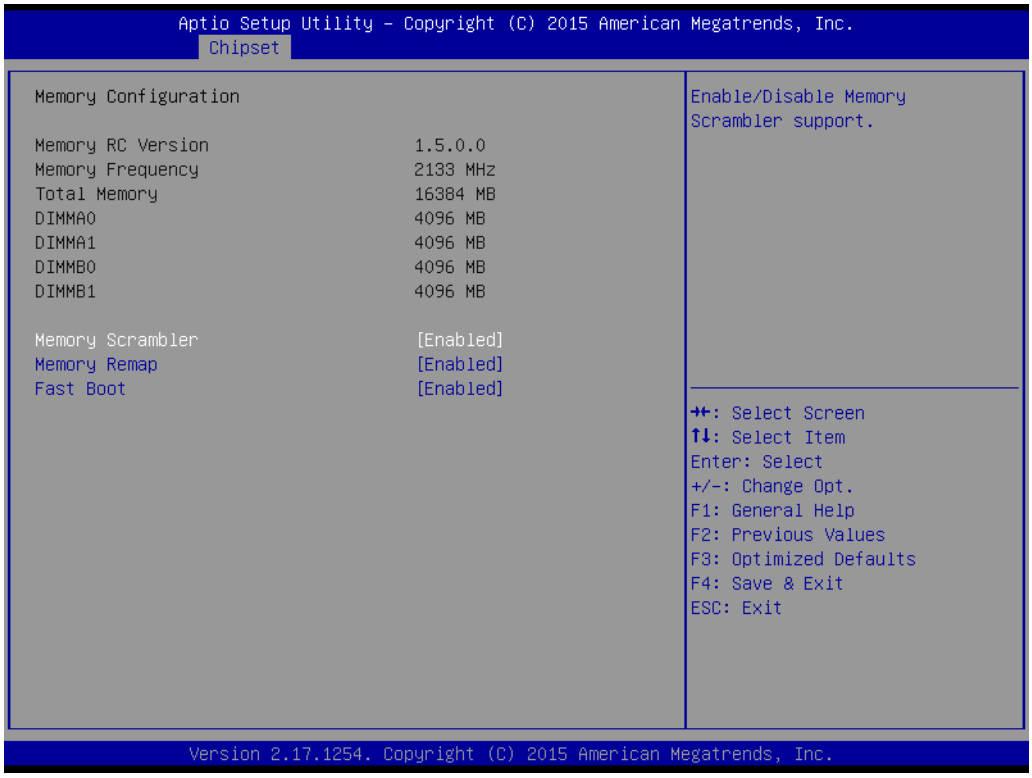



**Figure 3.24 Memory Configuration**

- **Memory Scrambler**
  Enable/Disable Memory Scrambler support.
- **Memory Remap**
  Enable/Disable Memory Remap above 4G.
- **Fast Boot**
  Enable/Disable fast path thru the MRC.

### 3.4.2 PCH-IO Configuration

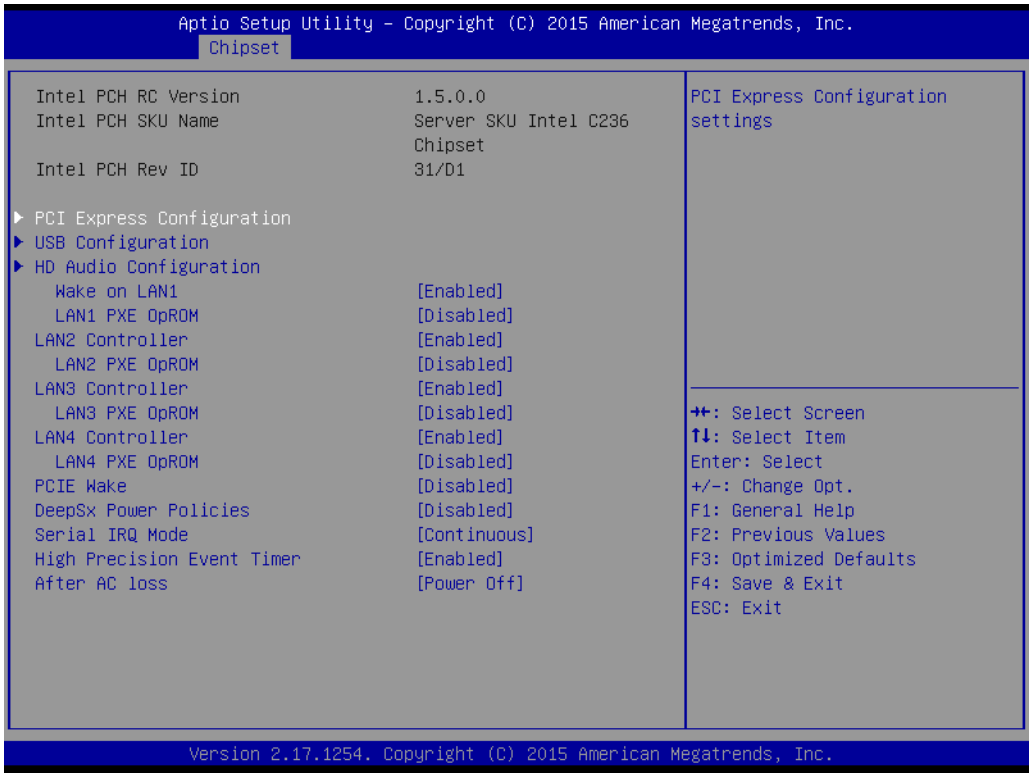



**Figure 3.25 PCH-IO Configuration**

- **PCIE Wake**
  To enable or disable PCIE to wake the system from S5.
- **Deep Sx Power Policies**
  Enable or disable Deep Sx feature. When Deep Sx is enabled, most power including 5VSB will be off during deep Sx for energy saving.
- **Serial IRQ Mode**
  Configure Serial IRQ Mode.
- **High Precision Event Timer**
  Enable/Disable the High Precision Event Timer.
- **After AC Power Loss**
  To select AC power state when power is re-applied after a power failure.

***Note!*** *When a system enters G3 status with deep S5 enabled, some power supply's 5VSB won't drop until after more than 30 seconds. If "Restore AC Power Loss" is set to "power on", the system won't boot up in 30 seconds after power failure. We recommend the user waits for more than 30 seconds to power on after a power failure. On the other hand, the system will auto power on if power is restored within 30 seconds, before 5VSB actually drops, even if "Restore AC Power Loss" is set to "power off".*

