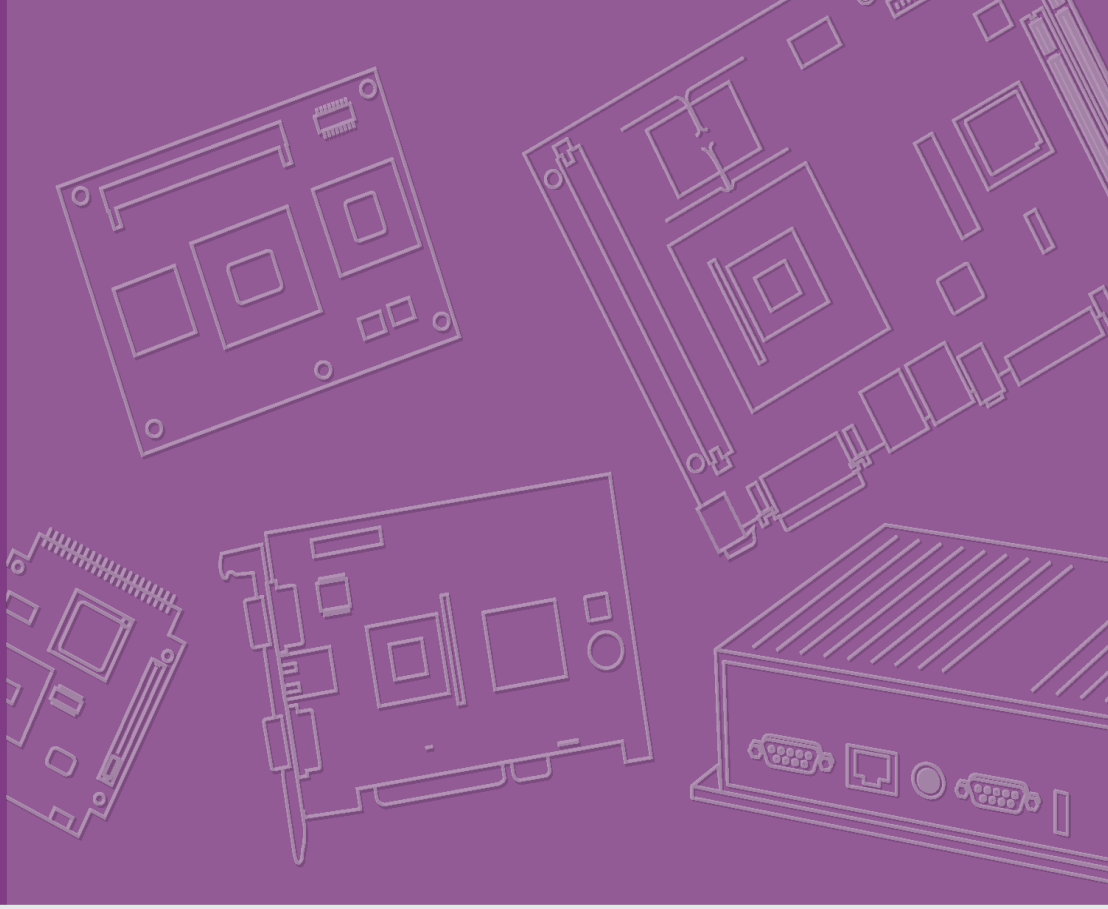

User Manual

ASMB-782

LGA 1155 Intel® Xeon® E3 V2 ATX Server Board with 2 PCIe x16 slots (x8 link), 2 PCIe x4, USB 3.0, PCIe Gen III, Quad LANs

ADVANTECH

Enabling an Intelligent Planet

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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.*

Memory Compatibility

Brand	Size	Speed	Advantech PN	ECC
Transcend	1GB	1333 MHz	NA	Yes
	2GB	1333 MHz	NA	Yes
	4GB	1333 MHz	NA	Yes
InnoDisk	4GB	1333 MHz	NA	Yes
Transcend	1GB	1333 MHz	96D3-1G1333NN-TR	No
	4GB	1333 MHz	96D3-4G1333NN-TR	No

ASMB-782 Ordering Information

Part Number	Chipset	Memory	LAN	USB3.0
ASMB-782G2-00A1E	C216	DDR3 ECC/Non-ECC	2	4
ASMB-782G4-00A1E	C216	DDR3 ECC/Non-ECC	4	4

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.

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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-782 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-782 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-782, 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.

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Chapter 1

Hardware Configuration

1.1 Introduction

The ASMB-782 motherboard is the most advanced Intel® C216 board for industrial server grade applications that require high-performance computing. The motherboard supports Intel® Xeon® E3 and E3 V2/2nd and 3rd generation Core™ i3 with DDR3 1066/1333/1600MHz memory supports up to 32 GB. ASMB-782 also provides cost-effective Intel HD graphics integrated in processor, and the graphics VRAM is 1 GB maximum shared memory with 2 GB and above system memory installed.

There are two PCIe x16 slots (Gen III x8 link), one PCIe x4 gen III and one PCIe x4 gen II slot on ASMB-782 to fulfill multi-PCIe expansion slots demand from manufacture automation and factory automation market. In addition, the ASMB-782 has four Gigabit Ethernet LAN (G4 version) via dedicated PCIe bus, which offers bandwidth up to 300 MB/s eliminating network bottlenecks. High reliability and outstanding performance make the ASMB-782 the ideal platform for industrial networking applications.

By using the Intel® C216 chipset, the ASMB-782 offers three 32-bit, 33 MHz PCI slots and a variety of features such as 2 onboard SATA III interfaces (bandwidth = 600 MB/s) and 4 onboard SATA II with software RAID; 4 USB 3.0 and 10 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-782 also adopts Advantech's unique, patented Sleep Mode Control Circuit for AT Power Mode. With all the excellent features and outstanding performance, the ASMB-782 is the ideal platform for today's industrial applications.

1.2 Features

- **PCIe architecture:** The Intel® C216 PCH chipset supports 2 PCIe x16 slots (x8 link), 2 PCIe x4 slot
- **High Performance I/O capability:** Four Gigabit LAN via PCIe bus, 3 PCI 32-bit/ 33MHz PCI slots, 4 USB 3.0,10 USB 2.0 ports. (2*Type A USB 2.0), 2 SATA III and 4 SATA II connectors.
- **Standard ATX form factor with industrial features:** ASMB-782 provides industrial features like long product life, reliable operation under wide temperature range, watchdog timer functions, etc.
- **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 1.5 of Section 1.8.1.3.
- **Active Management Technology 8.0:** 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 nonvolatile 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. For iAMT enable, please refer 3.3.8 AMT Configuration. Advantech provides Software utility called SUSIAccess to allow user enabling iAMT function. For detail information and user manual, please download it from link: http://www.advantech.com.tw/embcore/SUSIAccess.aspx

1.3 Specifications

1.3.1 System

- **SATA hard disk drive interface:** Six on-board SATA III/II connectors support Advanced Host Controller Interface (AHCI) technology and have data transmission rates up to 600 MB/s or 300 MB/s.
- **System Chipset:** Intel® C216

1.3.2 Memory

- **RAM:** Up to 32 GB in four 240-pin DIMM sockets. Supports dual-channel DDR3 ECC/Non-ECC 1066/1333/1600 SDRAM.

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

1.3.3 Input/Output

- **PCIe slot:** 2 PCIe x16 expansion slots (x8 link) and 2 PCIe x4 expansion slots
- **PCI Bus:** 3 PCI slots, 32-bit, 33 MHz PCI 2.2 compliant
- **Enhanced parallel port:** Configured to LPT1 or disabled. Standard DB-25 female connector cable is a optional accessory. LPT1 supports EPP/SPP/ECP.
- **Serial port:** Two serial ports. (COM1 is rear IO, COM2 is on board connector)
- **PS/2 Keyboard and mouse connector:** Two 6-pin mini-DIN connectors are located on the mounting bracket for easy connection to PS/2 keyboard and mouse.
- **USB port:** Supports up to 4 USB 3.0 ports with transmission up to 5Gbps and 10 USB 2.0 ports with transmission rates up to 480 Mbps.
- **LPC:** One LPC connector to support Advantech LPC modules, such as TPM module.
- **GPIO:** ASMB-782 supports 8-bit GPIO from super I/O for general purpose control application.

1.3.4 Graphics

- Processor is 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 (Only for QG2 version)
- **CRT:** Up to 2048 x 1536 resolution @ 75 Hz refresh rate

1.3.5 Ethernet LAN

- Supports dual/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 82579LM; LAN2/3/4: Intel 82574L (LAN 3/4 are for G4 SKU only).

1.3.6 Industrial Features

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

1.3.7 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 at 4.69A, +5 V at 1.39A, +12 V at 0.4A, +12 V_8P at 3.01A, +5 Vsb at 1.95A, -12 V at 0.01 A
- **Board size:** 304.8 x 228.6 mm (12" x 9.6")
- **Board weight:** 0.5 kg (1.68 lb)

1.4 Jumpers and Connectors

Connectors on the ASMB-782 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 list the function 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
JGREEN1	Deep sleep Sx mode
JUSB_1,JUSB_2	USB port and KBMS power source switch between +5 VSB and +5 V
CPUFAN_SEL1, SYSFAN_SEL1	FAN PWM(1-2)/DC mode selection(2-3)
PSON1	AT(1-2) / ATX(2-3)

Table 1.2: Connector list

Label	Function
ATX24P_P1	ATX 24 Pin main power connector (for System)
ATX8P_P1	Processor power connector (for CPU)
SATA0~1	SATA III (6Gb/s)
SATA2~5	SATA II (3Gb/s)
USB12	USB 3.0 Port 1 2
USB34	USB 3.0 Port 3 4 (Header)
USB56	USB 2.0 Port 5 6
USB78, USB910, USB1112	USB 2.0 Port 7,8,9,10,11,12 (Header)
USB13, USB14	USB 2.0 Port 13, 14 (USB Type A)
PCIE2, PCIE7	PCIE x4 slot
PCIE5, PCIE6	PCIe x16 slot (x8 link)

Table 1.2: Connector list	
DIMMA0,DIMMA1,DIMMB0,DIMMB1	DDR3 slot
CPUFAN1	CPU FAN connector
SYSFAN1,SYSFAN2,SYSFAN3,SYSFAN4	System FAN connector
LAN1_USB12,LAN2_USB56	LAN1 / USB 3.0 port 1, 2 stack connector LAN2 / USB 2.0 port 5, 6 stack connector
LAN34	LAN 3,4 stack connector
VGA_COM1	VGA+COM connector
KBMS1	PS/2 keyboard and mouse connector
KBMS2	External keyboard and mouse connector(6 pin)
SPI1	SPI socket
SPI_CN1	SPI flash card pin header
LANLED1,LANLED2	LAN LED extension connector
SMBUS1	SM Bus From PCH
SNMP1	SM Bus from HW Monitor IC
GPIO1	GPIO header
FPAUD1	Audio front panel header
LPT1	Parallel port
COM2	Serial port: RS-232
JFP1	Front panel header
LPC1	Low pin count connector for Advantech TPM LPC modules
LANLED1	LAN1/2 LED extension connector
LANLED2	LAN3/4 LED extension connector
VOLT1	Voltage Display
PMBUS1	PMBUS connector to communicate with power supply

1.5 Board Layout: Jumper and Connector Locations

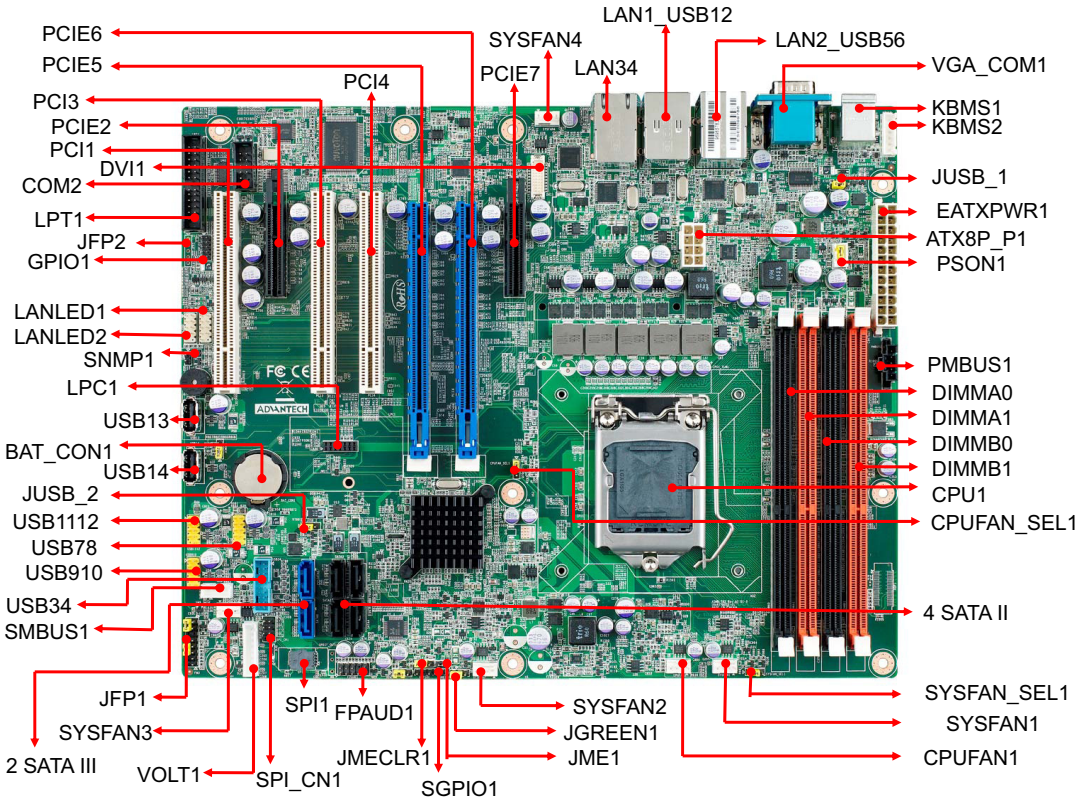


Figure 1.1 Jumper and Connector Locations

Figure 1.2 I/O connectors

1.6 ASMB-782 Block Diagram

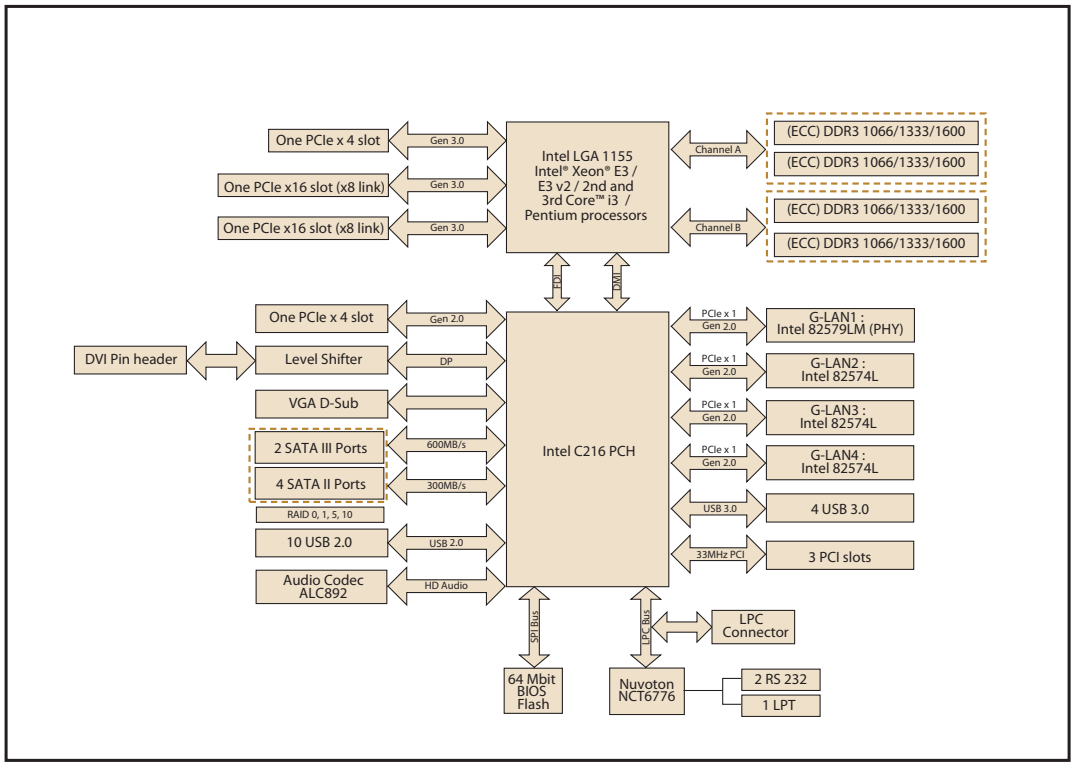


Figure 1.3 ASMB-782 Block Diagram

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.

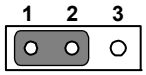
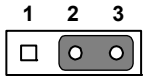
1.8.1 How to set jumpers

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-782 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.

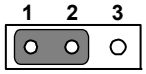
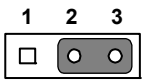
Table 1.3: JCMOS1

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-782 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.

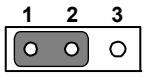
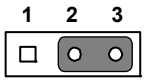
Table 1.4: JME1

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

1.8.1.3 Watchdog timer output (JWDT1)

The ASMB-782 contains a watchdog timer that will reset the CPU. This feature means the ASMB-782 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 1.5: Watchdog timer output (JWDT1)

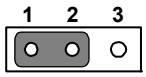
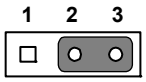
Function	Jumper Setting	
*Reset		1-2 closed
NC		2-3 closed
* default setting		

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 Deep Sx Mode (JGREEN1)

The ASMB-782 contains a jumper that can support energy saving for BIOS deep Sx feature. Normally this jumper should be set with pin 1-2 closed. If you want to disable, set JGREEN1 to 2-3 closed for disable.

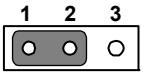
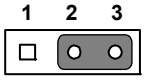
Table 1.6: Deep Sx Mode (JGREEN1)

Function	Jumper Setting	
*Enable		1-2 closed
Disable		2-3 closed

1.8.1.5 USB power switch (JUSB_1, JUSB_2)

The ASMB-782 contains a jumper that can support USB/KBMS power source from +5Vsb or +5V. The default setting is 1-2 closed which is supporting USB stand-by power under S5. When the jumper is 2-3 closed, the USB/KBMS 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 mode.

Table 1.7: USB power switch (JUSB_1, JUSB_2)

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

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

The ASMB-782 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 1.8: (CPUFAN_SEL1, SYSFAN_SEL1)

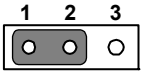
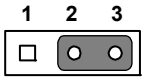
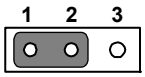
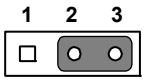
Function	Jumper Setting	
*PWM mode		1-2 closed
DC mode		2-3 closed

Table 1.9: ATX/AT mode selector (PSON1)

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

* default setting

1.9 System Memory

ASMB-782 has four 240-pin memory sockets for DDR3 ECC/Non-ECC 1066/1333/1600 MHz memory modules with maximum capacity of 32GB (Maximum 8GB for each DIMM).

Please note that both versions ASMB-782 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.

1.11 Cache Memory

The ASMB-782 supports a CPU with one of the following built-in full speed L3 caches:

The built-in third-level cache in the processor yields much higher performance than conventional external cache memories.

- 8 MB for 3rd Generation Intel Xeon E3-1275 V2 CPU
- 8 MB for 3rd Generation Intel Xeon-E3-1225 V2 CPU
- 3 MB for 3rd Generation Intel Core i3-3220 CPU
- 3 MB for Intel Pentium G2120 CPU
- 8 MB for 2nd Generation Intel Xeon E3-1275 CPU
- 6 MB for 2nd Generation Intel Xeon-E3-1225 CPU
- 3 MB for 2nd Generation Intel Core i3-2120 CPU
- 3 MB for Intel Pentium G850 CPU

1.12 Processor Installation

The ASMB-782 is designed for LGA1155, Intel Xeon® E3 V2/Core™ i3 processor.

1.13 PCI Bus Routing Table

AD PCI slot INT	PCI1	PCI3	PCI4
	AD16	AD21	AD22
A	A	F	G
B	B	G	H
C	C	H	E
D	D	E	F

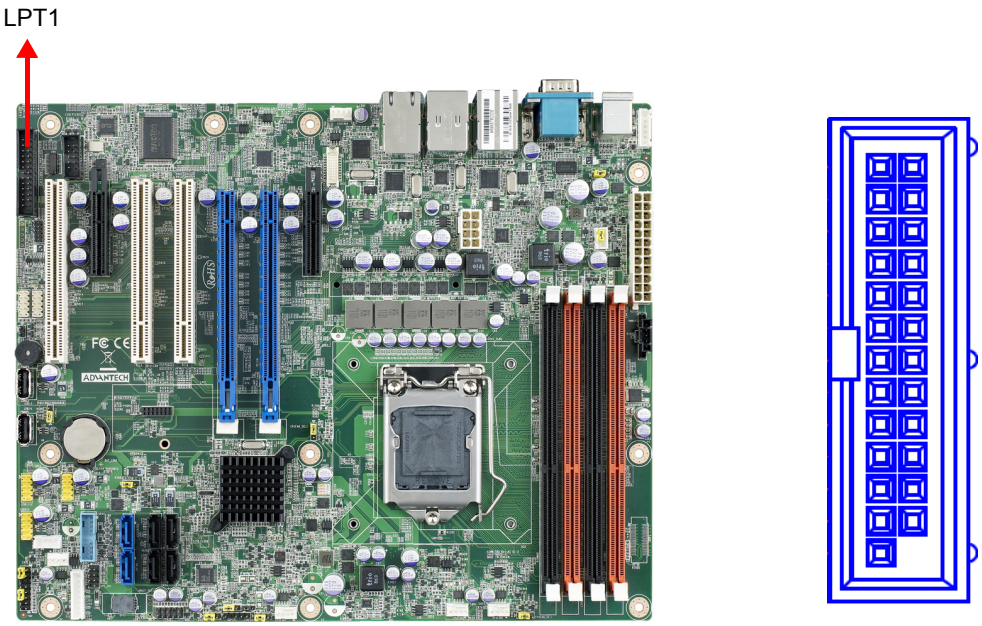
Chapter 2

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 Parallel Port (LPT1)



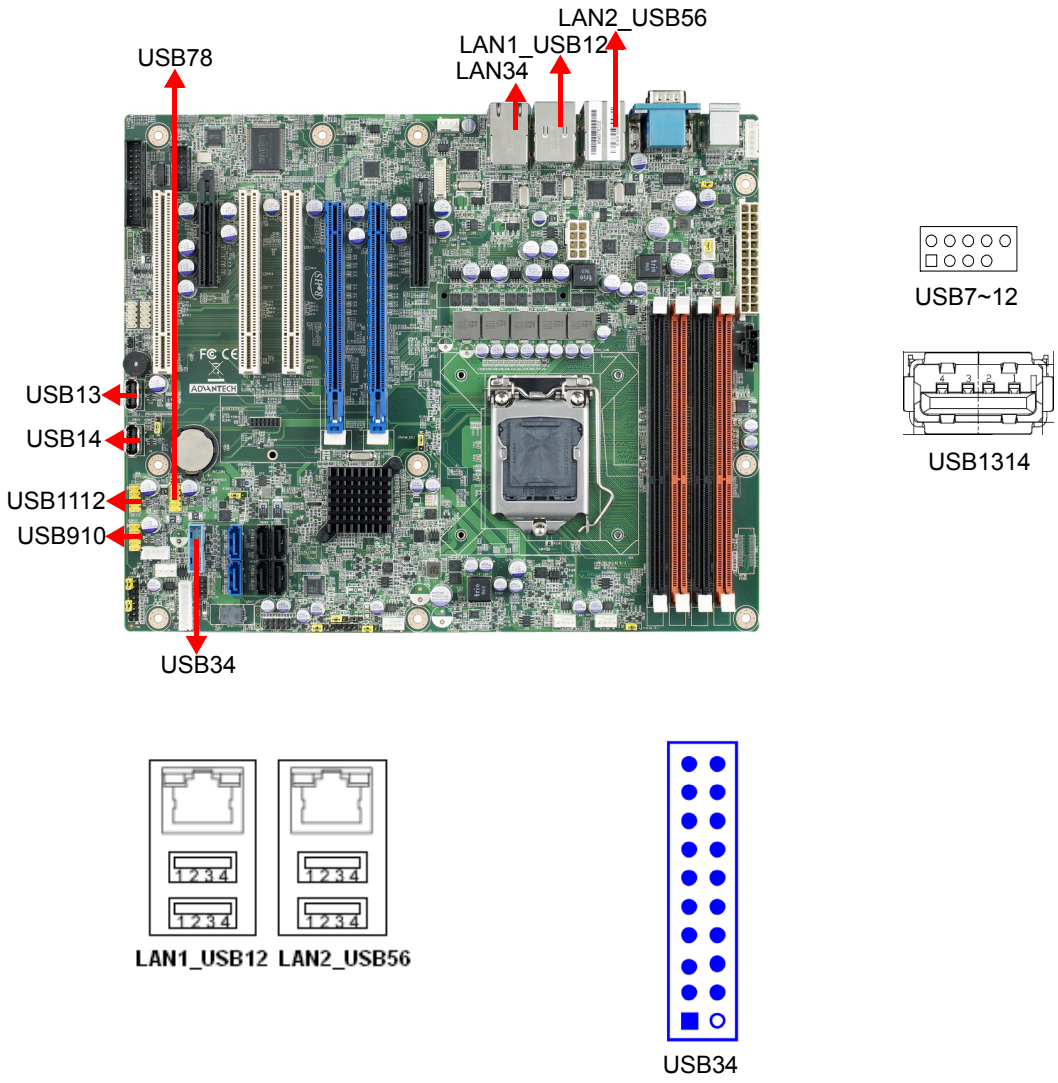
The parallel port is normally used to connect the motherboard to a printer. The ASMB-782 includes an onboard parallel port, accessed through a 25-pin flat-cable connector, LPT1.

2.3 USB Ports (LAN1_USB12,LAN2_USB56,USB34, USB78, USB910,USB1112, USB13, USB14)

ASMB-782 provides up 14 USB ports. USB5~14 are USB 2.0 ports supporting transmission rates up to 480 Mbps, and USB1~4 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-782 is equipped with two or four 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.



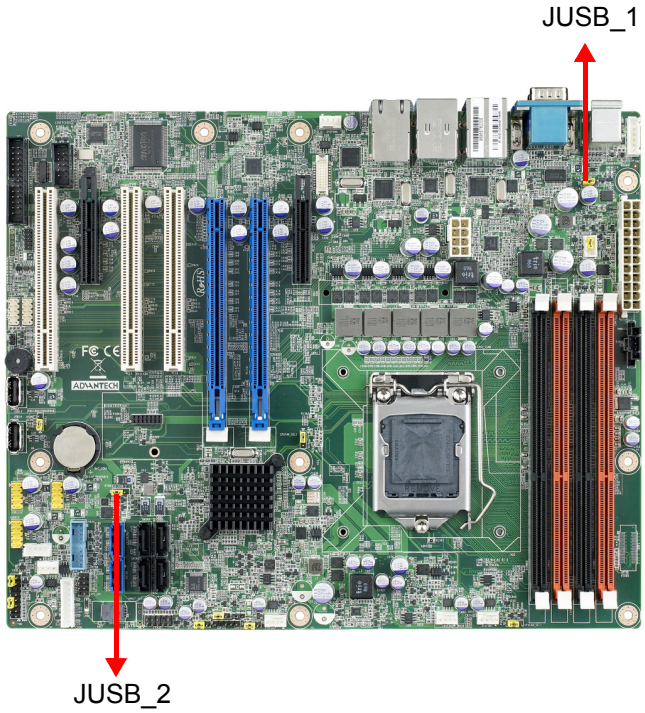
LAN 1/2 LED Indicator

LAN Mode	LAN Indicator
1 Gbps Link on	LED1 Green on (left)
100 Mbps Link on	LED1 Orange on (left)
10 Mbps Link on	LED1 N/A (left)
Active	LED2 Green flash (right)

LAN 3/4 LED Indicator

LAN Mode	LAN Indicator
1 Gbps Link on	LED1 Green on (Right)
100 Mbps Link on	LED1 Orange on (Right)
10 Mbps Link on	LED1 N/A (Right)
Active	LED2 Green flash (left)

2.4 USB Power Switch

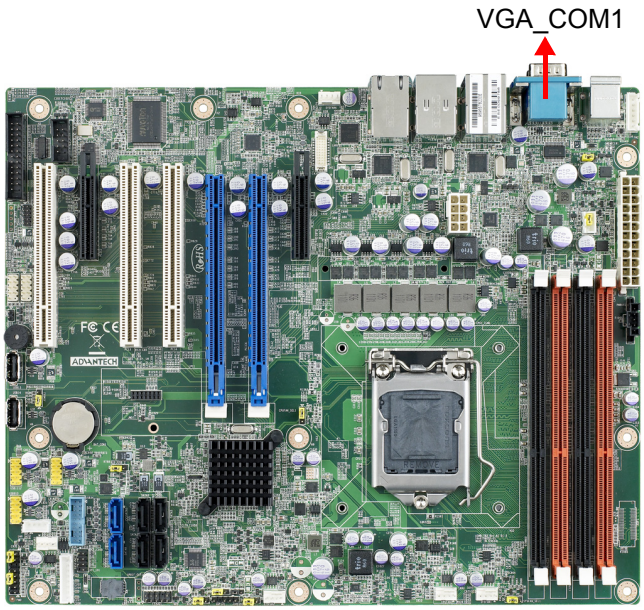


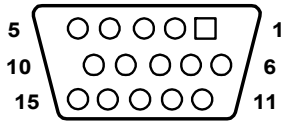
Jumper	USB Ports
JUSB_1	USB port 1,2,5,6
JUSB_2	USB port 3,4,7~14

ASMB-782 allows user to set USB and KBMS power between +5VSB and +5V. When the jumper is set as +5V, the board doesn't support S3/S4.

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

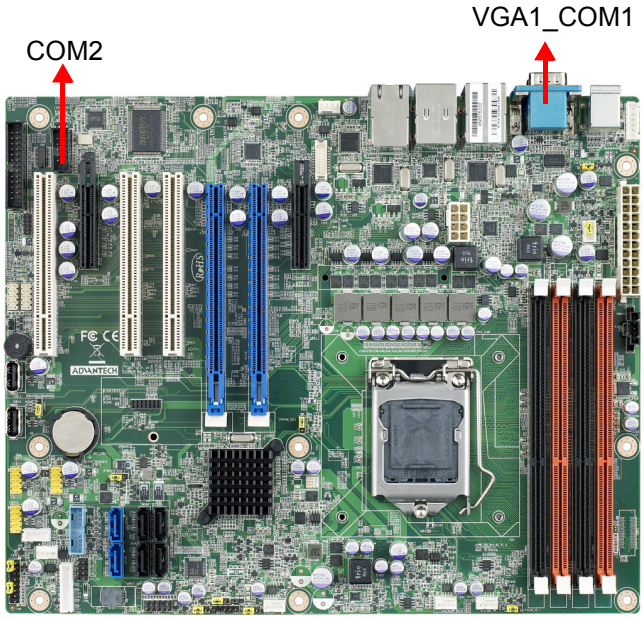
2.5 VGA Connector (VGA1)

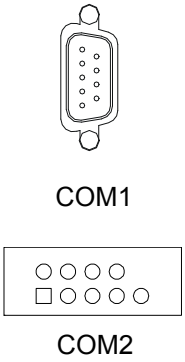




The ASMB-782 includes a VGA interface that can drive conventional CRT displays. Pin assignments of VGA1 are detailed in Appendix B.

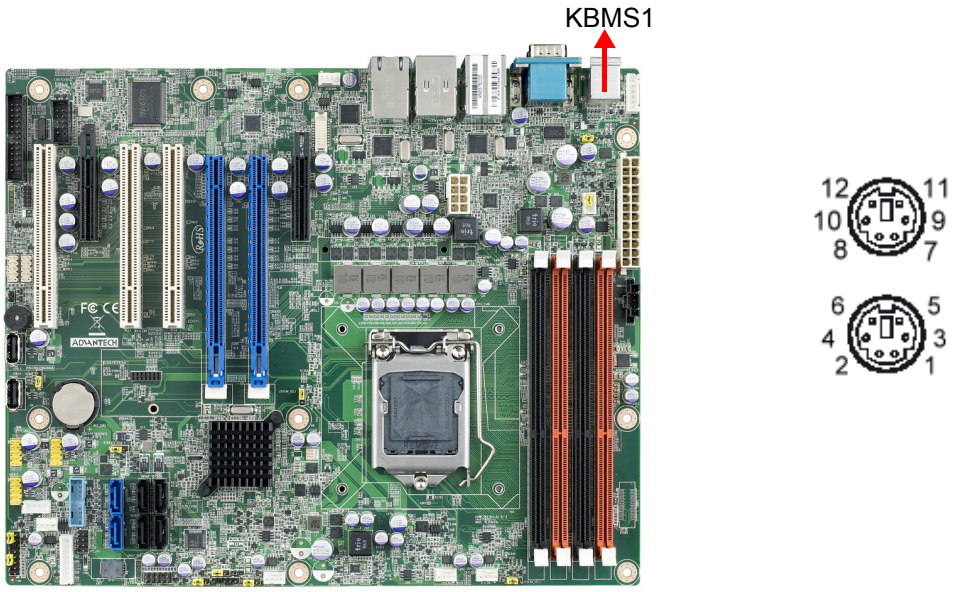
2.6 Serial Ports (COM1, COM2)





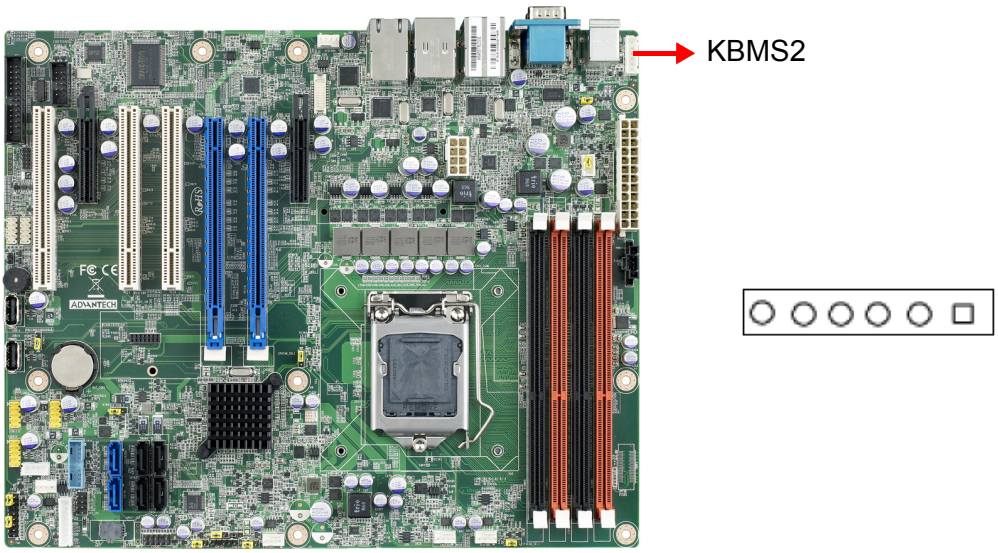
The ASMB-782 offers two serial ports (one on the rear panel and one onboard).These ports can connect to a serial mouse, printer or communications network. The IRQ and address ranges for those ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup. Different devices implement the RS-232 standards in different ways. If you are having problems with a serial device, please be sure to check the pin assignments for the connector.

2.7 PS/2 Keyboard and Mouse Connector (KBMS1)



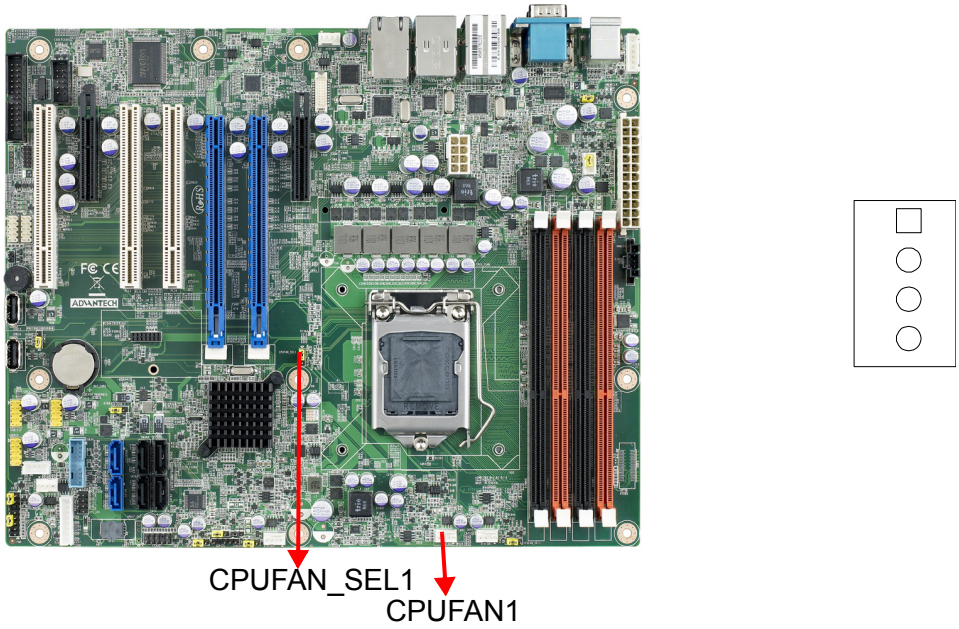
Two 6-pin mini-DIN connectors (KBMS1) on the rear panel of the motherboard provide PS/2 keyboard and mouse connections.