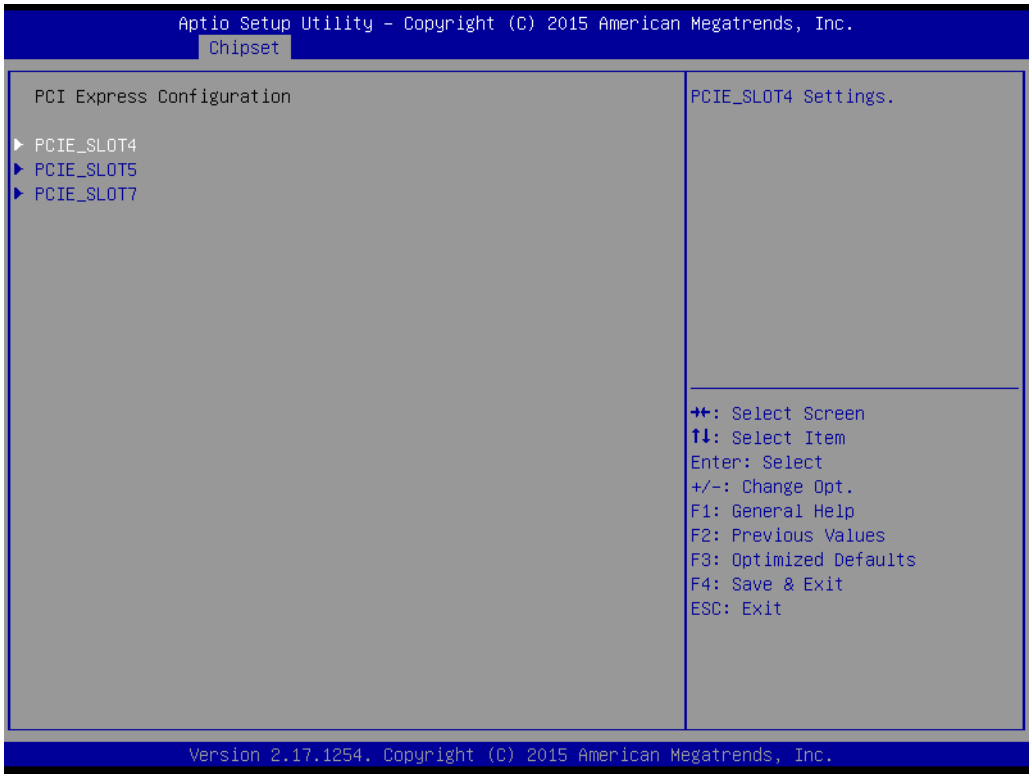



**Figure 3.26 PCI Express Configuration**

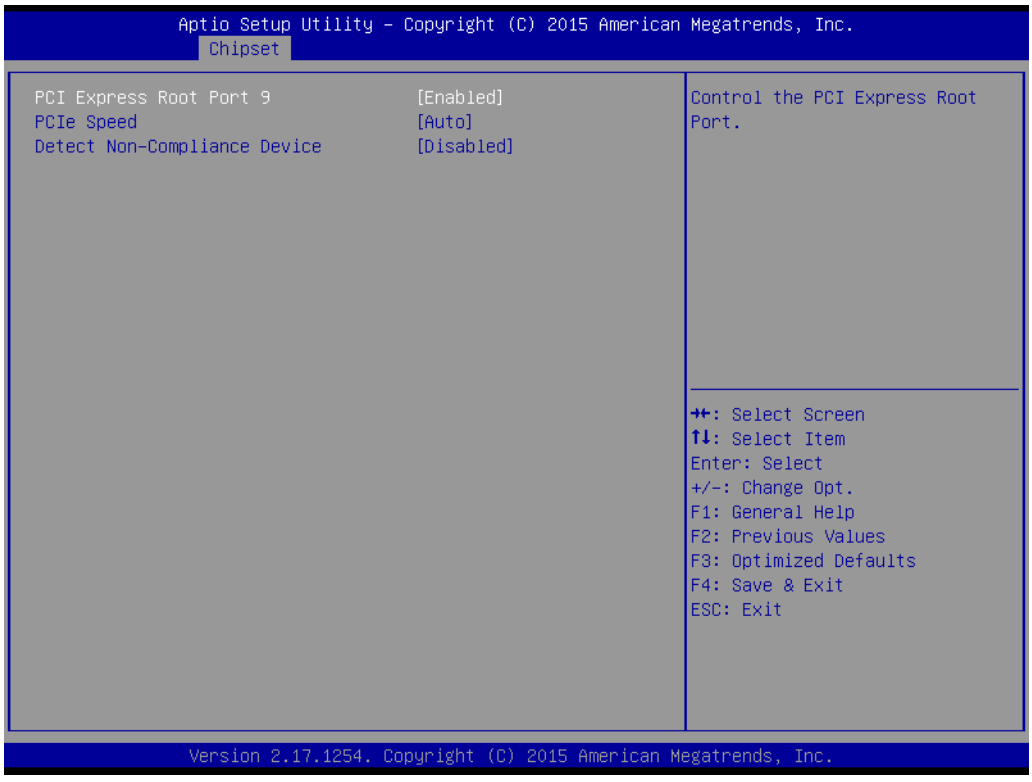
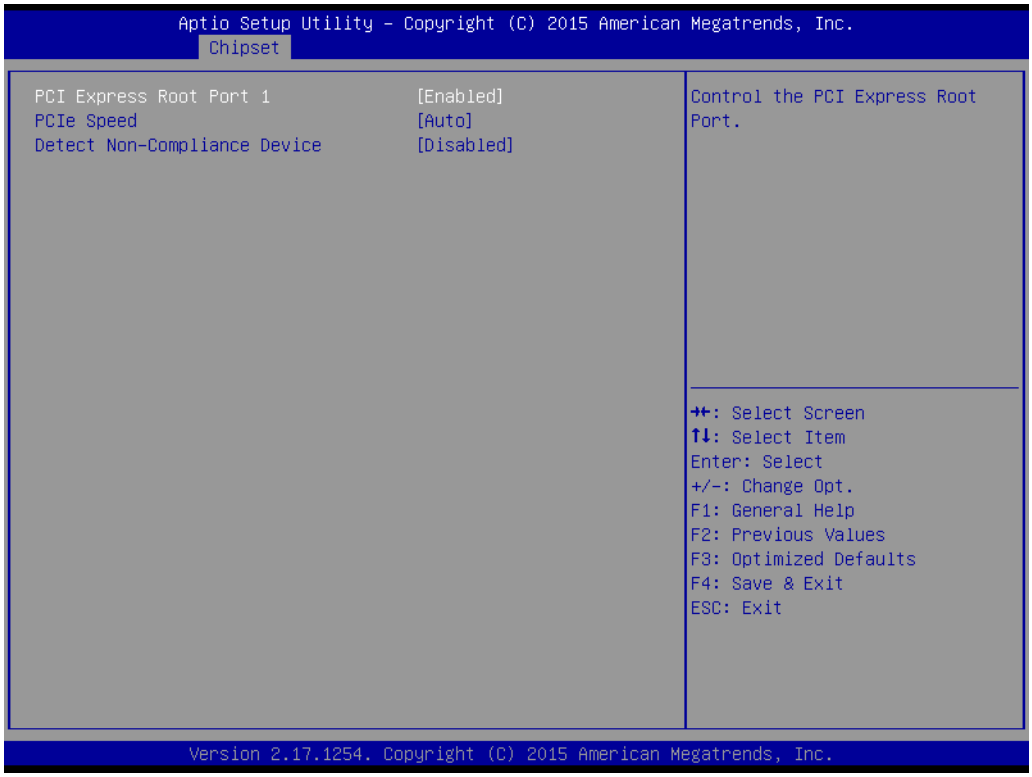
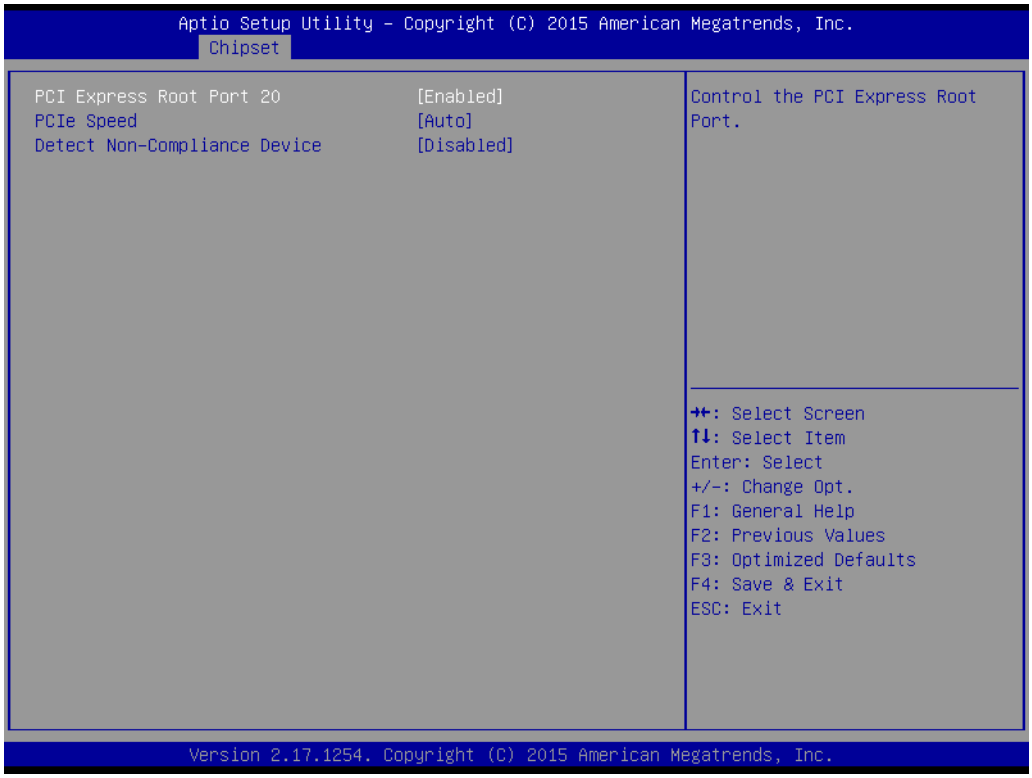



**Figure 3.27 PCI Express Slot 5 Configuration**

- **PCI Express Root Port 9 (PCIE SLOT4)**
  Control the PCI Express Root Port.
- **PCIe Speed**
  To set PCIe speed for PCI Express Slot 4.
- **Detect Non-Compliance Device**
  Detect Non-compliance PCIE device. When this item is enabled, it will take more time during POST.




- **PCI Express Root Port 1 (PCIE SLOT5)**
  Control the PCI Express Root Port.
- **PCIe Speed**
  To set PCIe speed for PCI Express Slot 5.
- **Detect Non-Compliance Device**
  Detect Non-compliance PCIE device. When this item is set to enable, it will take more time during post.




- **PCI Express Root Port 20 (PCIE SLOT7)**
  Control the PCI Express Root Port.
- **PCIe Speed**
  To set PCIe speed for PCI Express Slot 7.
- **Detect Non-Compliance Device**
  Detect Non-compliance PCIE device. When this item is set to enable, it will take more time during post.