2.8 External Keyboard & Mouse (KBMS2)



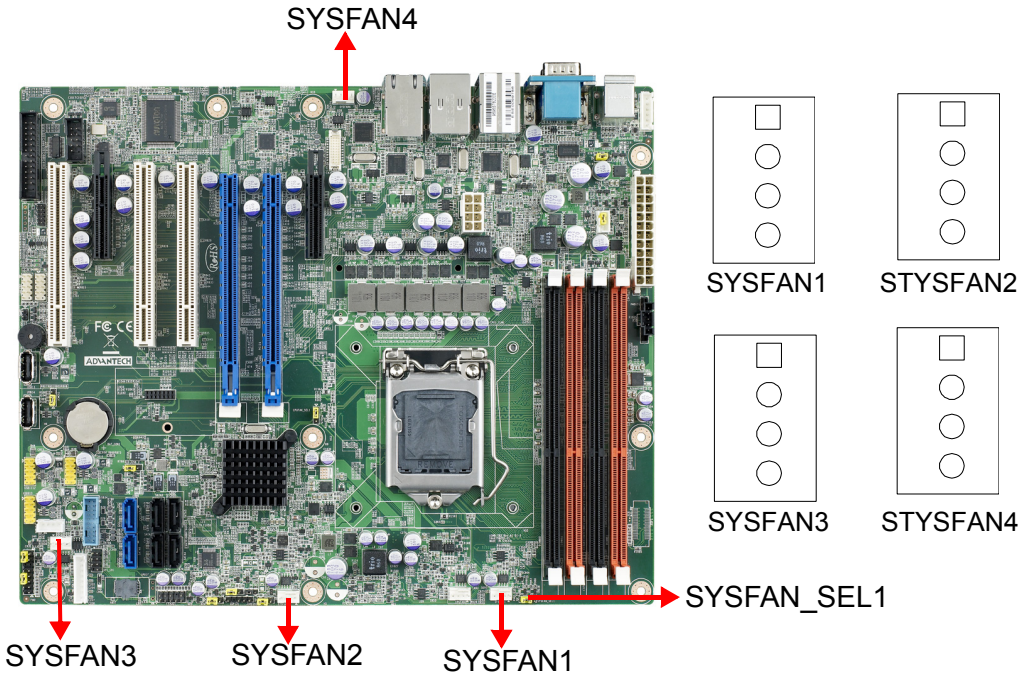
There is also an extra onboard external keyboard and mouse connector on the motherboard. This gives system integrators greater flexibility in designing their systems.

2.9 CPU Fan Connector (CPUFAN1)



If a fan is used, this connector supports cooling fans that draw up to 500 mA (6 W).

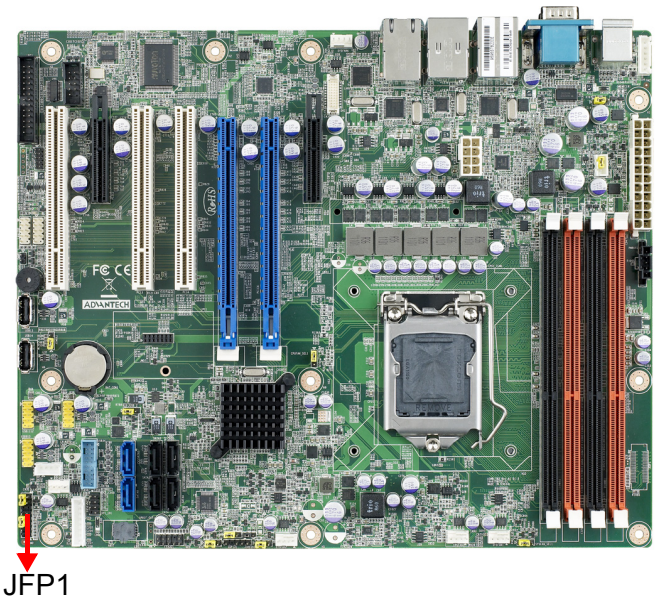
2.10 System FAN Connector (SYSFAN1, SYSFAN2, SYSFAN3 and SYSFAN4)



If a fan is used, this connector supports cooling fans that draw up to 1A (12W).

2.11 Front Panel Connectors (JFP1)

There are several external switches and LEDs to monitor and control the ASMB-782.



JFP1

2	4	6	8	10	12	14	16
1	3	5	7	9	11	13	15

RSTBTN	Case Open	SPEAKER	
PWRBTN	HDDLED	PWRLED	NC

2.11.1 Power LED (JFP1)

JFP1 pin9 and pin13 are for the power LED. Refer to Appendix B for detailed information on the pin assignments. If a PS/2 or ATX power supply is used, the system's power LED status will be as indicated as follows.

Table 2.1: PS/2 or ATX power supply LED status

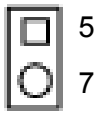
Power mode	LED (PS/2 power)	LED (ATX power)
System On	On	On
System Suspend	Fast Flash	Fast Flash
System Off	Off	Off
System Off in deep sleep	Off	Off

2.11.2 External Speaker (JFP1 pins 10, 12, 14, 16)

JFP2 pins 10, 12, 14, 16 connector for an external speaker. The ASMB-782 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 14-16 as closed.

2.11.3 HDD LED Connector (JFP1 pins 5 & 7)

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

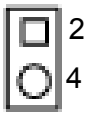


2.11.4 ATX Soft Power Switch (JFP1 pins 1 & 3)

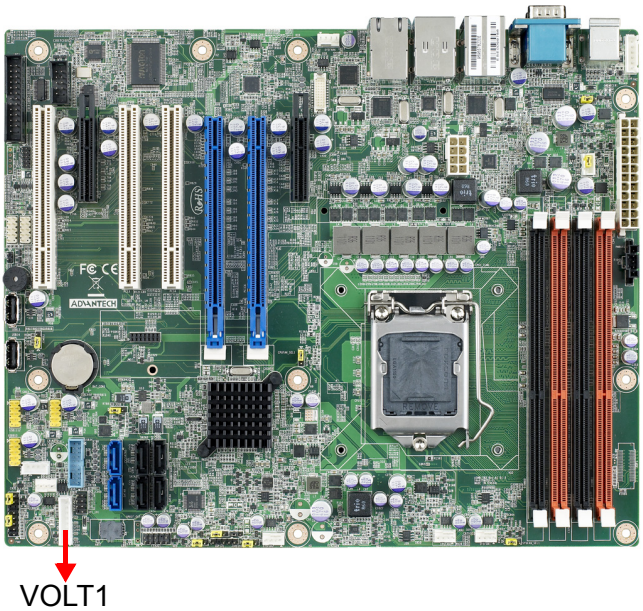
If your computer case is equipped with an ATX power supply, you should connect the power on/off button on your computer case to pins 1 and 3 of JFP1. This connection enables you to turn your computer on and off.

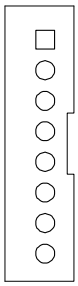
2.11.5 Reset Connector (JFP1 pins 2 & 4)

Many computer cases offer the convenience of a reset button.



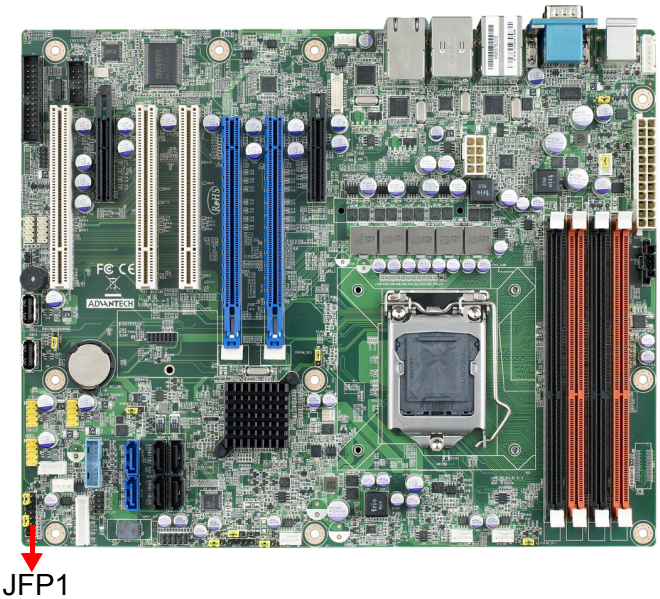
2.12 8-pin Alarm Board Connector (VOLT1)





VOLT1 connects to the alarm board of Advantech chassis. These alarm boards give warnings if a power supply or fan fails, if the chassis overheats.

2.13 Case Open Connector (JFP1 pin 6 & 8)

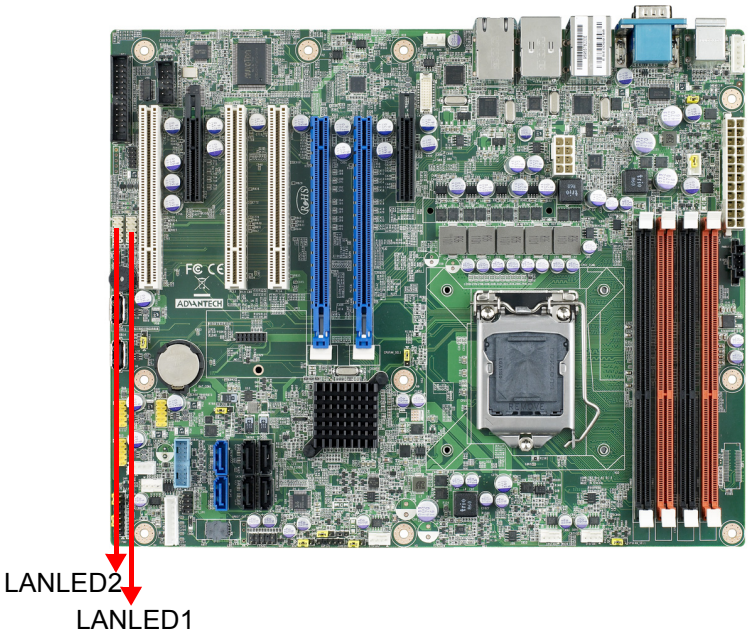


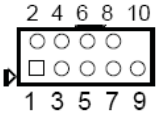
JFP1 pin 6 & 8 are for chassis with a case open sensor. The warning message will show in post screen.

2.14 Front Panel LAN Indicator Connector (LANLED1 and LANLED2)

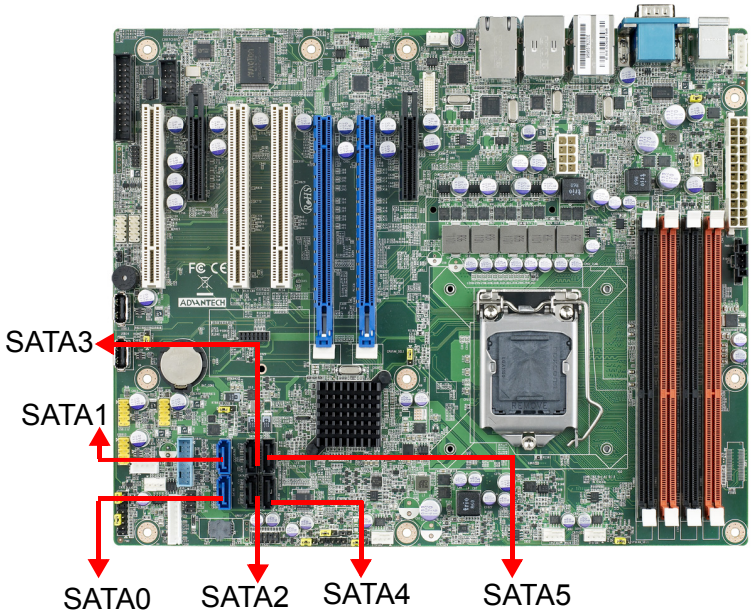
Table 2.2: Front Panel LAN Indicator Connector

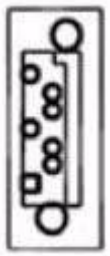
Pin	Signal	Pin	Signal
1	LAN1/3_LED0_ACT	2	LAN2/4_LED1_ACT
3	VCC3_LAN1/3LED	4	VCC3_LAN2/4LED
6	LAN1/3_LED1_1000M	6	LAN2/4_LED2_1000
7	LAN1/3_LED2_100M	8	LAN2/4_LED0_100
9	VCC3	10	NC





2.15 Serial ATA Interface (SATA0~5)



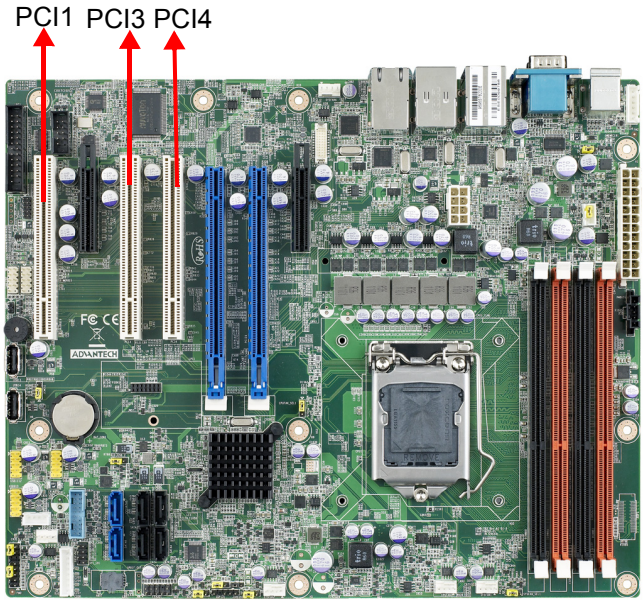


ASMB-782 features two high performance serial ATA III interfaces (up to 600 MB/s, blue connector) and four serial ATA II interfaces (up to 300 MB/s, black connector).

Note!

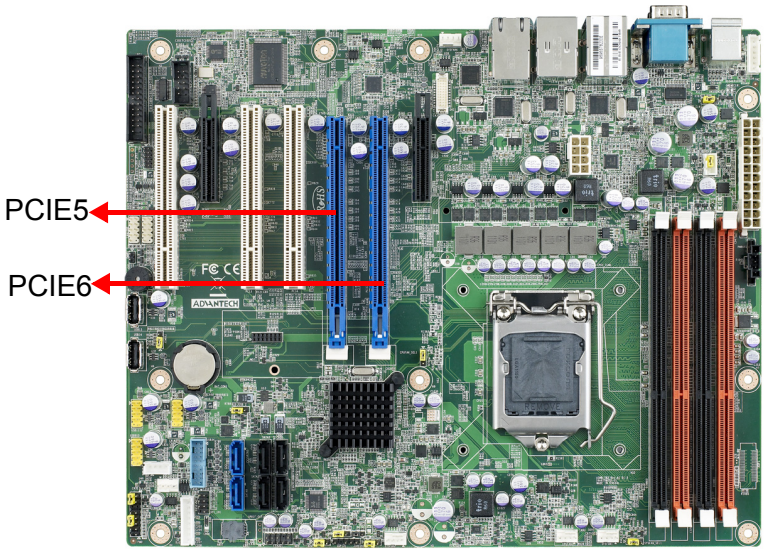
1. *ASMB-782 on board SATA only supports Fedora 14 and 15 and SATA mode in BIOS should be set as AHCI mode.*
2. *If SATA mode is set as IDE mode, when user is installing Fedora 14 and 15, ODD must be connected on SATA port 2~5.*

2.16 PCI Slots (PCI 1, 3, 4)



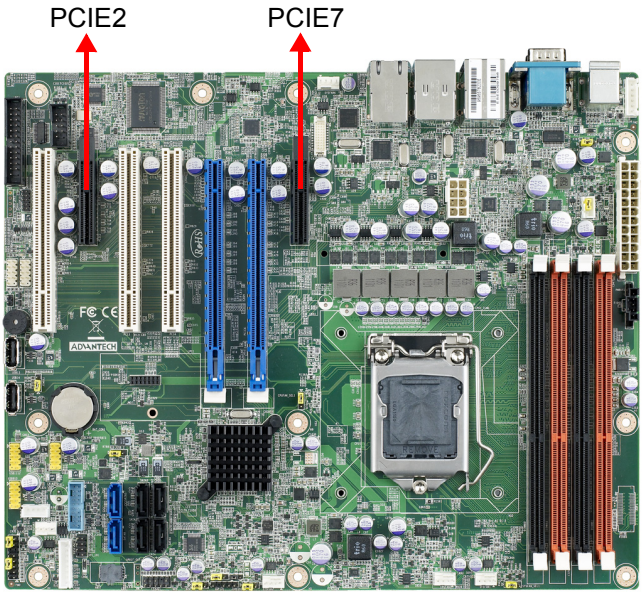
The ASMB-782 provides three 32-bit / 33 MHz PCI slots.

2.17 PCIe x16 slots (x8 link) Expansion Slot (PCIE5 and PCIE6)



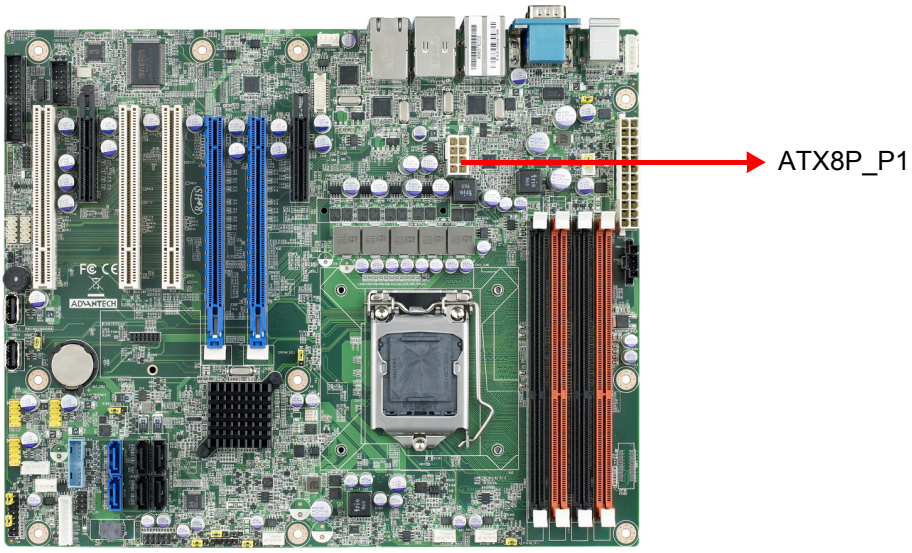
The ASMB-782 provides two PCIe x16 slots (x8 link) for users to install add-on VGA cards when their applications require higher graphics performance than the CPU embedded graphics controller can provide, or high bandwidth demanded I/O card, such as frame grabber card, raid card and 10G LAN card.