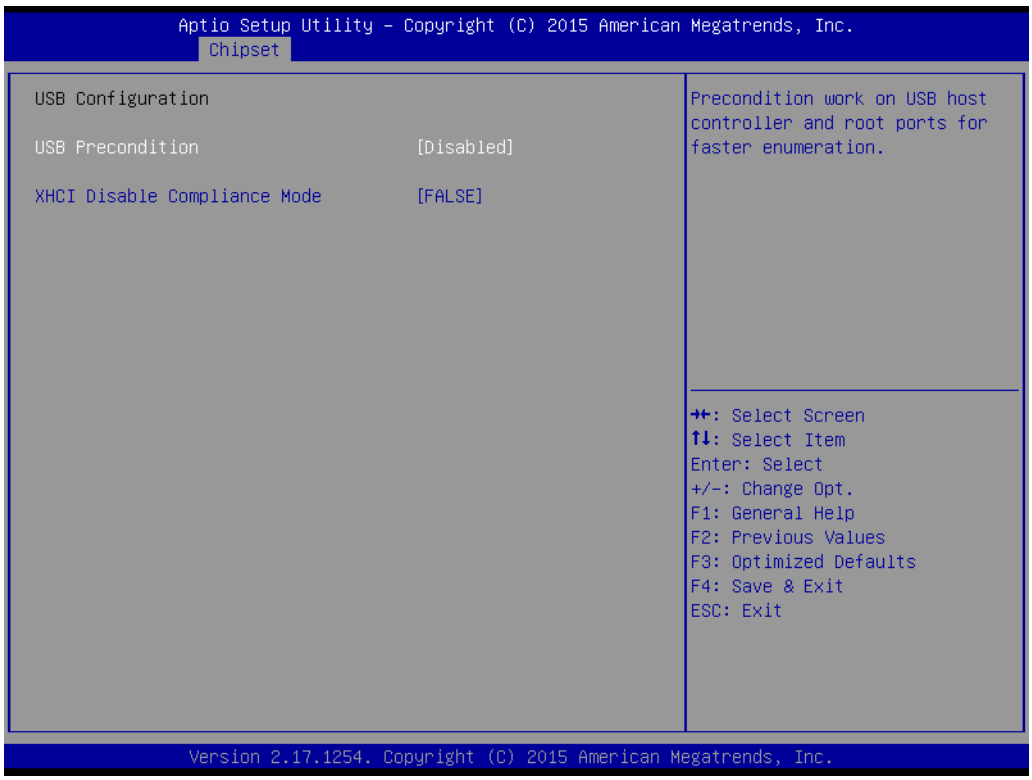



**Figure 3.28 USB Configuration**

- **USB Precondition**
  Pre-condition work on USB host controller and root ports for faster enumeration.
- **XHCI Disable Compliance Mode**
  Options to disable Compliance Mode Default is FALSE to not disable Compliance Mode. Set TRUE to disable Compliance Mode.

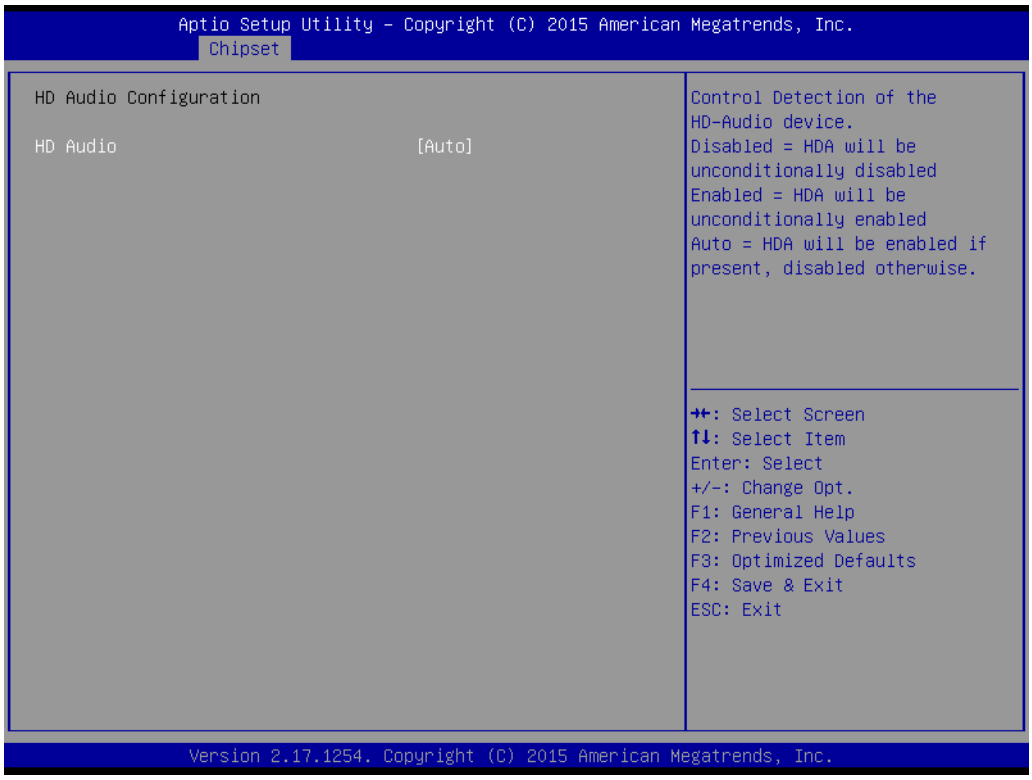



**Figure 3.29 PCH Azalia**

- **Azalia**
  Control detection of Azalia device.

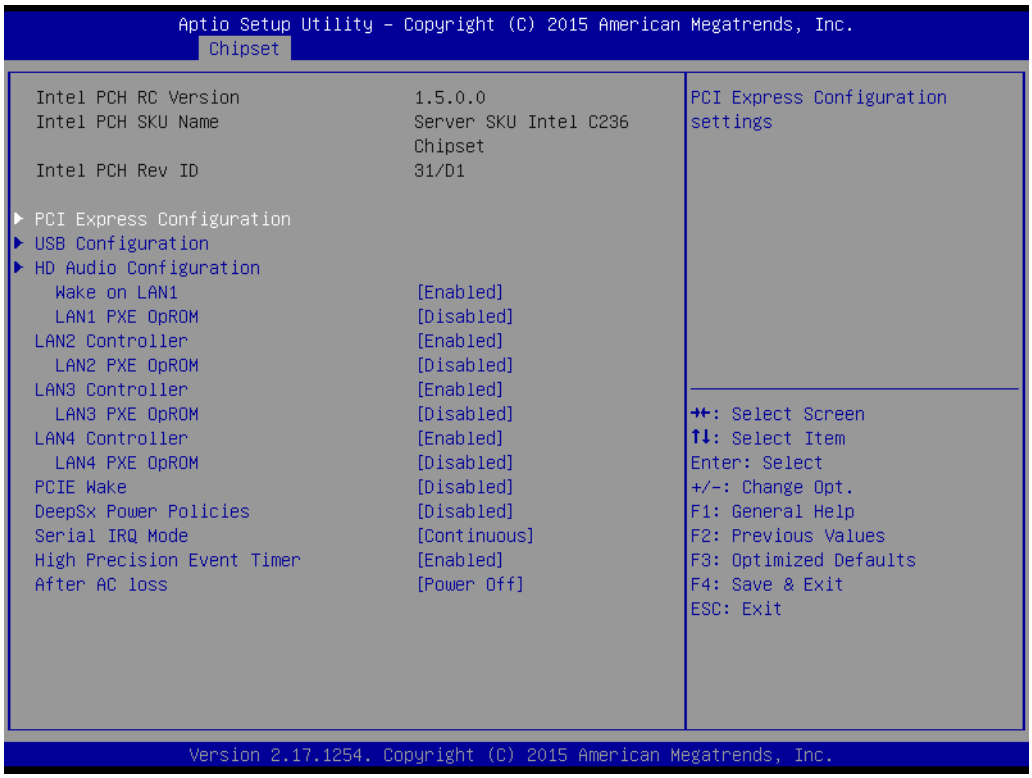



**Figure 3.30 LAN Configuration**

- **LAN1 PXE OpROM**
  Enable or disable boot options for legacy network devices.
- **Wake on LAN1**
  Enable or disable integrated LAN to wake the system.
- **LAN2 Controller**
  Enable or disable onboard LAN2.
- **LAN2 PXE OpROM**
  Enable or disable boot options for legacy network devices.
- **LAN3 Controller**
  Enable or disable onboard LAN3.
- **LAN3 PXE OpROM**
  Enable or disable boot options for legacy network devices.
- **LAN4 Controller**
  Enable or disable onboard LAN4.
- **LAN4 OpROM**
  Enable or disable boot options for legacy network devices.