2.18 PCIe x4 Expansion Slot (PCIE2 and PCIE7)



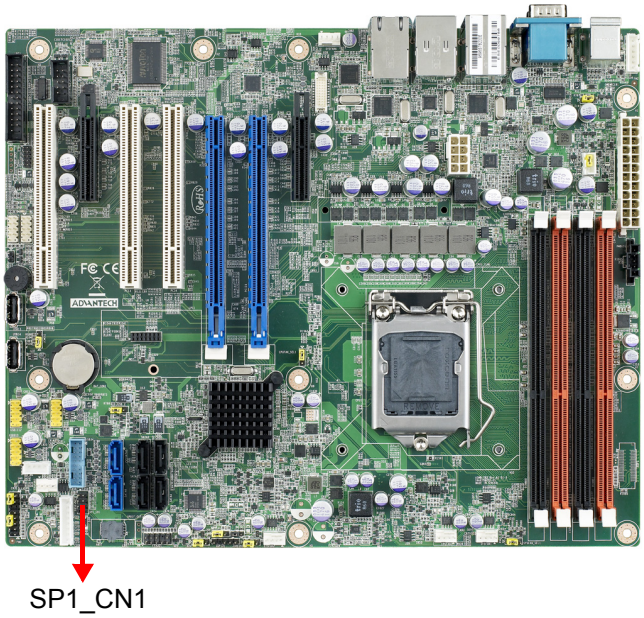
2.19 Auxiliary 8-pin power connector (ATX8P_P1)

For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version). Do not forget to connect the 8-pin EATX12 V power plug; otherwise, the system will not boot.

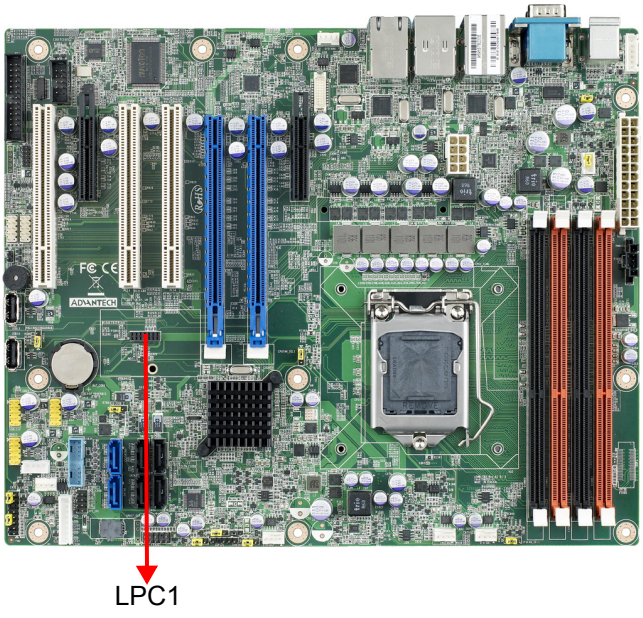


2.20 SPI Flash connector(SPI_CN1)

SPI flash card pin header which can flash BIOS while ASMB-782 can not be power on and ensures platform integrity.



2.21 Low Pin Count Connector (LPC1)



Chapter 3

BIOS Operation

3.1 Introduction

AMIBIOS has been integrated into myriad motherboards for decades. In the past, people often referred to the AMIBIOS setup menu as BIOS, BIOS setup or CMOS setup.

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-782 setup screens.

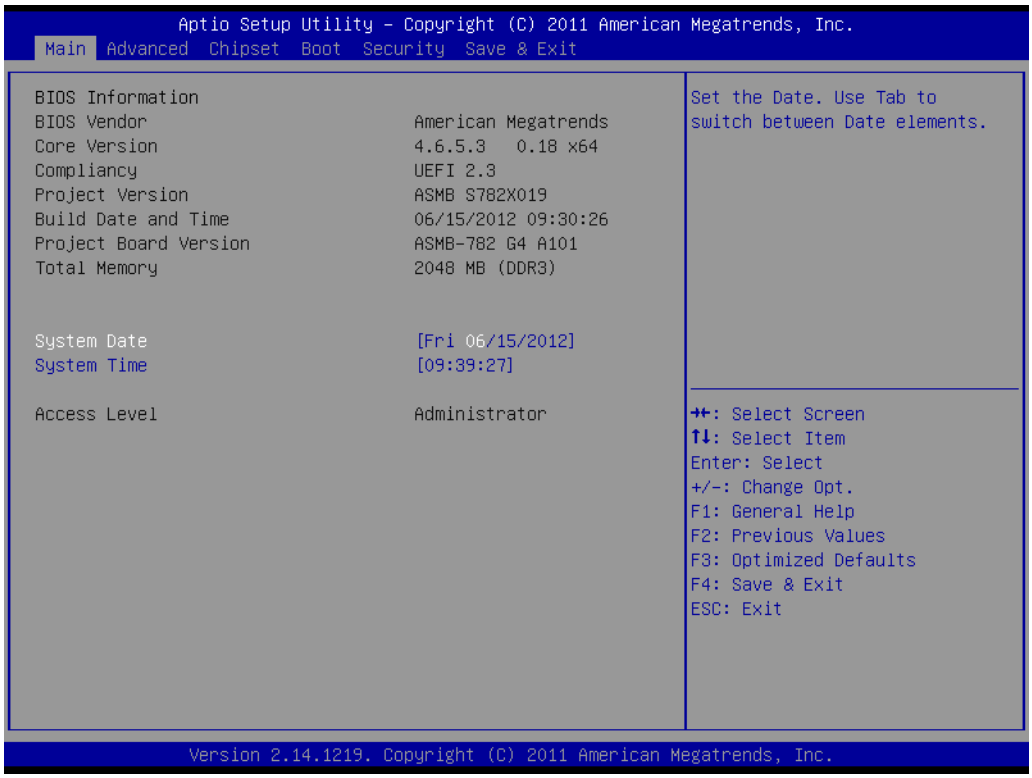


Figure 3.1 Main setup screen

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 <F2> 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> 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.

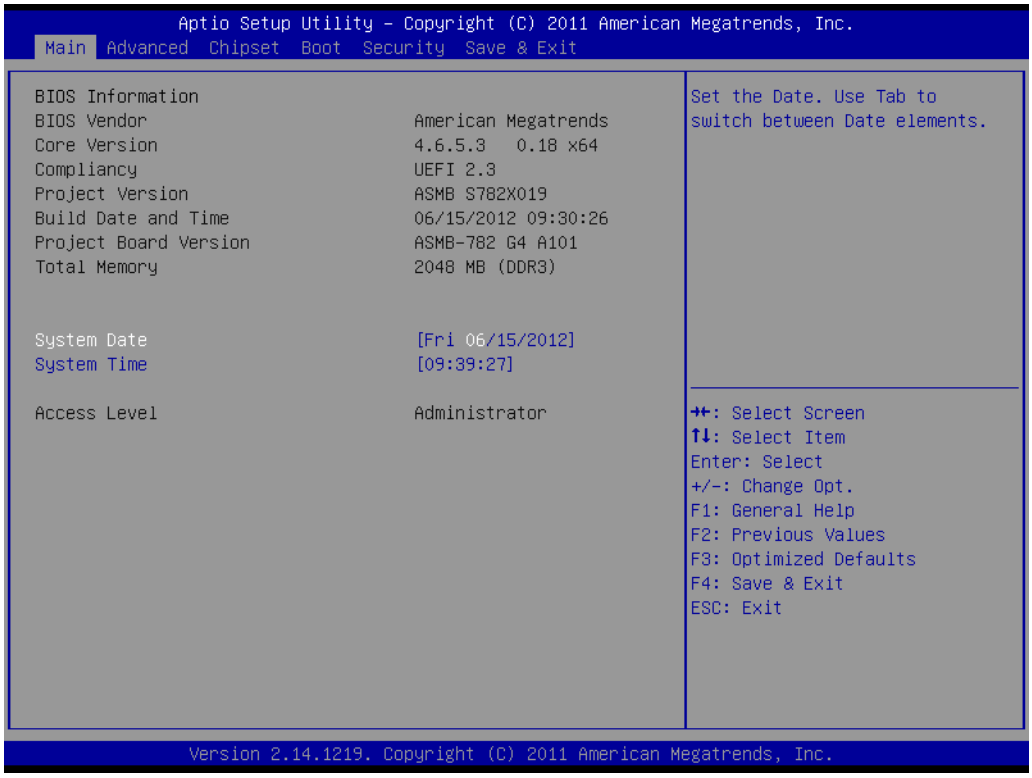


Figure 3.2 Main setup screen

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-782 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.

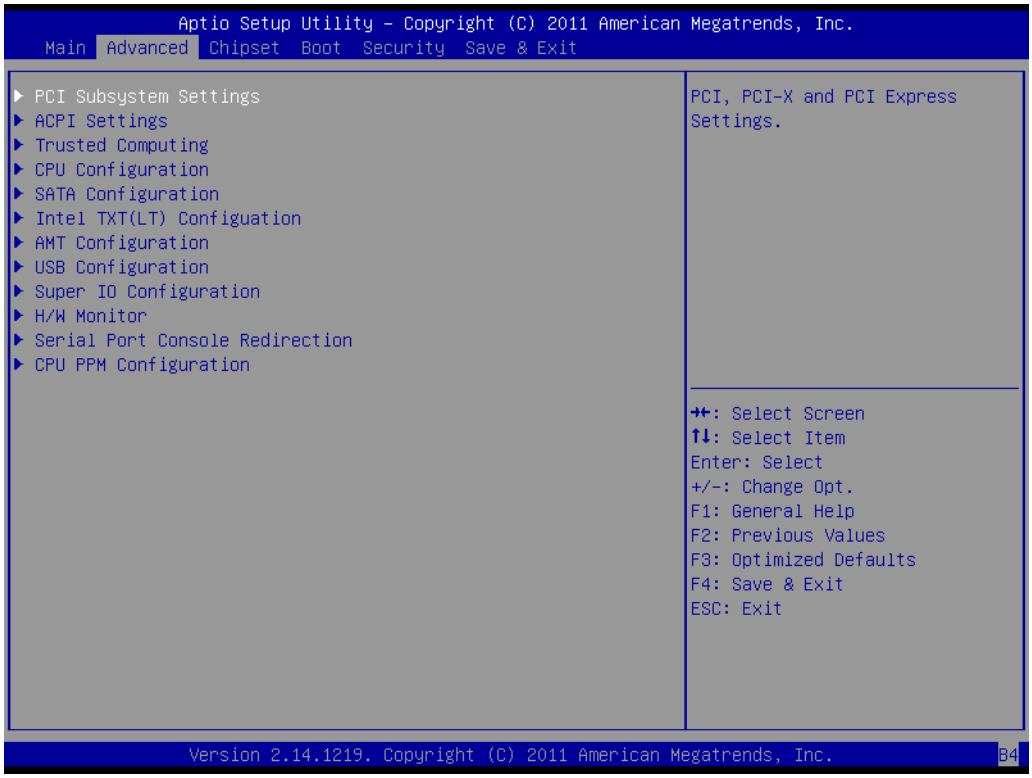


Figure 3.3 Advanced BIOS features setup screen

3.4 PCI Subsystem Settings

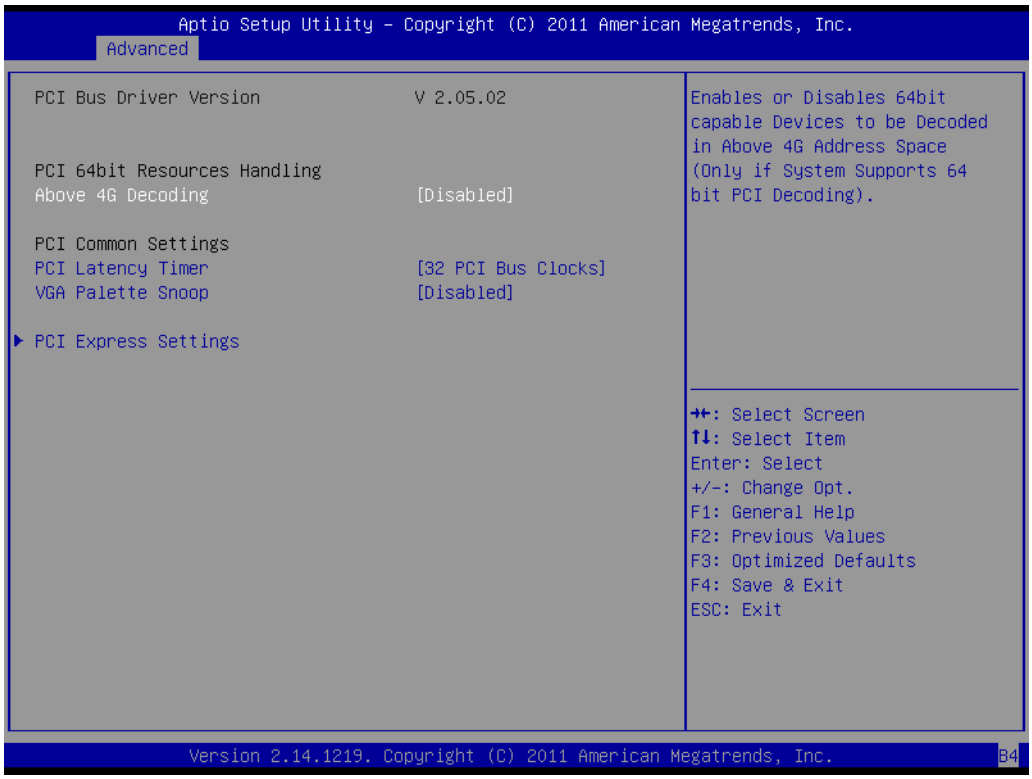


Figure 3.4 PCI subsystem settings screen

Above 4G Decoding

Enable or disable 64bit capable devices to be decoded in above 4G address space when system supports 64 bit PCI decoding.

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.

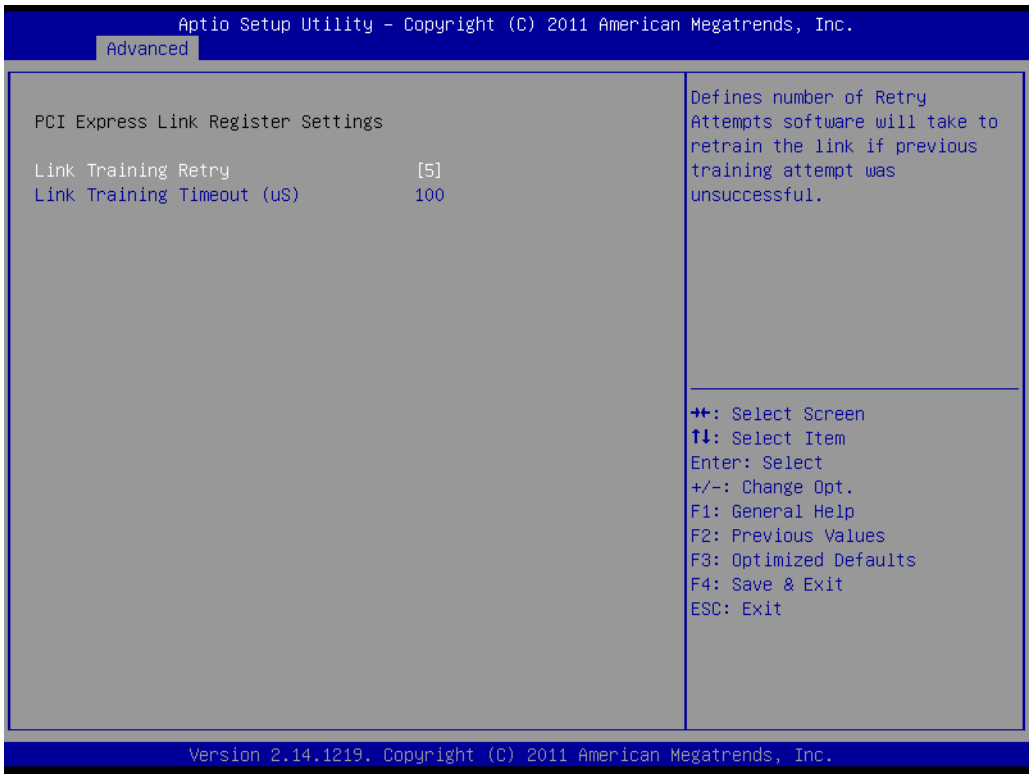


Figure 3.5 PCI Express Setting

Link Training Retry

This item is to allow user to define numbers of retry attempts software will take to retrain the link if previous training attempt was unsuccessful.

Link Training Time out

To define number of microseconds waiting for "Link Training", and the value range is from 10 to 1000 uS.