# 3.5 Boot

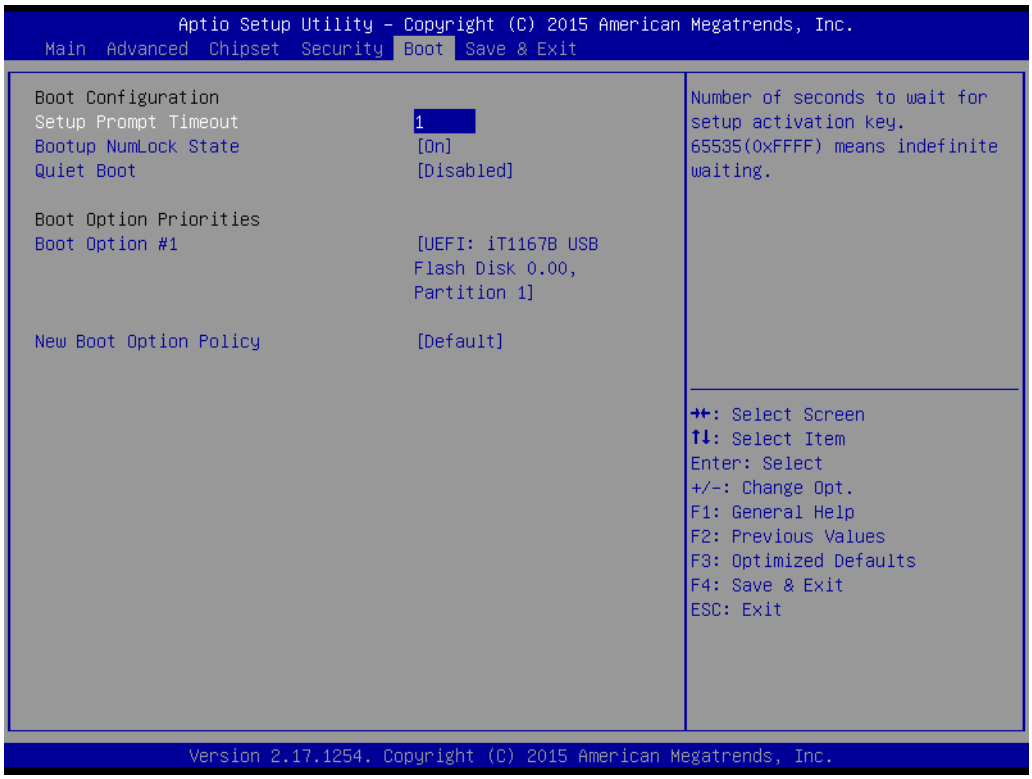



**Figure 3.31 Boot**

- **Setup Prompt Timeout**
  Use the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  “On” or “Off” power-on state for the NumLock.
- **Quiet Boot**
  If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Boot Option Priorities**
  Choose boot priority from boot device.
- **New Boot Option Policy**
  Controls the placement of newly detected UEFI boot options.

## 3.6 Security

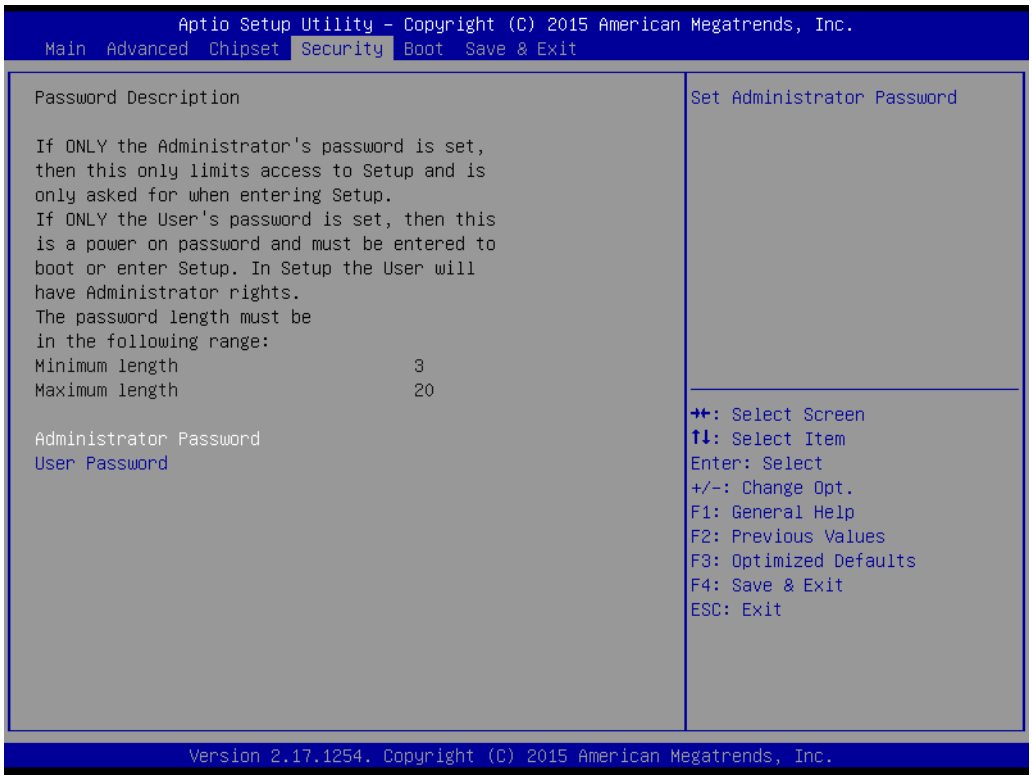



**Figure 3.32 Security**

Select Security Setup from the ASMB-585 Setup main BIOS setup menu. All Security Setup options, such as password protection, are described in this section. To access the sub menu for the following items, select the item and press <Enter>.

## 3.7 Save & Exit

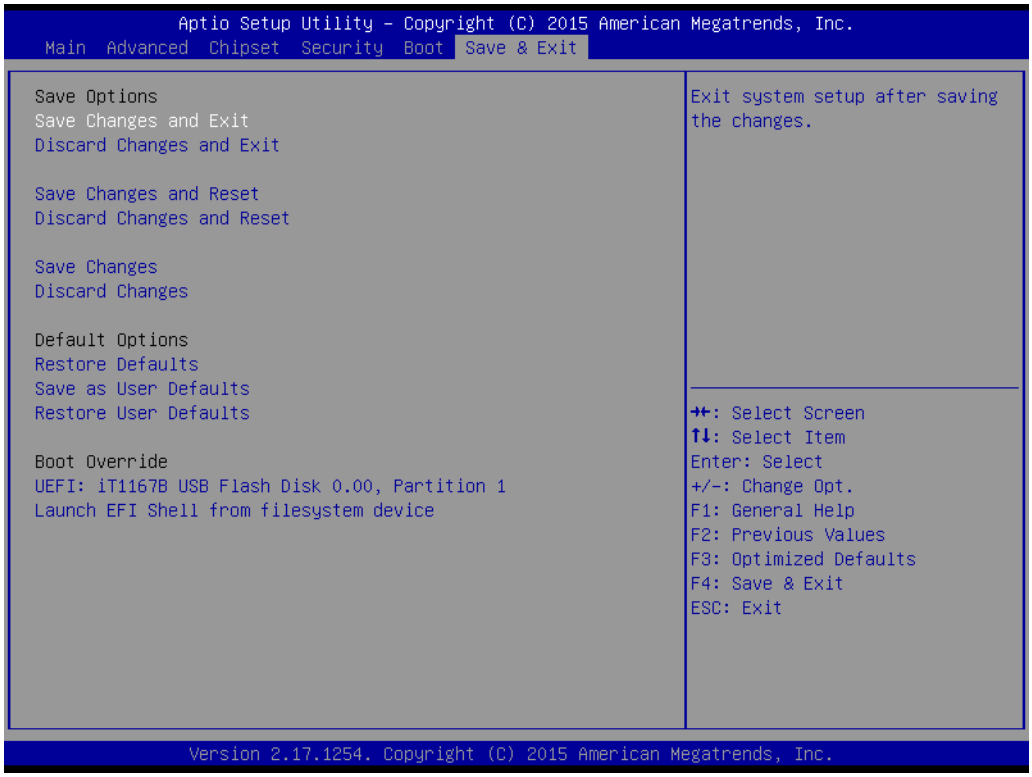



**Figure 3.33 Save & Exit**

- **Save changes and exit***

  When you have completed system configuration, select this option to save your changes, exit BIOS setup and boot into the OS so the new system configuration parameters can take effect.
- **Discard changes and exit**

  Select this option to quit setup without making any permanent changes to the system configuration.
- **Save changes and Reset**

  When you have completed system configuration, select this option to save your changes, exit BIOS setup and reboot into the computer so the new system configuration parameters can take effect.
- **Discard changes and Reset**

  Select this option to quit Setup and reset computer without making any permanent changes to the system configuration.
- **Save Changes**

  Select this option to save your changes.
- **Discard Changes**

  Select this option to discard your changes.
- **Restore Defaults**

  Select this option to restore BIOS configuration as origin.
- **Save as User Defaults**

  Select this option to save user's configuration.
- **Restore User Defaults**

  Select this option to restore BIOS to user's configuration.

- **Launch EFI Shell from file system device**

  This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available file system devices.

  *When you do some critical changes, the system will still reboot even you choose "Save changes and exit".

# Chapter 4

## Chipset Software Installation Utility

## 4.1 Before You Begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the ASMB-585 are located on the software installation DVD.