3.4.1 ACPI Settings

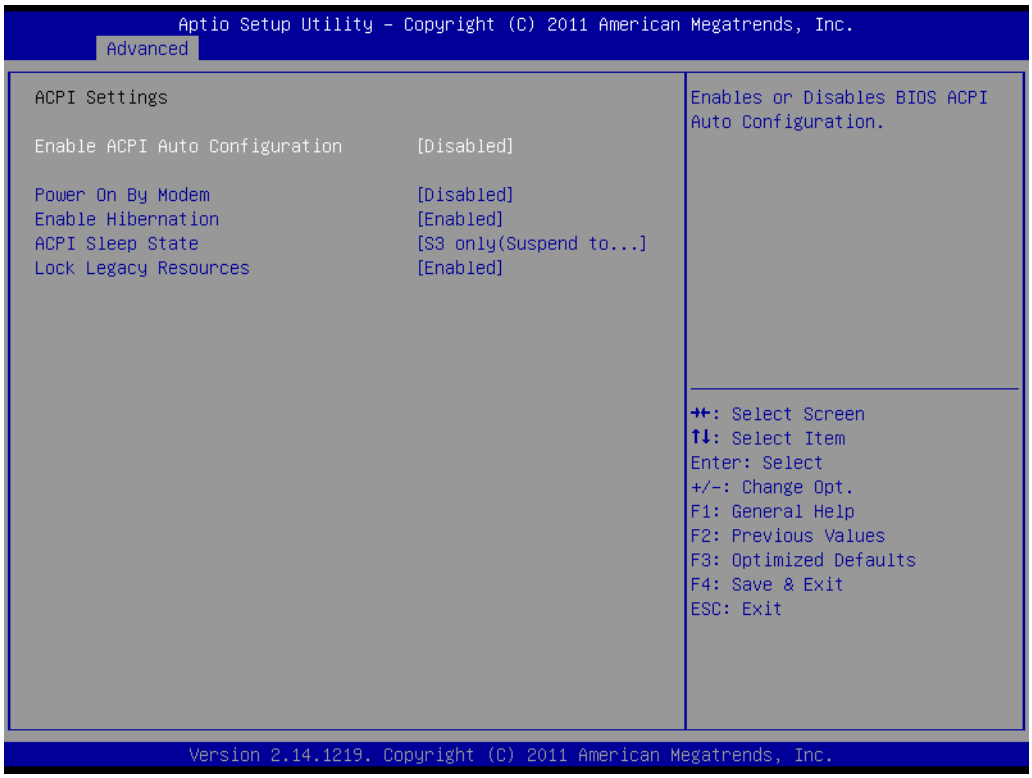


Figure 3.6 ACPI Settings

Enable ACPI Auto Configuration

"Enable" or "disable" ACPI Auto Configuration.

Power On By Modem

Power on by modem can be supported by COM1 and COM2.

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.

3.4.2 Trusted Computing

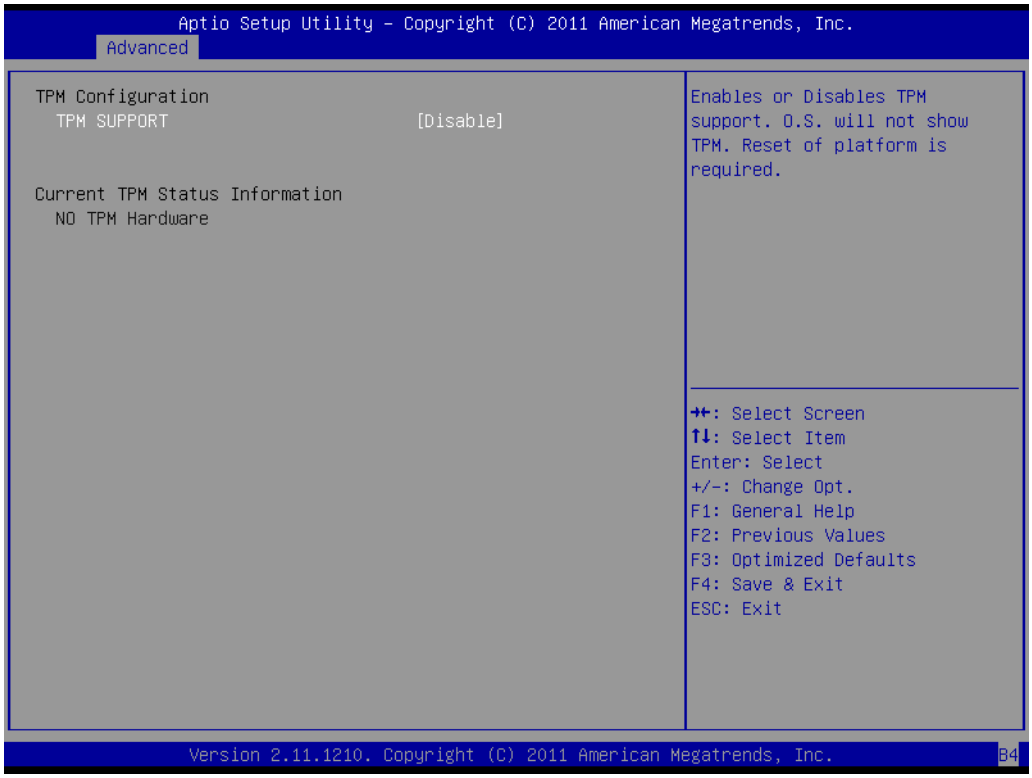


Figure 3.7 TPM Settings

TPM Support

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

3.4.3 CPU Configuration

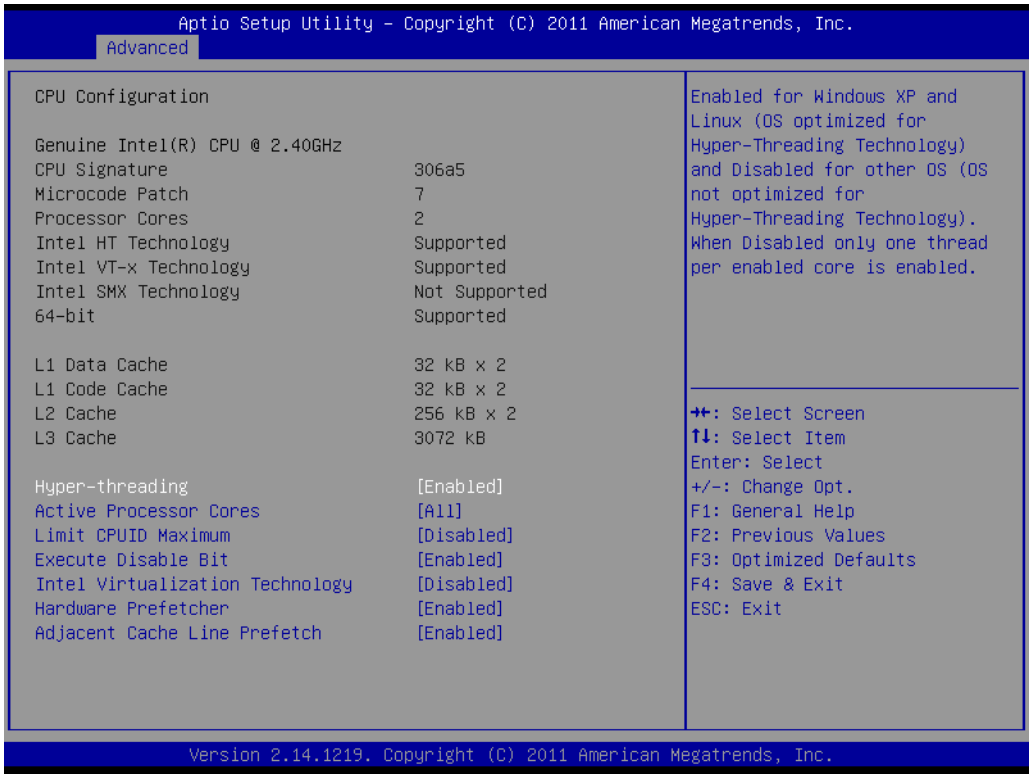


Figure 3.8 CPU Configuration

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.

Limit CPUID Maximum

Setting this item to [Enable] allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.

Execute Disable Bit

This item specifies the Execute Disable Bit Feature. The settings are Enabled and Disabled. The Optimal and Fail-Safe default setting is Enabled. If Disabled is selected, the BIOS forces the XD feature flag to always return to 0.

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.

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.

3.4.4 SATA Configuration

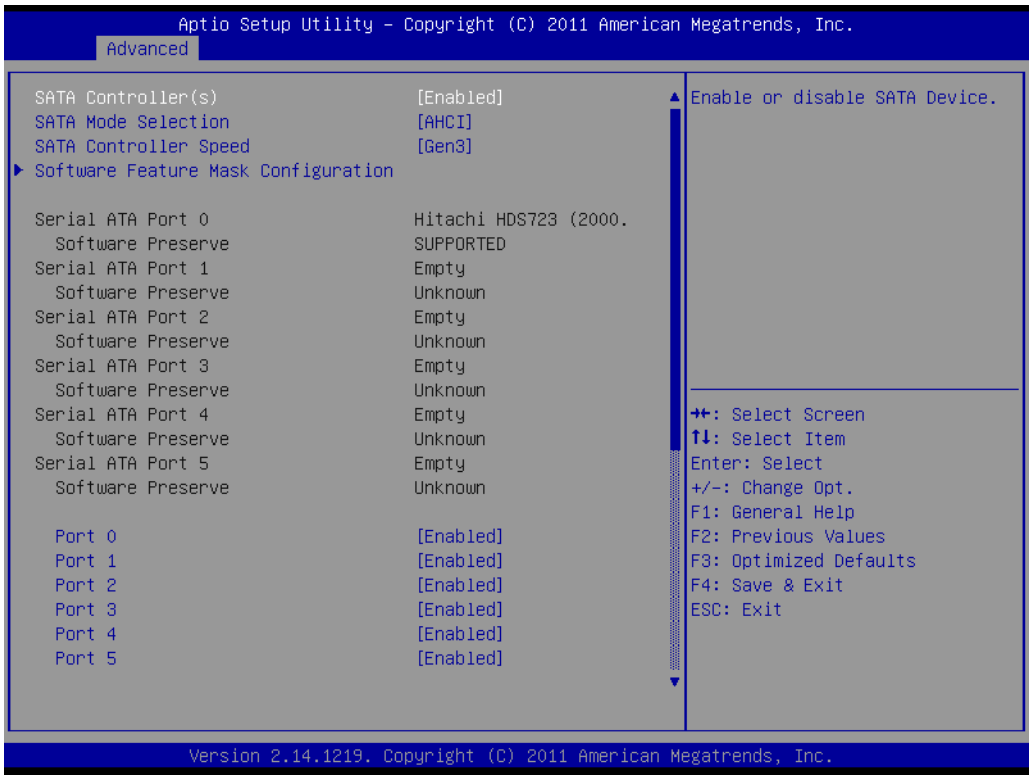


Figure 3.9 SATA Configuration

SATA Controller(s)

This item is to enable or disable SATA devices.

SATA Mode Selection

It's able to set as IDE, AHCI, or RAID when SATA Controllers are enable.

SATA Controller Speed

To set the maximum speed of SATA controllers, and there are three modes, Gen1, Gen2, and Gen3.

Port 0~5

To enable or disable SATA port 0~5.

Port 0~5 Hot Plug

To designate dedicated SATA port as hot pluggable.

Port 0~1 SATA Device Type

To identify the SATA is connected to Solid State Drive or Hard Disk Drive.

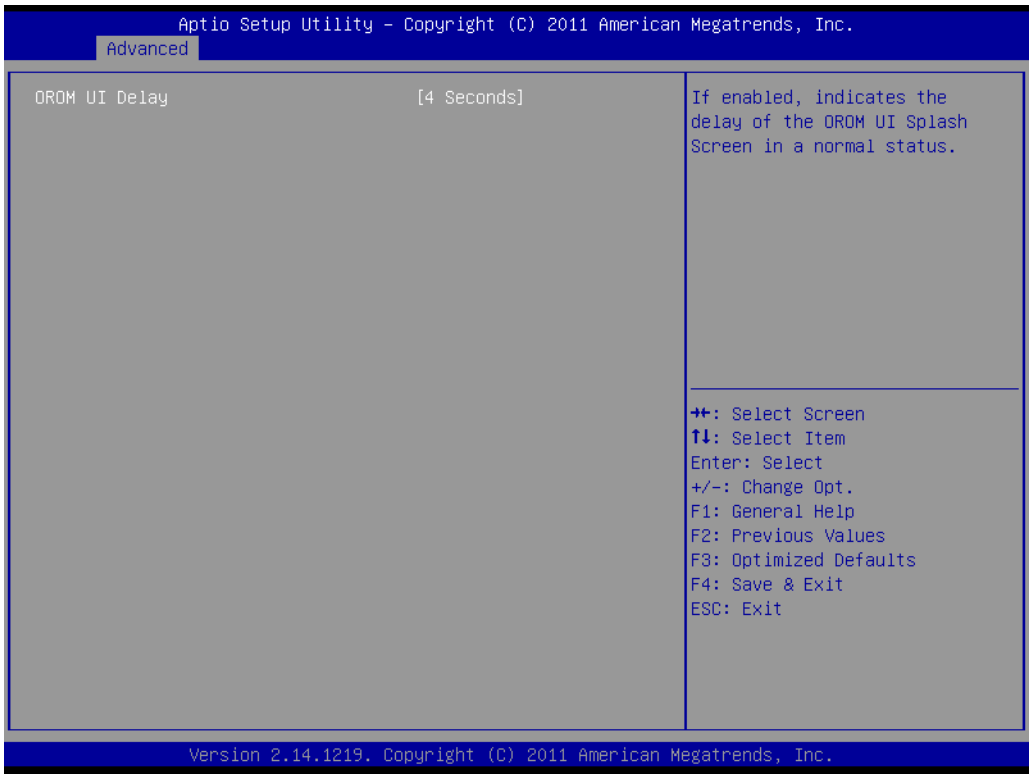


Figure 3.10 Software Feature Mask Configuration

OROM UI Delay

When this item is enable, user is able to indicate the delay of the OROM UI Splash Screen in a normal status.

3.4.5 Intel TXT(LT) Configuration

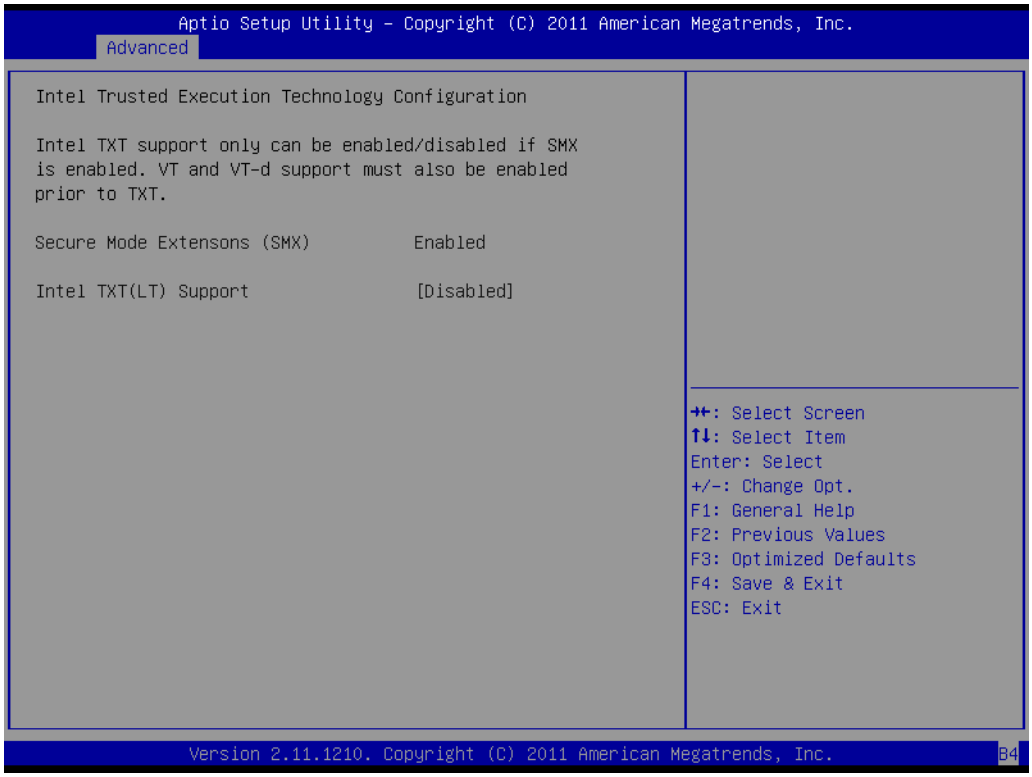


Figure 3.11 Intel Trusted Execution Technology Configuration

Intel Trusted Execution Technology Configuration

To enable or disable Intel Trusted Execution Technology if SMX is enable, and VT-D support must also be enabled prior to TXT.

3.4.6 AMT Configuration

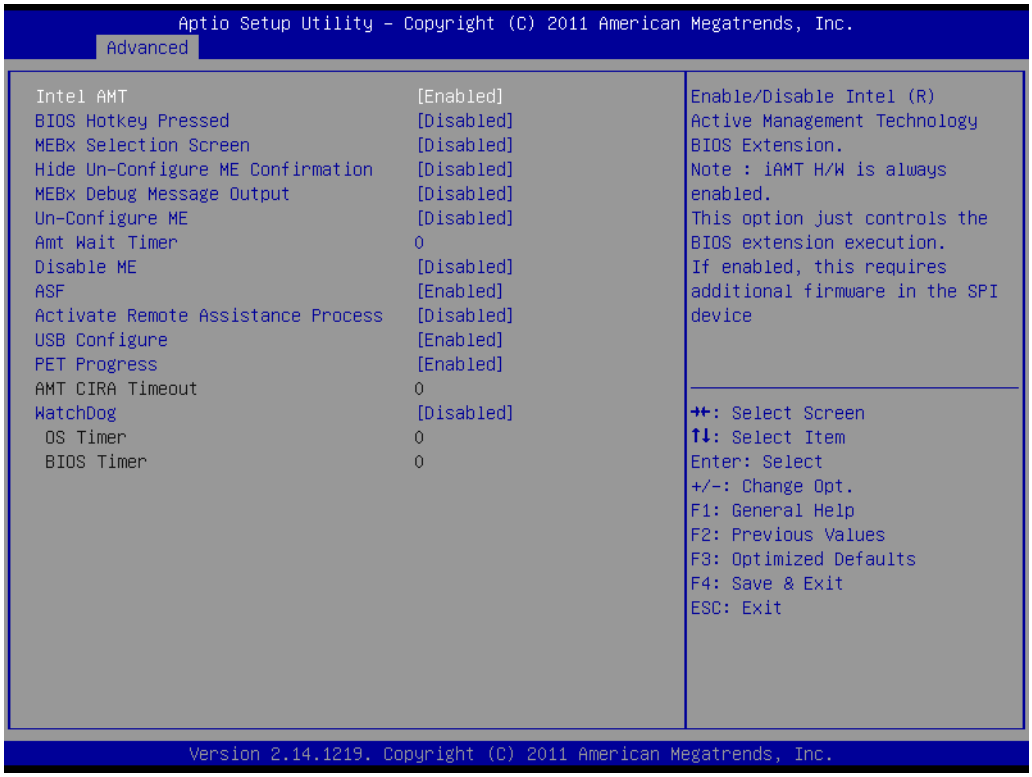


Figure 3.12 AMT Configuration

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

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.