***Note!*** *The files on the software installation DVD are compressed. Do not attempt to install the drivers by copying the files manually. You must use the supplied SETUP program to install the drivers.*

Before you begin, it is important to note that most display drivers need to have the relevant software application already installed in the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

## 4.2 Introduction

The Intel® Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured. This is needed for the proper functioning of the following features:

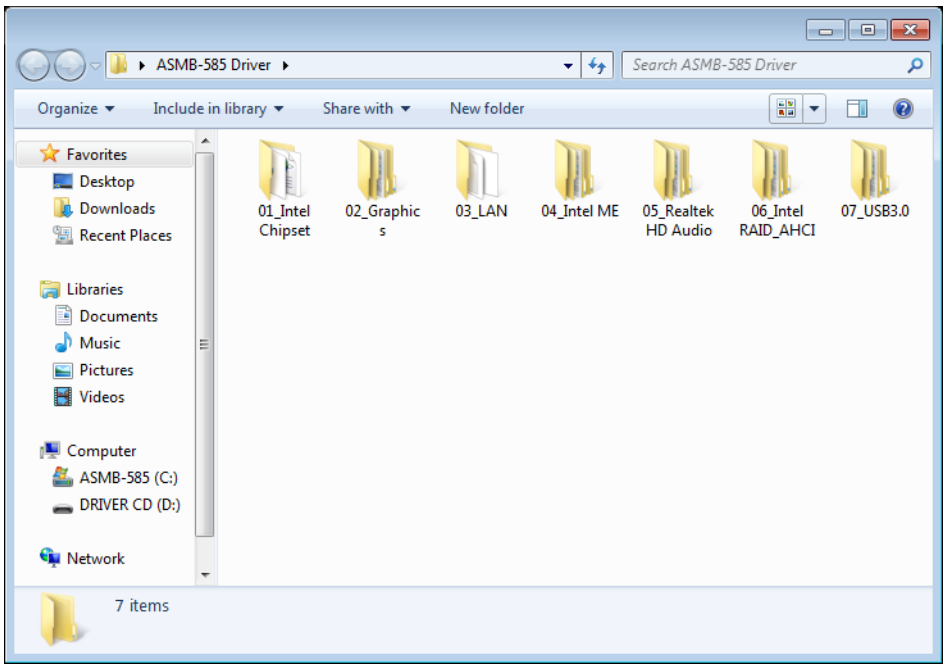
- Serial ATA interface support
- USB 1.1/2.0/3.0 support
- Identification of Intel chipset components in the Device Manager

***Note!*** *The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*

- *Windows® server 2008 R2 SP1 Enterprise (64-bit)*
- *Windows® server 2012 R2 (64-bit)*
- *Windows® 7 Ultimate SP1 (32-bit)*
- *Windows® 7 Ultimate SP1 (64-bit)*
- *Windows® 8 Pro (32-bit)*
- *Windows® 8 Pro (64-bit)*

## 4.3 Windows OS Driver Setup

Insert the driver DVD into your system's DVD-ROM drive. You can see the driver folders items. Move the mouse cursor over the folder "01-Chipset". In CSI folder, you can click find an executable file to complete implementation of the driver.



# Chapter 5

## VGA Setup

## 5.1 Introduction

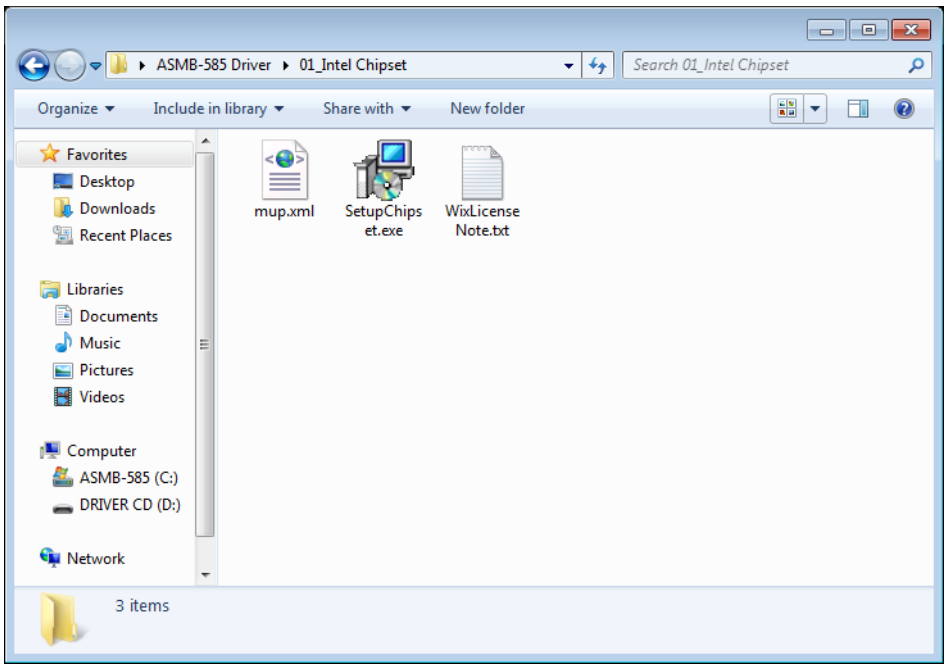
The Intel Xeon E3-1200 v5 and 6th Gen. Core i3/i5/i7 series processors are embedded with integrated graphics controller. You need to install the VGA driver to enable this function, which includes the following features:

- Optimized integrated graphic solution: With Intel® Graphics Flexible Display Interface, it supports versatile display options and 32-bit 3D graphics engine. Dual independent display, enhanced display modes for widescreen flat panels for extend, twin, and clone dual display mode, and optimized 3D support deliver an intensive and realistic visual experience.

## 5.2 Windows OS Driver Setup

***Note!*** *Before installing this driver, make sure the INF driver has been installed in your system. See Chapter 4 for information on installing the INF driver.*

Insert the driver DVD into your system's DVD-ROM drive. You can see the driver folders items. Navigate to the "02 Graphics" folder and click the executable file to complete the installation of the drivers for Windows® OS.



# Chapter 6

## LAN Configuration

## 6.1 Introduction

The ASMB-585 is equipped up to four Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (GbE LAN1: Intel I219LM; GbE LAN2~4: Intel I210-AT that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

## 6.2 Features

- 10/100/1000 Mbps Ethernet controller
- 10/100/1000 Mbps triple-speed MAC
- Full duplex at 10, 100, or 1000 Mbps and half duplex at 10 or 100 Mbps
- Wake-on-LAN (WOL) support
- PCIe x1 host interface

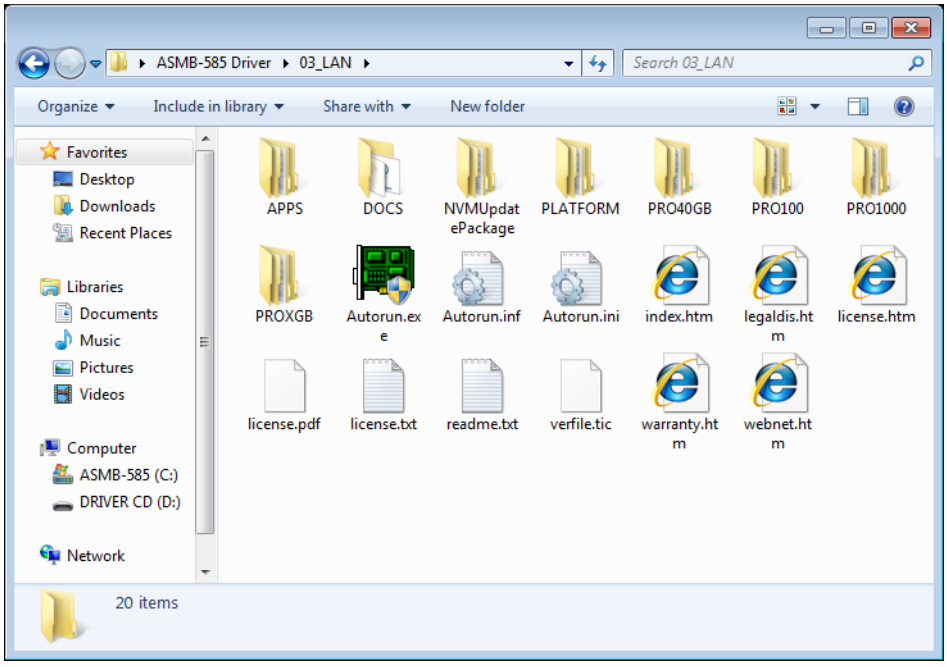
## 6.3 Installation

***Note!*** *Before installing the LAN drivers, make sure the CSI utility has been installed on your system. See Chapter 4 for information on installing the CSI utility.*

The integrated Intel® gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.

## 6.4 Windows OS Driver Setup (LAN)

Insert the driver DVD into your system's DVD-ROM drive. Select folder "03-LAN" then click the proper LAN driver for the OS.



# Chapter 7

## Intel ME

## 7.1 Introduction

The Intel ME software components that need to be installed depend on the system's specific hardware and firmware features. The installer detects the system's capabilities and installs the relevant drivers and applications.

## 7.2 Installation

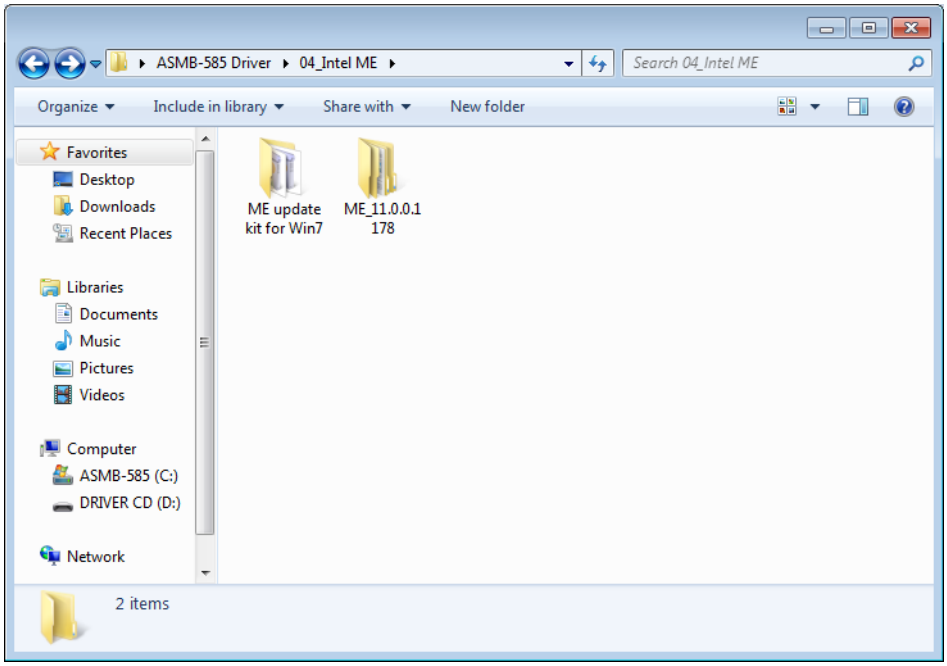
Insert the driver DVD into your system's DVD-ROM drive. Navigate to the "04_Intel ME" folder to install the driver.

***Note!***

*If the Intel® Management Engine (Intel ME) driver has not been successfully installed, you may see an error on a "PCI Simple Communications Controller" in Device Manager.*

*If you use Win7 OS and there is a problem of ME installing, please find the folder "ME update kit for Win7" for problem solving.*

The integrated Intel® gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.



# Chapter 8

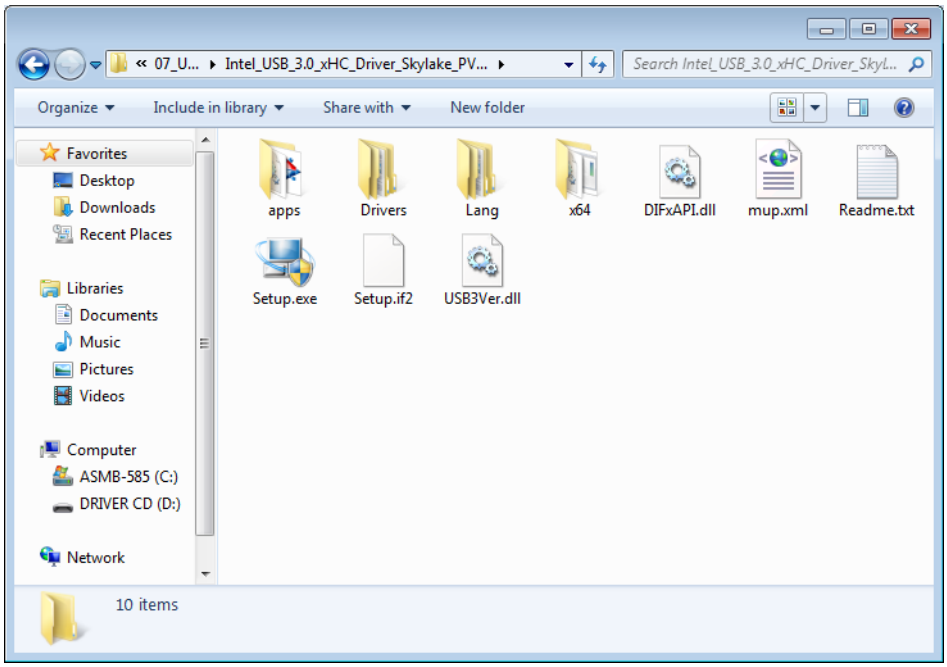
## Intel USB 3.0

## 8.1 Introduction

ASMB-585 provides Intel® USB 3.0 and the data transfer rate of USB3.0(5Gbps) is 10 times to USB2.0(480Mbps).

## 8.2 Installation

Insert the driver DVD into your system's DVD-ROM drive. Navigate to the "07_USB3.0" folder to install the driver.



# Chapter 9

## SATA RAID Setup

## 9.1 Introduction

To support demanding disk I/O, Intel C236 chipset integrates seven Serial ATA controllers with software RAID 0, 1, 5, 10 capabilities.

RAID 0 striping increases the storage performance and is designed to speed up data transfer rates for disk-intensive applications.

RAID 1 mirroring protects valuable data that might be lost in the event of a hard drive failure.

RAID 5 array contains three or more hard drives where the data is divided into manageable blocks called strips. Parity is a mathematical method for recreating data that was lost from a single drive, which increases fault-tolerance. The data and parity are striped across all the hard drives in the array. The parity is striped in a rotating sequence to reduce bottlenecks associated with the parity calculations.

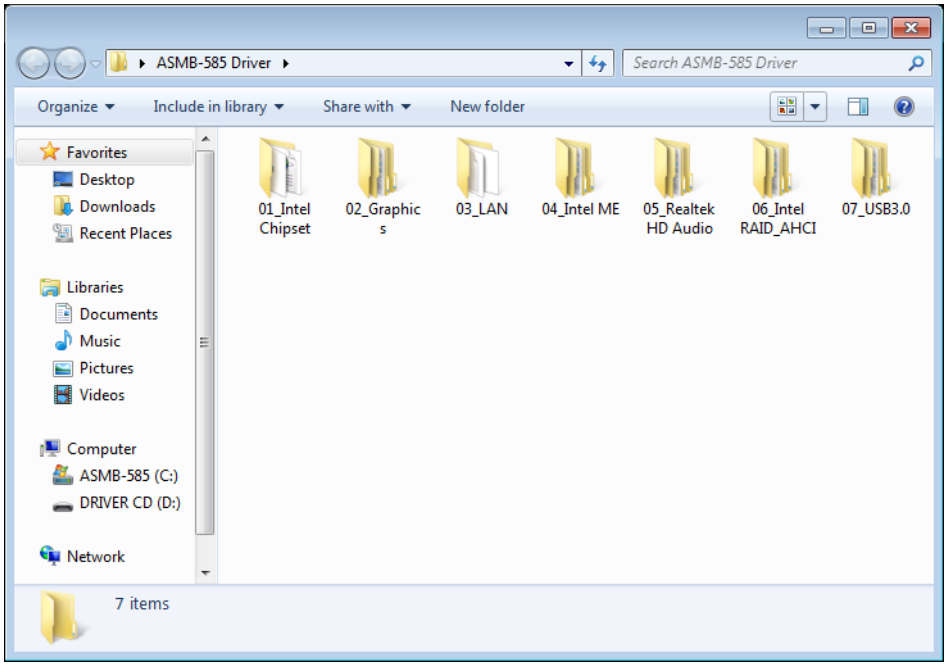
RAID 10 array uses four hard drives to create a combination of RAID levels 0 and 1. The data is striped across a two-drive array forming the RAID 0 component. Each of the drives in the RAID 0 array is then mirrored by a RAID 1 component.

## 9.2 SATA RAID Driver and Utility Setup

The driver is in the DVD "06_Intel RAID_AHCI" folder. You may go to the directory of the DVD and follow Intel's installation guide to install the driver and utility.

***Note!*** *For the detailed installation instructions for the SATA RAID driver and utility, please check the User Guide in the driver CD. Path: folder "Intel Rapid Storage Technology" in "06_Intel RAID_AHCI".*

***Note!*** *Before you install the Intel Rapid Storage Technology, please read the "readme.txt" which is in the folder "Intel Rapid Storage Technology" in "06_Intel RAID_AHCI".*



# Chapter 10

## HD Audio

## 10.1 Introduction

ASMB-585 equipped with Realtek ALC892 Audio chip. It provides "Line-out" & "Microphone" two ports for any related applications.

## 10.2 Installation

The driver is in the DVD's "05_Realtek HD Audio" folder. You may go to the directory of the DVD and follow the installation guide to install the driver and utility.