AMT CIRA Timeout

Allows users to define the timeout for MPS connection. 0 means using the default timeout value of 60 seconds. 255 means MEBX waits until a connection has been established successfully.

WatchDog

Enable/disable watchdog timer for OS and BIOS.

3.4.7 USB Configuration

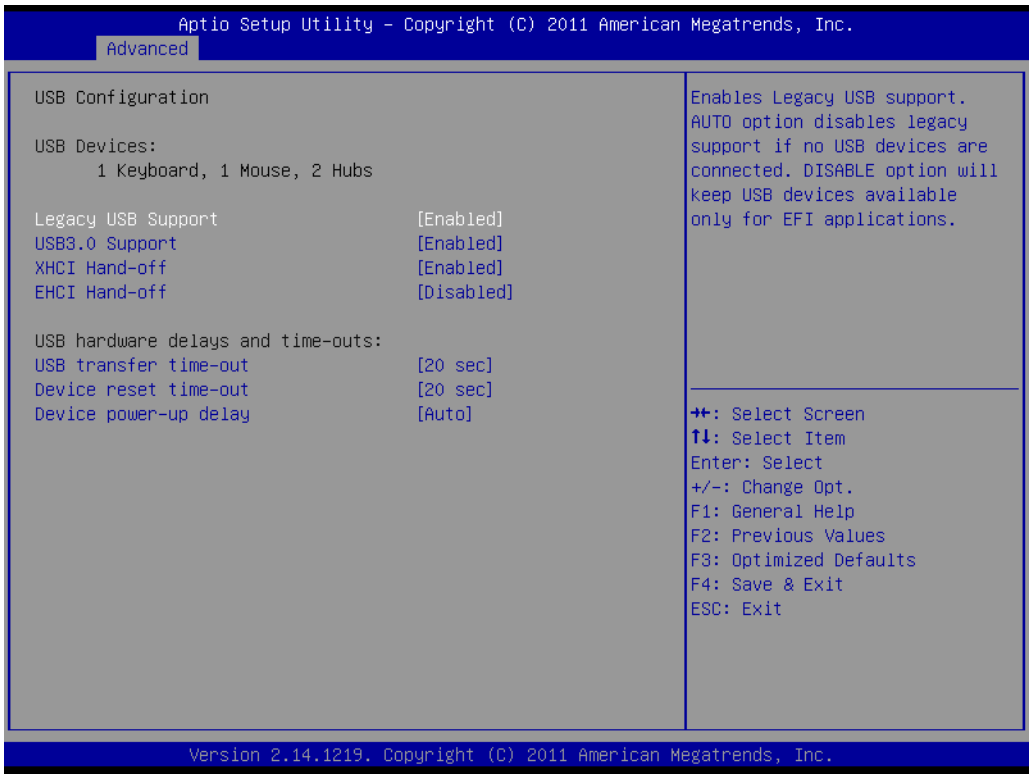


Figure 3.13 USB Configuration

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.

USB3.0 Support

Enables or disables USB 3.0 (XHCI) support

XHCI Hand-off

Enables or disables support for OS without XHCI hand-off features.

EHCI Hand-off

This enables or disables support for an OS without EHCI hand-off features.

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].

3.4.8 Super IO Configuration

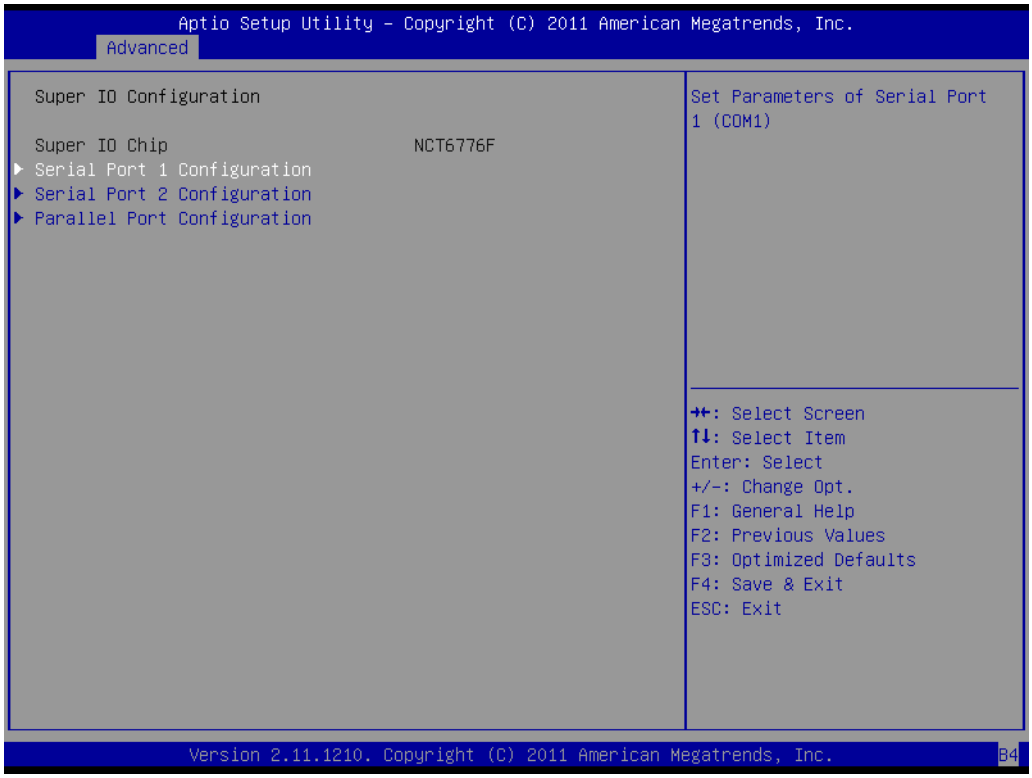


Figure 3.14 Super IO Configuration

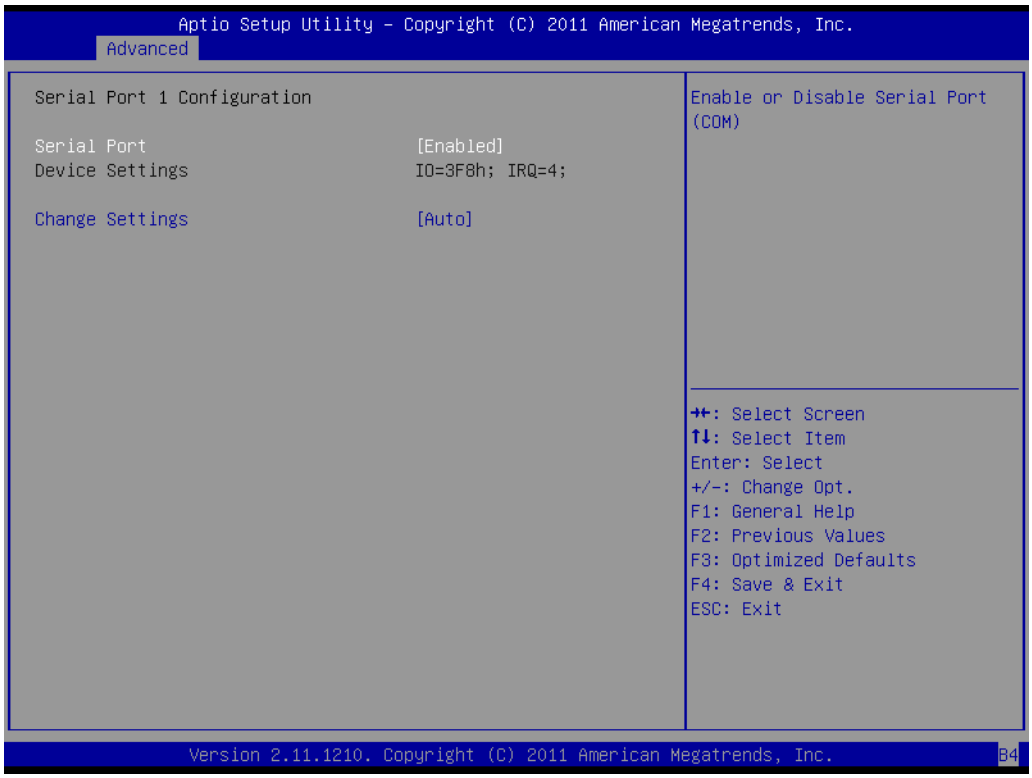


Figure 3.15 Serial Port 1 Configuration

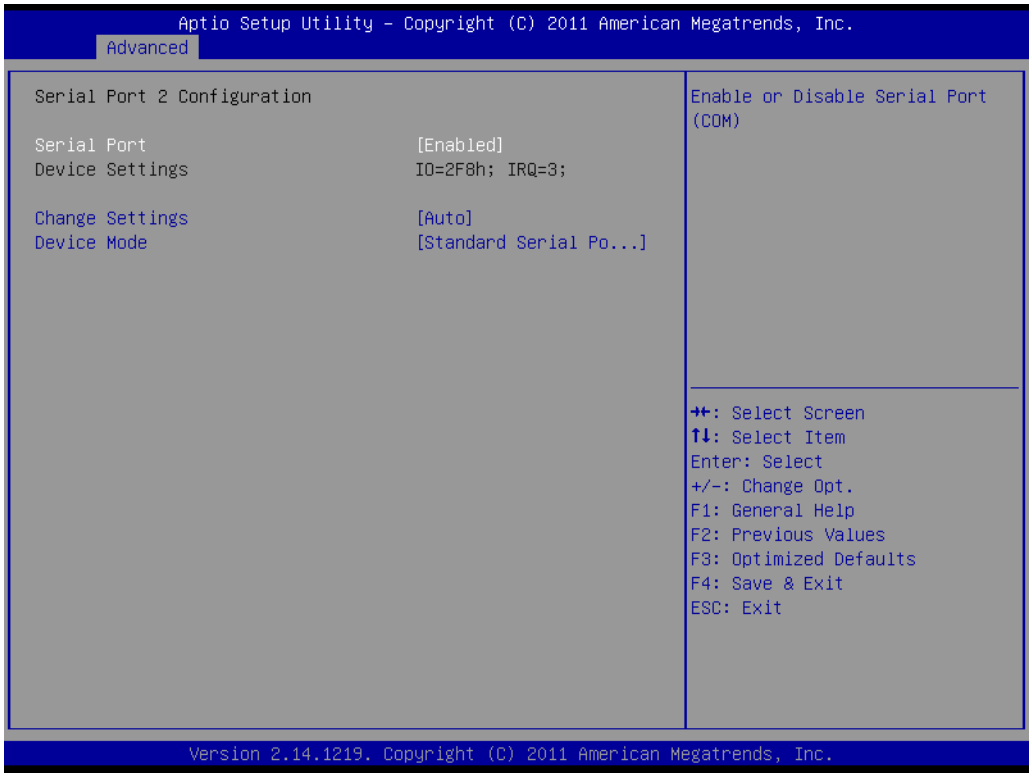


Figure 3.16 Serial Port 2 Configuration

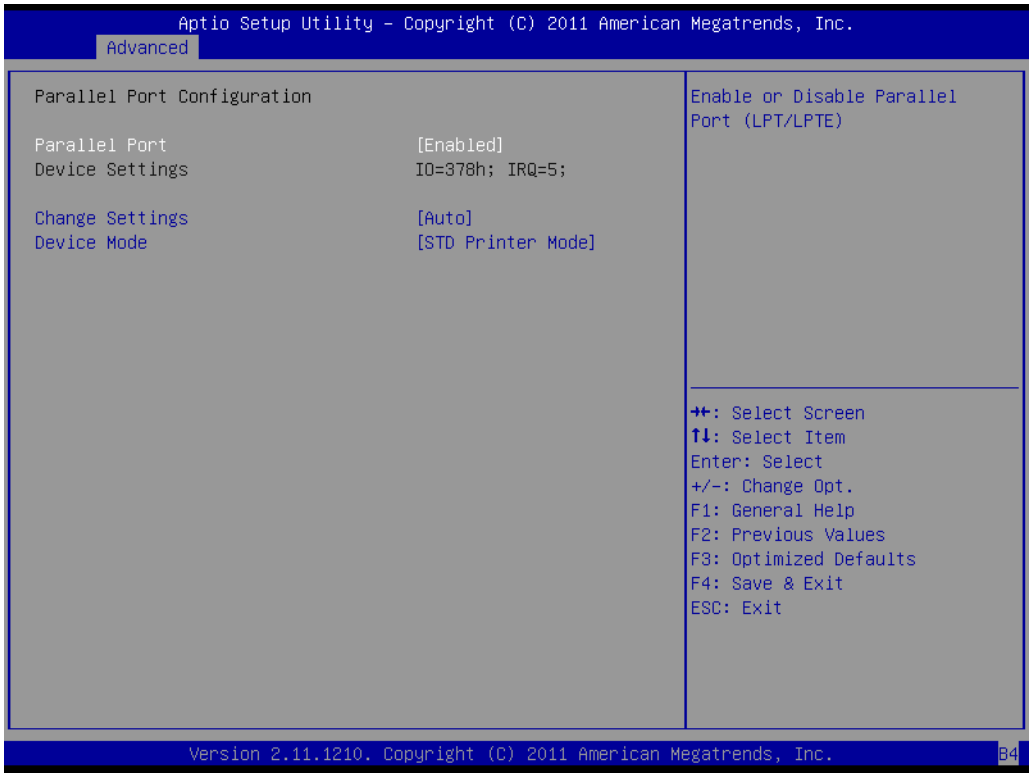


Figure 3.17 Parallel Configuration

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.

Device Mode

Serial port 2 could be selected as "Standard serial port mode", "IrDA 1.0 (HP SIR) mode", or "ASKIR mode".

Parallel Port

“Enable” or “disable” Parallel Port.

Change Settings

Select optimal settings for parallel port.

Device Mode

To change the printer port mode.

3.4.9 H/W Monitor

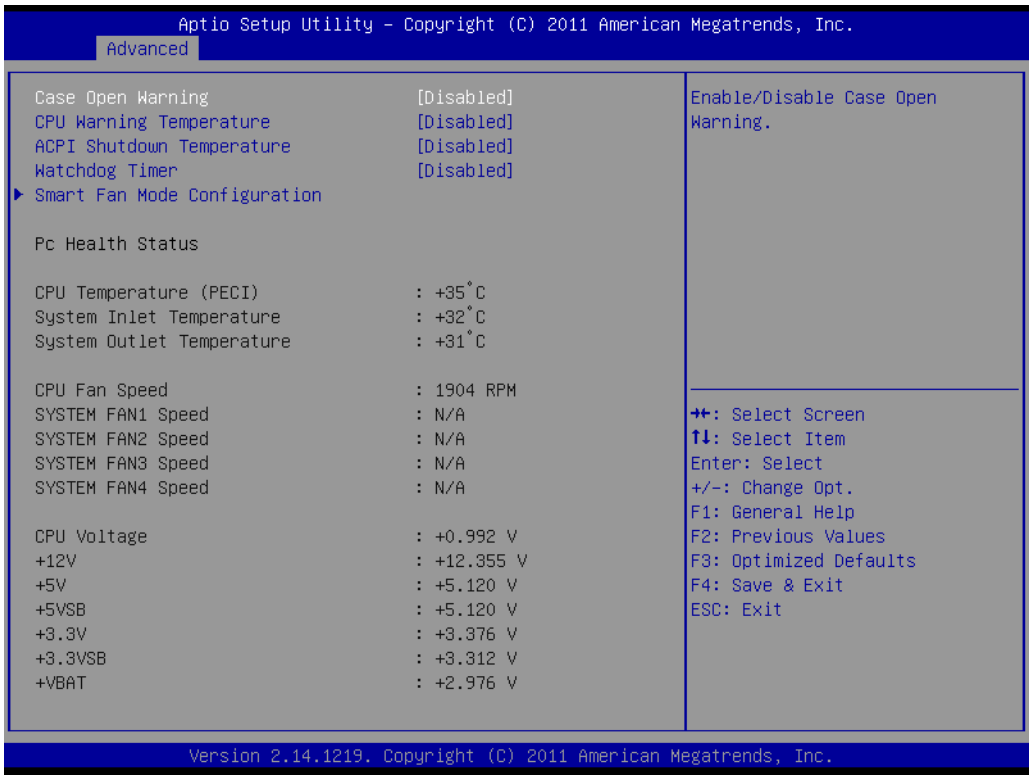


Figure 3.18 PC Health Status

CPU Temperature (PECI)

CPU temperature shown here is CPU T-junction temperature via PECI.

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.

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.

Watchdog Timer

Enable and disable the watchdog timer function

Smart Fan Mode Configuration

Enable or Disable CPU FAN and System FAN Mode to SMART FAN setting.

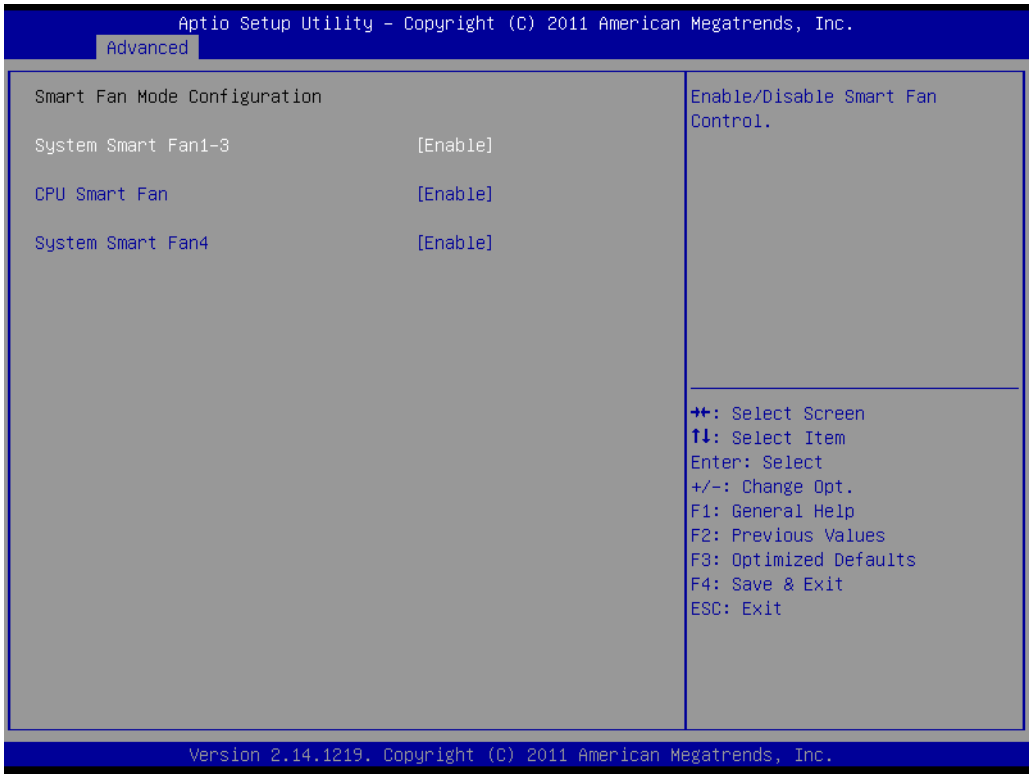


Figure 3.19 Smart Fan Mode Configuration

System Smart Fan1-3

To enable or disable system smart fan1~3.