# Appendix A

## Programming the Watchdog Timer

The ASMB-585's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

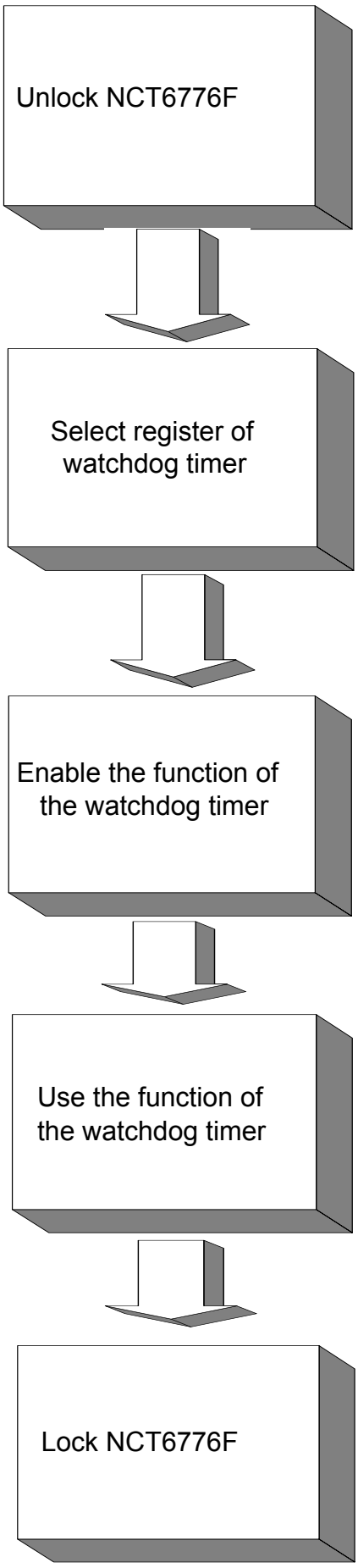
## A.1 Watchdog timer overview

The watchdog timer is built in to the super I/O controller NCT6776F. It provides the following functions for user programming:

- Can be enabled and disabled by user's program
- Timer can be set from 1 to 255 seconds
- Generates an interrupt or resets signal if the software fails to reset the timer before time-out

## A.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. You must first write an address value into address port 2E (hex), and then write/read data to/from the assigned register through data port 2F (hex).


Unlock NCT6776F
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock NCT6776F

| Table A.1: Watchdog timer registers | | |
|---|---|---|
| Address of register (2E) | Read/ Write | Value (2F) & description |
| 87 (hex) | - | Write this address to I/O address port 2E (hex) twice to unlock the NCT6776F |
| 07 (hex) | write | Write 08 (hex) to select register of watchdog timer. |
| 30 (hex) | write | Write 01 (hex) to enable the function of the watchdog timer. Disabled is set as default. |
| F5 (hex) | write | Set seconds or minutes as units for the timer. Write 0 to bit 3: set seconds as counting unit. [default]. Write 1 to bit 3: set minutes as counting unit.<br>Write 1 to bit 4: Watchdog timer count mode is 1000 times faster. If bit 3 is 0, the count mode is 1/1000 seconds mode. If bit 3 is 1, the count mode is 1/1000 minutes mode. |
| F6 (hex) | write | 0: stop timer [default]<br>01 ~ FF (hex): The amount of the count, in seconds or minutes, depends on the value set in register F5 (hex). This number decides how long the watchdog timer waits for strobe before generating an interrupt or reset signal. Writing a new value to this register can reset the timer to count with the new value. |
| F7 (hex) | read/ write | Bit 6: Write 1 to enable keyboard to reset the timer, 0 to disable.[default]<br>Bit 5: Write 1 to generate a timeout signal immediately and automatically return to 0. [default=0]<br>Bit 4: Read status of watchdog timer, 1 means timer is “timeout”. |
| AA (hex) | - | Write this address to I/O port 2E (hex) to lock NCT6776F. |

### A.2.1 Example Programs

**Enable watchdog timer and set 10 seconds as the timeout interval**

```
;--------------------------------------------------------
Mov dx,2eh ; Unlock NCT6776F
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
in al,dx
Or al,08h
Out dx,al
;--------------------------------------------------------
Dec dx; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;--------------------------------------------------------
```

```
Dec dx ; Set second as counting unit
Mov al,0f5h
Out dx,al
Inc dx
In al,dx
And al,not 08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Set timeout interval as 10 seconds and start counting
Mov al,0f6h
Out dx,al
Inc dx
Mov al,10; 10 minutes
Out dx,al
;--------------------------------------------------------
Dec dx ; lock NCT6776F
Mov al,0aah
Out dx,al
```

**Enable watchdog timer and set 5 minutes as the timeout interval**

```
;--------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
In al,dx
Or al,08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;--------------------------------------------------------
Dec dx ; Set minute as counting unit
Mov al,0f5h
Out dx, al
Inc dx
In al,dx
Or al, 08h
```

```
Out dx,al
;--------------------------------------------------------
Dec dx ; Set timeout interval as 5 minutes and start counting
Mov al,0f6h
Out dx,al
Inc dx
Mov al,5; 5 minutes
Out dx,al
;--------------------------------------------------------
Dec dx ; lock NCT6776F
Mov al,0aah
Out dx,al
```
**Enable watchdog timer to be reset by mouse**
```
;--------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
In al,dx
Or al,01h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable watchdog timer to be reset by mouse
Mov al,0f7h
Out dx,al
Inc dx
In al,dx
Or al,80h
Out dx,al
;--------------------------------------------------------
Dec dx ; lock NCT6776F
Mov al,0aah
Out dx,al
```
**Enable watchdog timer to be reset by keyboard**

```
;--------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable the function of watchdog timer
Mov al,30h
Out dx,al
Inc dx
Mov al,01h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable watchdog timer to be strobed reset by keyboard
Mov al,0f7h
Out dx,al
Inc dx
In al,dx
Or al,40h
Out dx,al
;--------------------------------------------------------
Dec dx ; lock NCT6776F
Mov al,0aah
Out dx,al
```

**Generate a time-out signal without timer counting**

```
;--------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
Mov al,87h
Out dx,al
Out dx,al
;--------------------------------------------------------
Mov al,07h ; Select registers of watchdog timer
Out dx,al
Inc dx
Mov al,08h
Out dx,al
;--------------------------------------------------------
Dec dx ; Enable the function of watchdog timer
Mov al,30h
```

```
Out dx,al
Inc dx
In al,dx
Or al,01h
Out dx,al
;--------------------------------------------------------
Dec dx ; Generate a time-out signal
Mov al,0f7h
Out dx,al ;Write 1 to bit 5 of F7 register
Inc dx
In al,dx
Or al,20h
Out dx,al
;--------------------------------------------------------
Dec dx ; lock NCT6776F
Mov al,0aah
Out dx,al
```

# Appendix B

## I/O Pin Assignments

# B.1 USB2.0 Header (USB7~12)

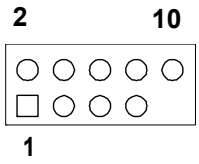



**Table B.1: USB Header (USB6~11)**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | USB_VCC5 | 2 | USB_VCC5 |
| 3 | USB_D- | 4 | USB_D- |
| 5 | USB_D+ | 6 | USB_D+ |
| 7 | GND | 8 | GND |
| 9 | Key | 10 | N/C |

# B.2 USB3.0 Header (USB3_4)

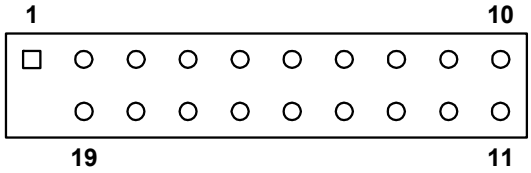
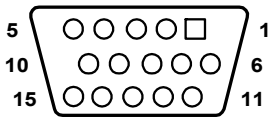



**Table B.2: USB 3.0 Header (USB3_4)**

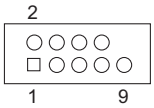
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | +5V_USB2_3 | 20 | NC |
| 2 | USB3_RX_DN5 | 19 | +5V_USB2_3 |
| 3 | USB3_RX_DP5 | 18 | USB3_RX_DN6 |
| 4 | GND | 17 | USB3_RX_DP6 |
| 5 | USB3_TX_DN5 | 16 | GND |
| 6 | USB3_TX_DP5 | 15 | USB3_TX_DN6 |
| 7 | GND | 14 | USB3_TX_DP6 |
| 8 | USB2_N2 | 13 | GND |
| 9 | USB2_P2 | 12 | USB2_N3 |
| 10 | USB_OC | 11 | USB2_P3 |

## B.3 VGA Connector (VGA)



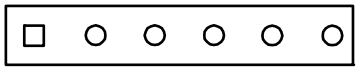

| Table B.3: VGA Connector (VGA) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | RED | 9 | VCC |
| 2 | GREEN | 10 | GND |
| 3 | BLUE | 11 | N/C |
| 4 | N/C | 12 | SDT |
| 5 | GND | 13 | H-SYNC |
| 6 | GND | 14 | V-SYNC |
| 7 | GND | 15 | SCK |
| 8 | GND | | |

## B.4 RS-232 Interface (COM12)



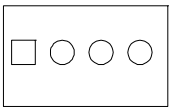

| Table B.4: RS-232 Interface (COM12) | |
|---|---|
| **COM1/COM2** | |
| **Pin** | **Signal** |
| 1 | DCD |
| 2 | DSR |
| 3 | SIN |
| 4 | RTS |
| 5 | SOUT |
| 6 | CTS |
| 7 | DTR |
| 8 | RI |
| 9 | GND |

## B.5 External Keyboard and Mouse Connector (KBMS1)



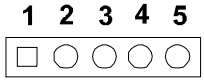
| Table B.5: External Keyboard and Mouse Connector (KBMS1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | KB CLK |
| 2 | KB DATA |
| 3 | MS DATA |
| 4 | GND |
| 5 | VCC |
| 6 | MS CLK |

## B.6 System Fan Power Connector (SYSFAN0~3)



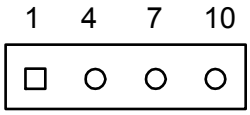
| Table B.6: Fan Power Connector | |
|---|---|
| **Pin** | **Signal** |
| 1 | GND |
| 2 | +12 V |
| 3 | DETECT |
| 4 | PWM |

## B.7 Power LED and Keyboard Lock (JFP3)



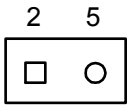

| Table B.7: Power LED and Keyboard Lock (JFP3) | |
|---|---|
| **Pin** | **Function** |
| 1 | LED power + (3.3 V) |
| 2 | NC |
| 3 | LED power - |
| 4 | #keylock |
| 5 | Ground |

## B.8 External Speaker Connector (JFP2)



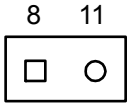

| Table B.8: External Speaker Connector (JFP2) | |
|---|---|
| **Pin** | **Function** |
| 1 | SPK_VCC |
| 4 | SPK_OBS |
| 7 | SPK_BUZ |
| 10 | SPK_OUT |

## B.9 HDD LED Connector (JFP2)




| Table B.9: HDD LED Connector (JFP2) | |
|---|---|
| **Pin** | **Signal** |
| 2 | HDD_LED+ |
| 5 | HDD_LED- |

## B.10 SNMP SMBus Connector (JFP2)




| Table B.10: SNMP SMBus Connector (JFP2) | |
|---|---|
| **Pin** | **Signal** |
| 8 | HWM_SDA |
| 11 | HWM_SCL |

## B.11 ATX Soft Power Switch (JFP1)

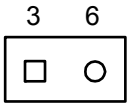



**Table B.11: ATX Soft Power Switch (JFP1)**

| Pin | Signal |
|---|---|
| 3 | PWR-BTN |
| 6 | GND |

## B.12 USB/LAN ports (LAN1_USB1_2 and LAN2_USB3_4)

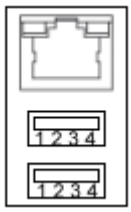


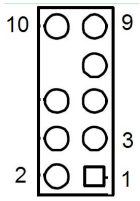

**Table B.12: USB Port**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | VCC_DUAL | 3 | Data0+ |
| 2 | Data0- | 4 | GND |

**Table B.13: Giga LAN 10/100/1000 Mbps RJ-45 port**

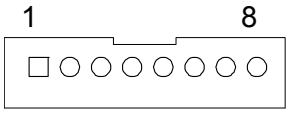
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | MID0+ | 5 | MID2+ |
| 2 | MID0- | 6 | MID2+ |
| 3 | MID1+ | 7 | MID3+ |
| 4 | MID1- | 8 | MID3+ |

## B.13 Front Panel Audio Connector (FPAUD1)



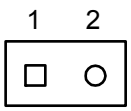

| Table B.14: Front Panel Audio Connector (FPAUD1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | MIC2_L |
| 2 | AGND |
| 3 | MIC2_R |
| 4 | PRESENSE |
| 5 | LIN2_R |
| 6 | MIC_DEC |
| 7 | FIO_JD |
| 8 | N/A |
| 9 | LIN2_L |
| 10 | LINEOUT2_DEC |

## B.14 8-pin Alarm Board Connector (VOLT1)




| Table B.15: 8-pin Alarm Board Connector (VOLT1) | | | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | 5VSB | 5 | VCC |
| 2 | GND | 6 | VCC3 |
| 3 | GND | 7 | -12V |
| 4 | -5V | 8 | +12V |

## B.15 Case Open Connector (JCASE1)




| Table B.16: Case Open Connector (JCASE1) | |
|---|---|
| **Pin** | **Signal** |
| 1 | CASEOP |
| 2 | GND |

## B.16 Front Panel LAN LED Connector (LAN_LED1,LAN_LED2)

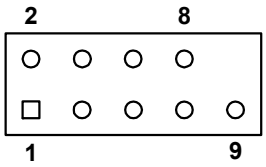



**Table B.17: LAN LED Connector (LANLED1)**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | LAN1_LED0_ACT | 2 | LAN2_LED1_ACT |
| 3 | VCC3_LAN1LED | 4 | VCC3_LAN2LED |
| 5 | LAN1_LED1_1000M | 6 | LAN2_LED2_1000 |
| 7 | LAN1_LED2_100M | 8 | LAN2_LED0_100 |
| 9 | VCC3 | 10 | N/C |

**Table B.18: LAN LED Connector (LANLED2)**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | LAN3_LED1_ACT | 2 | LAN4_LED1_ACT |
| 3 | VCC3_LAN3LED | 4 | VCC3_LAN4LED |
| 5 | LAN3_LED2_1000M | 6 | LAN4_LED2_1000M |
| 7 | LAN3_LED0_100M | 8 | LAN4_LED0_100M |
| 9 | VCC3 | 10 | NC |

## B.17 SPI_CN1: SPI flash card pin connector

**Table B.19: SPI_CN1:SPI fresh card pin connector**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | +3VSB | 2 | GND |
| 3 | SPI_CS# | 4 | SPI_CLK |
| 5 | SPI_MISO | 6 | SPI_MOSI |
| 7 | N/A | 8 | NC |

## B.18 GPIO Connector

**Table B.20: GPIO Connector**

| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | SIO_GPIO0 | 2 | SIO_GPIO4 |
| 3 | SIO_GPIO1 | 4 | SIO_GPIO5 |
| 5 | SIO_GPIO2 | 6 | SIO_GPIO6 |
| 7 | SIO_GPIO3 | 8 | SIO_GPIO7 |
| 9 | VCC_GPIO0 | 10 | GND |

## B.19 System I/O Ports

**Table B.21: System I/O ports**

| Addr. range (Hex) | Device |
|---|---|
| 000-01F | DMA controller |
| 020-021 | Interrupt controller 1, programmable interrupt controller |
| 022-03F | Motherboard resources |
| 040-043 | System timer |
| 060-060 | Standard PS/2 Keyboard |
| 064-064 | Standard PS/2 Keyboard |
| 070-077 | Real-time clock, non-maskable interrupt (NMI) mask |
| 081-091 | DMA controller |
| 0A0-0A1 | Interrupt controller 2, programmable interrupt controller |
| 0C0-0DF | DMA controller |
| 0F0-0F0 | Numeric data processor |
| A35-A36 | On-board hardware monitor |
| 2F8-2FF | Serial port 2 |
| 778-77F | Printer port (LPT1) |
| 3B0-3BB | Intel HD Graphics |
| 3C0-3DF | Intel HD Graphics |
| 3F8-3FF | Serial port 1 |

## B.20 Interrupt Assignments

**Table B.22: Interrupt assignments**

| Priority | Interrupt# | Interrupt source |
|---|---|---|
| 1 | NMI | Parity error detected |
| 2 | IRQ0 | Interval timer |
| 3 | IRQ1 | PS/2 Keyboard |
| - | IRQ2 | Interrupt from controller 2 (cascade) |
| 4 | IRQ8 | Real-time clock |
| 5 | IRQ9 | Cascaded to INT 0A (IRQ 2) |
| 6 | IRQ10 | Intel 8 series/C226 Chipset Family SMBus Controller |
| 7 | IRQ11 | Available |
| 8 | IRQ12 | PS/2 mouse |
| 9 | IRQ13 | Numeric data processor |
| 10 | IRQ14 | Available |
| 11 | IRQ15 | Available |
| 12 | IRQ3 | Serial communication port 2 |
| 13 | IRQ4 | Serial communication port 1 |
| 14 | IRQ5 | Available |
| 15 | IRQ6 | Available |
| 16 | IRQ7 | Parallel port 1 (print port) |

## B.21 1st MB Memory Map

**Table B.23: 1st MB memory map**

| Addr. range (Hex) | Device |
|---|---|
| E0000h - FFFFFh | BIOS |
| D0000h - DFFFFh | Unused |
| C0000h - CFFFFh | VGA BIOS |
| A0000h - BFFFFh | Video Memory |
| 00000h - 9FFFFh | Base memory |

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