CPU Smart Fan

To enable or disable CPU smart fan.

System Smart Fan4

To enable or disable system smart fan4.

3.4.10 Serial Port Console Redirection

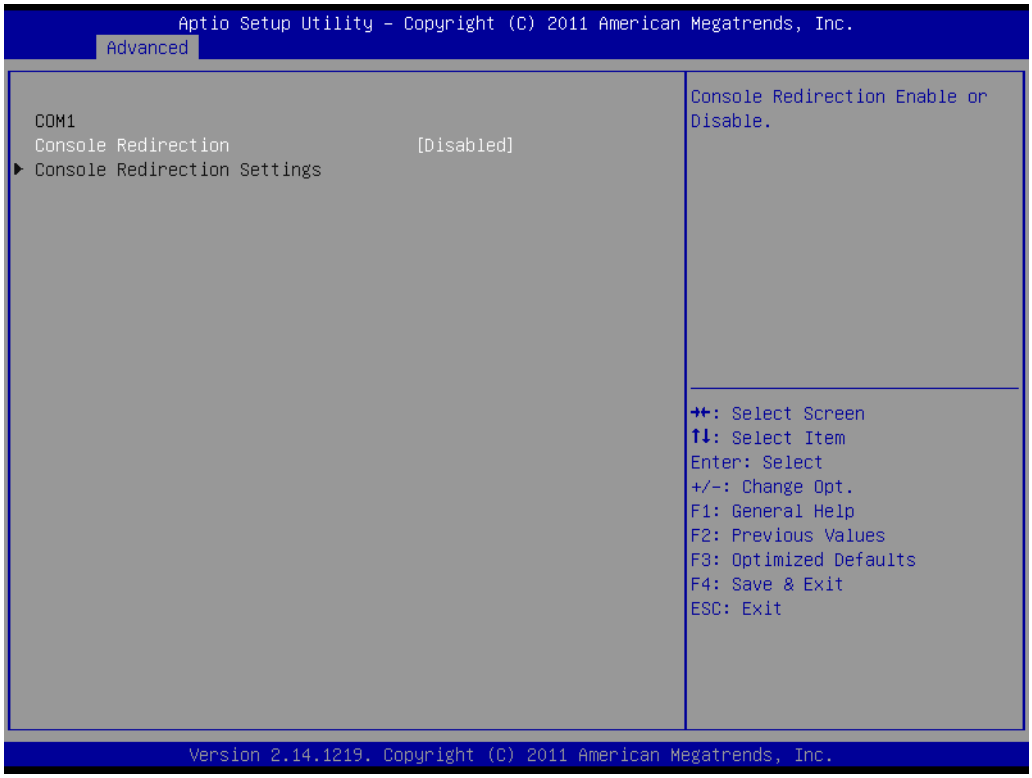


Figure 3.20 Serial Port Console Redirection

Console Redirection

Enable or disable the console redirection feature.

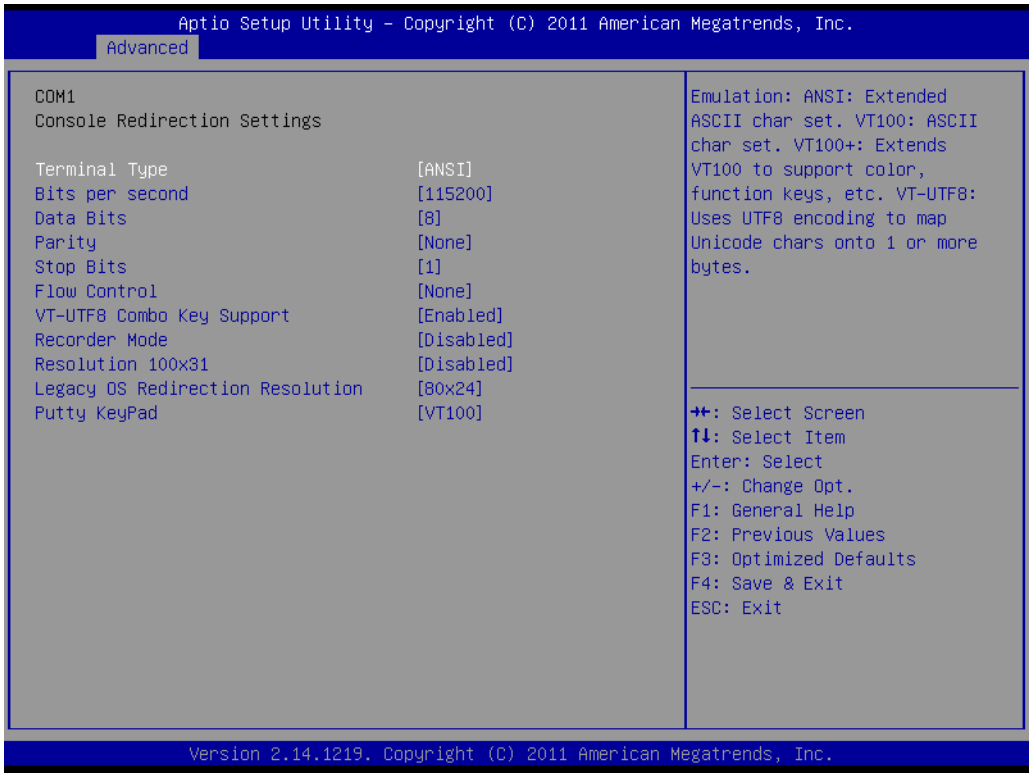


Figure 3.21 Console Redirection Setting

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.

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.

3.4.11 CPU PPM Configuration

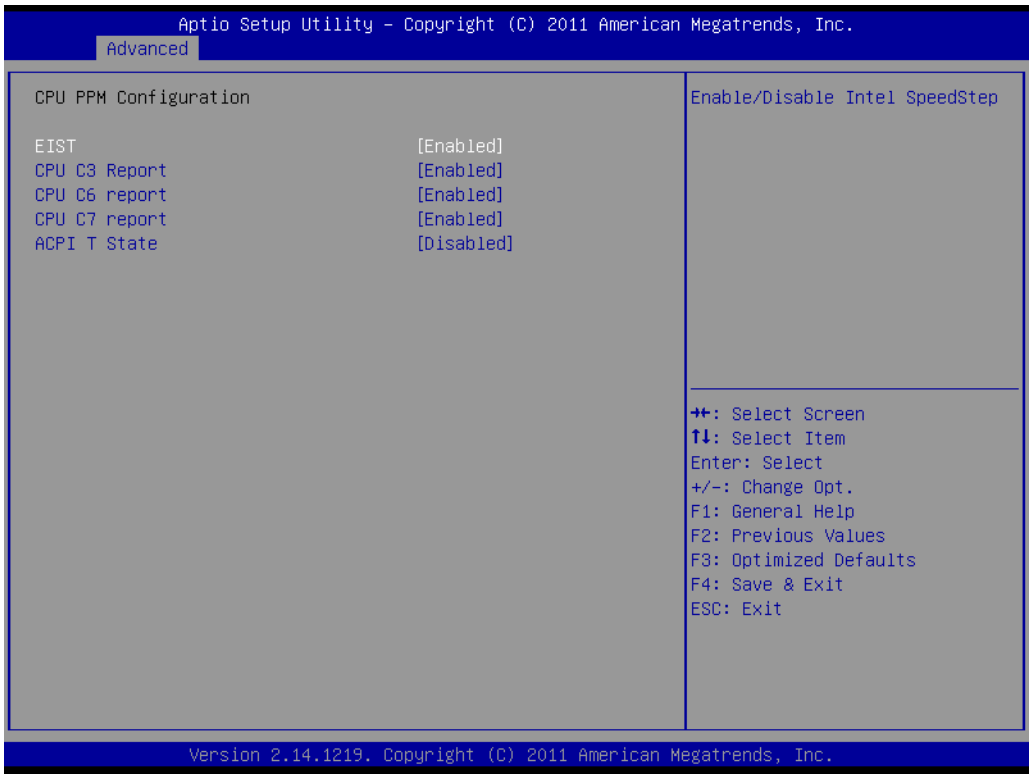


Figure 3.22 CPU PPM Configuration

EIST

Enable or disable Intel Speedstep function.

CPU C3 Report

Enable/disable CPU C3(ACPI C2) report to OS CPU

CPU C6 Report

Enable/disable CPU C6(ACPI C3) report to OS CPU

CPU C7 Report

Enable/disable CPU C7(ACPI C3) report to OS CPU

ACPI T State

Enable/disable ACPI T state

3.5 Chipset

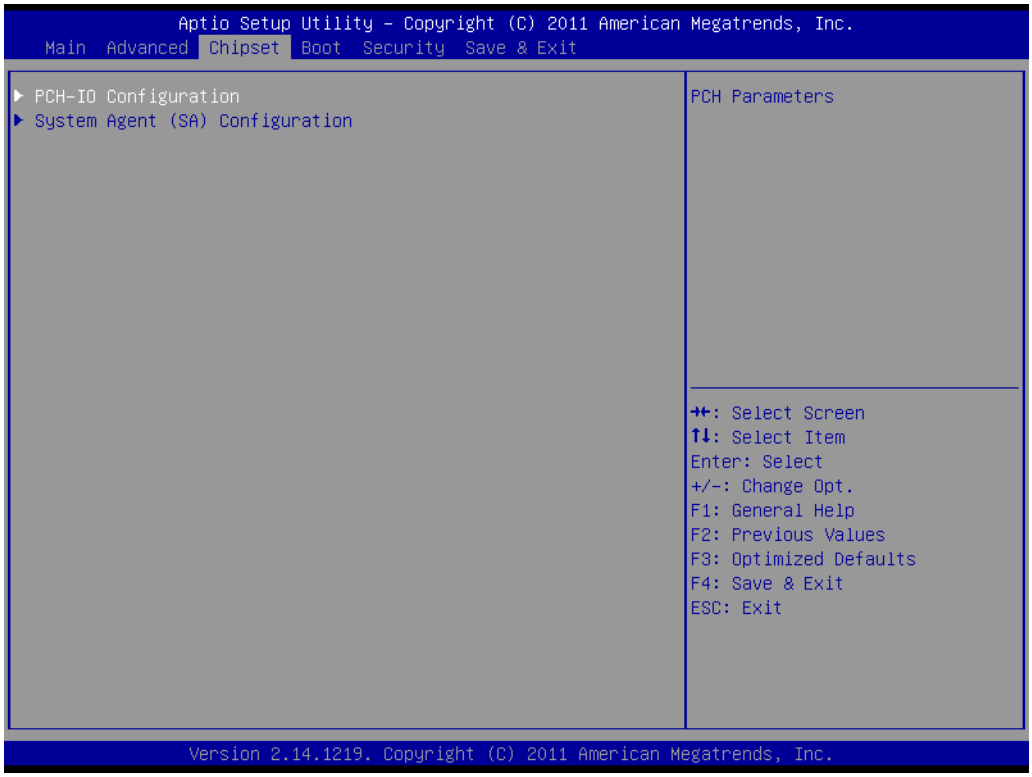


Figure 3.23 Chipset

3.5.1 PCH-IO Configuration

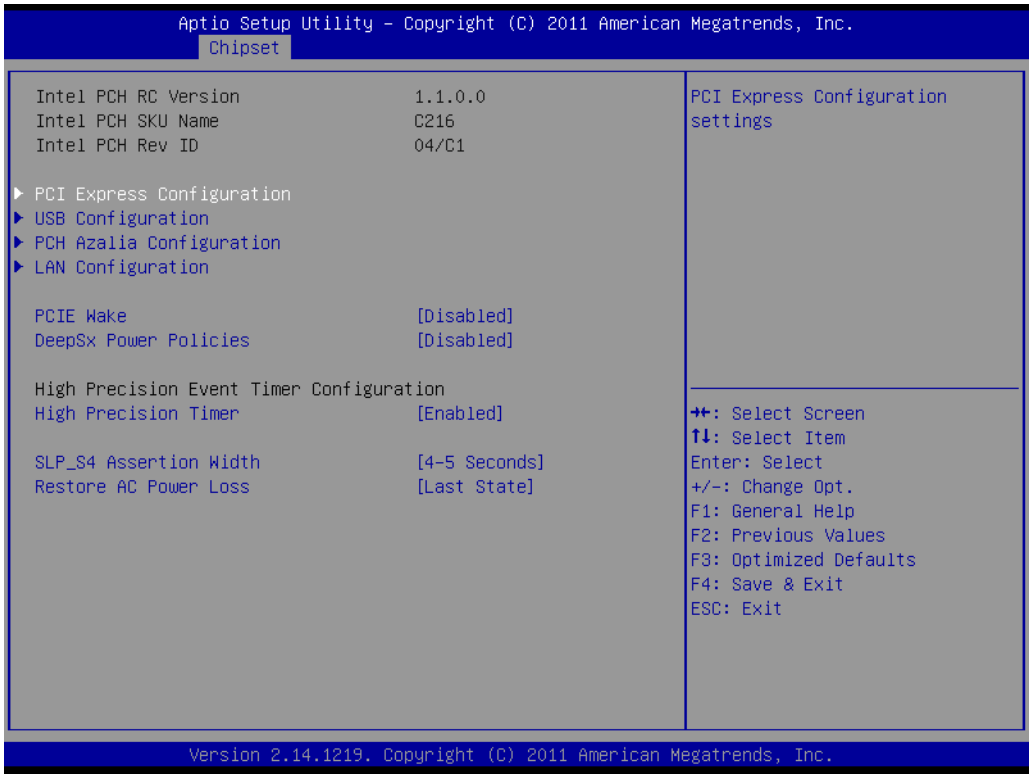


Figure 3.24 PCH-IO Configuration

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.

High Precision Timer

To enable or disable the high precision event timer.

SLP_S4 Assertion Width

To select a minimum assertion width of the SLP_S4 signal.

Restore 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".*

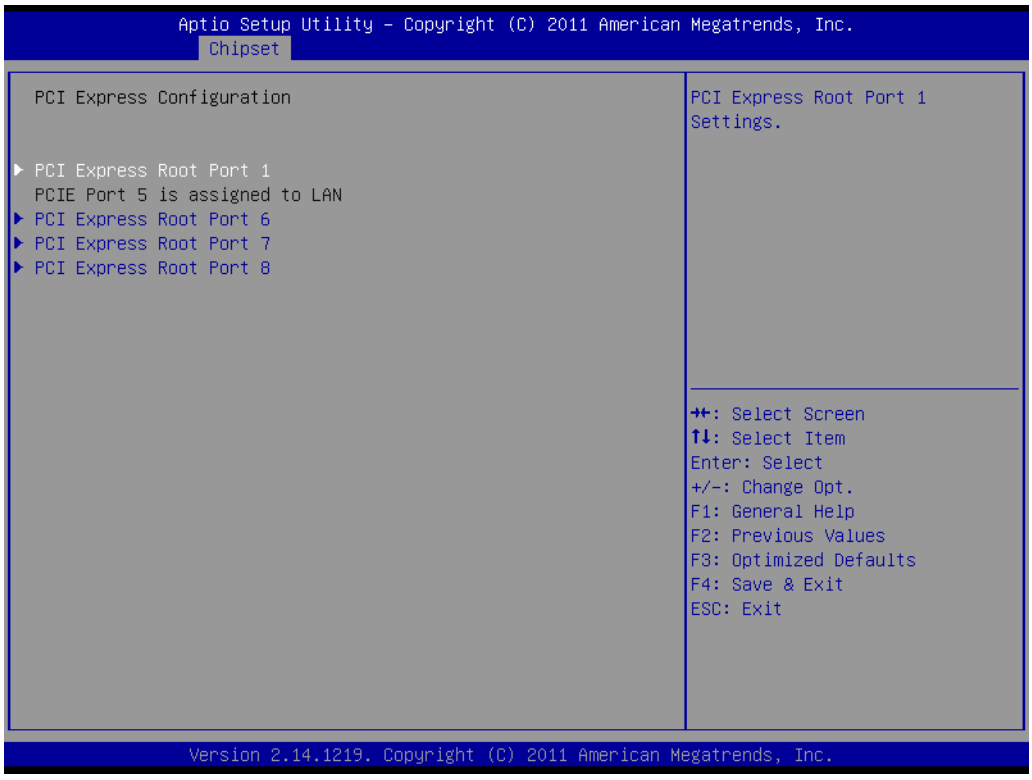


Figure 3.25 PCI Express Configuration

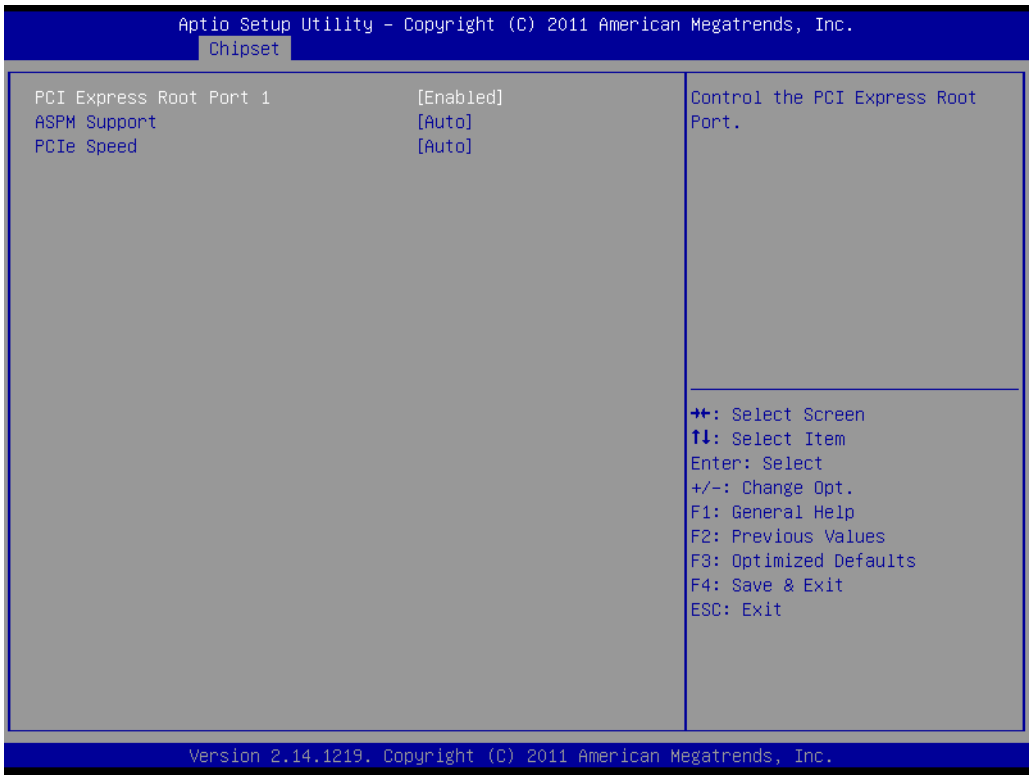


Figure 3.26 PCI Express Configuration

PCI Express Root Port 6 and 6~8

To enable or disable PCI Express Root Port 1 or 6~8.

ASPM Support

To set ASPM level for PCI Express Root POrt 1 or 6~8.

PCIe Speed

To set PCIe speed for PCI Express 1 or 6~8.

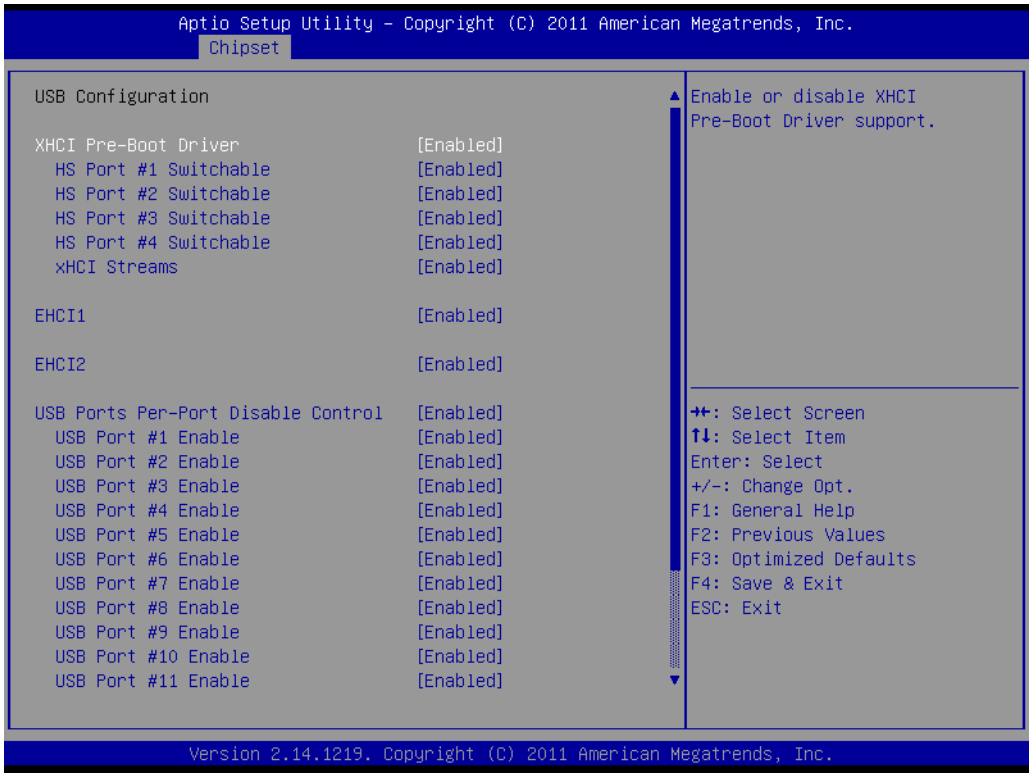


Figure 3.27 USB Configuration

XHCI Pre-Boot Driver

To enable or disable XHCI pre-boot driver support

HS Port #1~4 Switchable

To allow HS port switching between XHCI and EHCI. When this item is disabled, the port is routed to EHCI. If HS port is routed to XHCI, the corresponding SS port is enabled.

XHCI Streams

Enables or disables XHCI maximum primary stream array size.

EHCI1 and EHCI2

Enable or disable EHCI controller 1 or 2.

USB Ports Pre-Port Disable Control

Enable or disable USB port#1~14

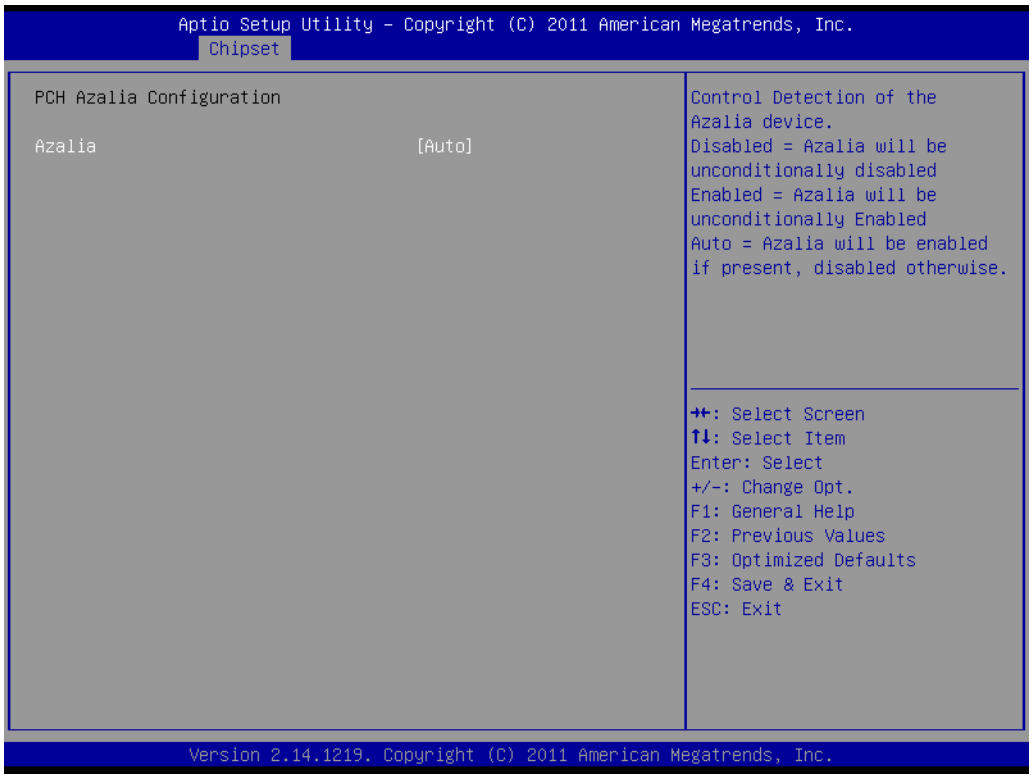


Figure 3.28 PCH Azalia

Azalia

Control detection of Azalia device.

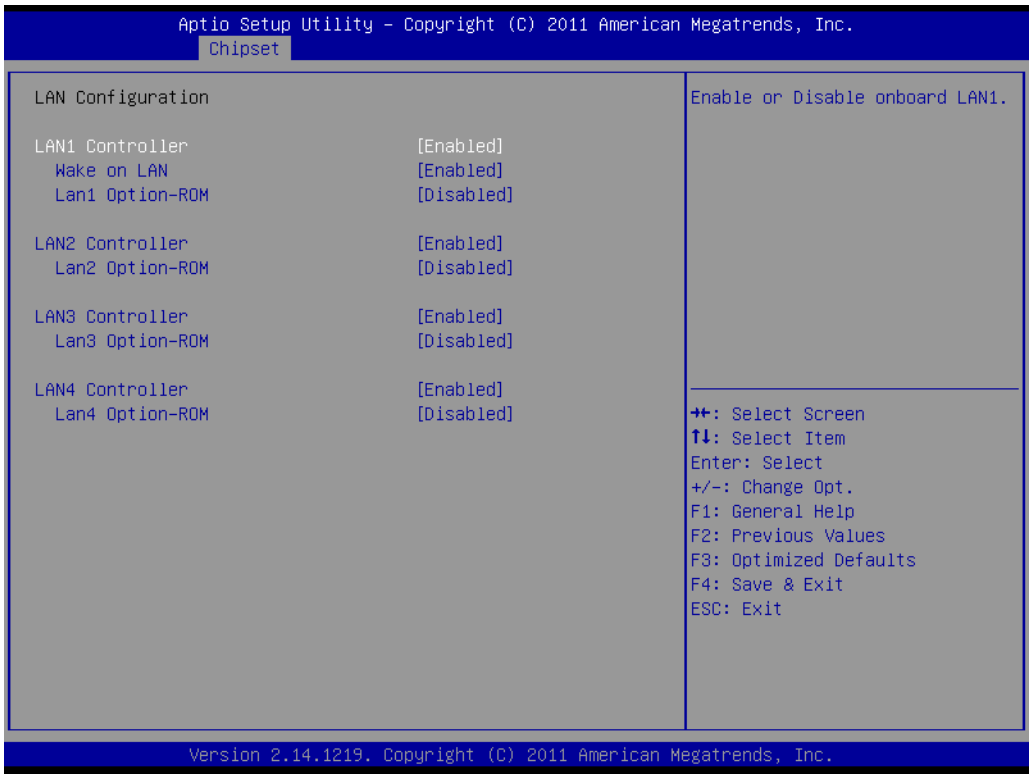


Figure 3.29 LAN Configuration

LAN1 Controller

Enable or disable onboard LAN1.

Wake on LAN

Enable or disable integrated LAN to wake the system.

LAN1 Option-ROM

Enable or disable boot options for legacy network devices.

LAN2~4 Controller

Enable or disable onboard LAN1.

LAN2~4 Option-ROM

Enable or disable boot options for legacy network devices.

3.5.2 System Agent (SA) Configuration

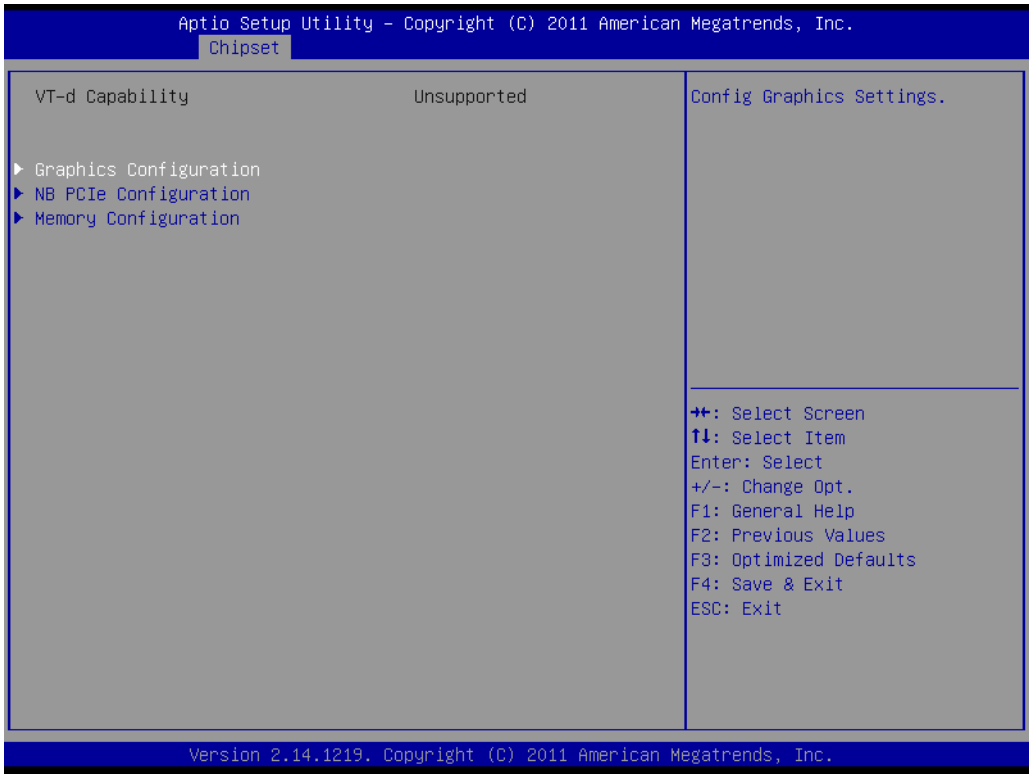


Figure 3.30 System Agent (SA) Configuration

VT-d

To enable or disable VT-d function on MCH.

3.5.2.1 Graphics Configuration

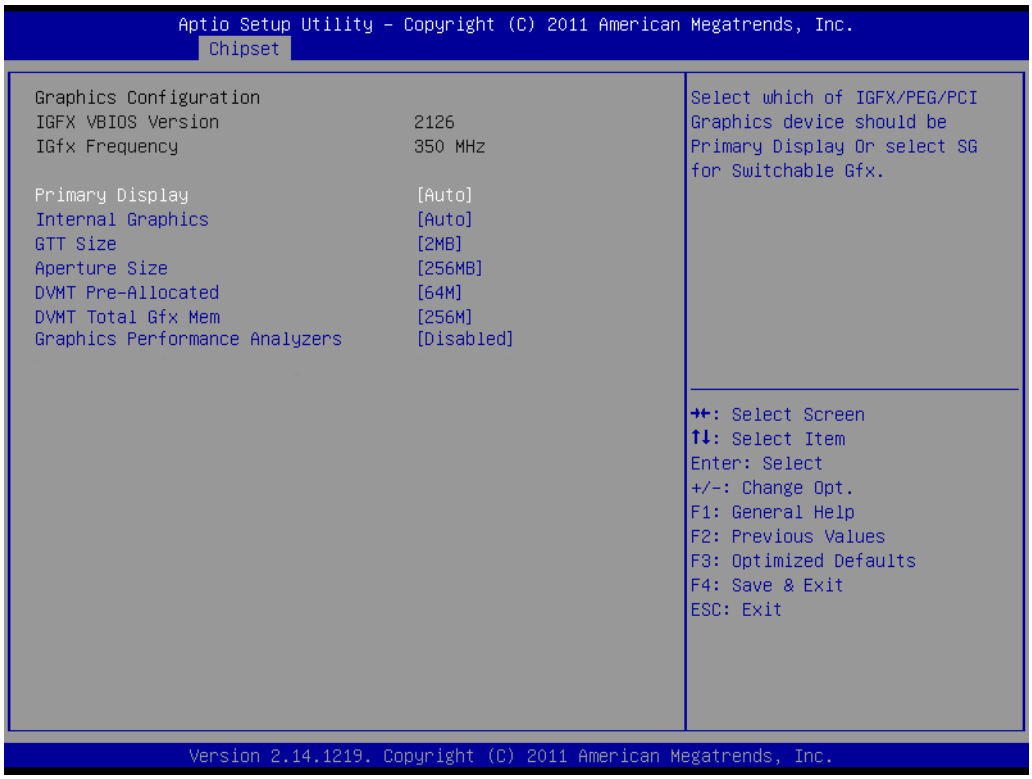


Figure 3.31 Graphics Configuration

Primary Display

To select which graphics device, IGFX/PEG/PCI should be primary display or select SG for switchable Gfx.

Internal Graphics

To enable/disable/Auto internal graphics.

GTT Size

This item sets the amount of main memory that is pre-allocated to support the Internal Graphics Translation Table.

Aperture Size

This item is to determine the size of the graphics memory aperture in function 0 and in the trusted space.

DVMT Pre-Allocated

This item is to select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

DVMT Total Gfx Mem

This item is to select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

Graphics Performance Analyzers

To enable or disable Intel Graphics Performance Analyzers Counters. When the setup option is set to ”Enable”, BIOS must skip the PAVP configuration steps. When the setup option is set to “Disable”, BIOS must perform PAVP steps.

3.5.2.2 NB PCIe Configuration

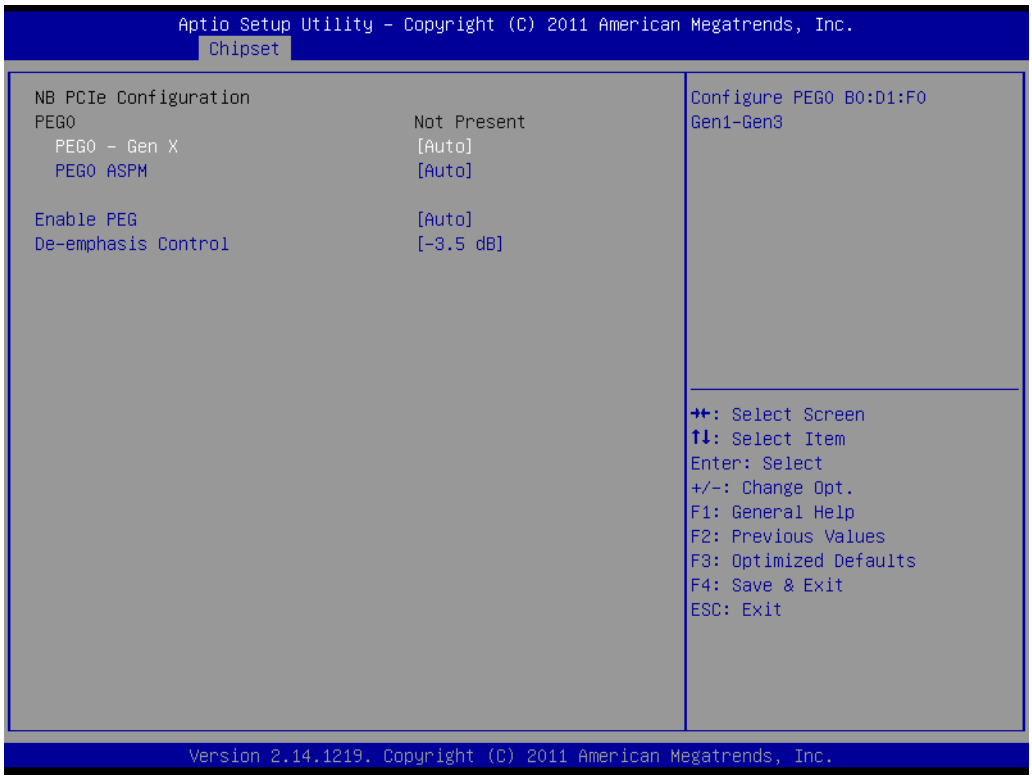


Figure 3.32 LAN configuration screen

PEG0 - Genx

To configure PEG from Gen1 to Gen3.

PEG0 ASPM

To control ASPM support for the PEG Device, and this item has no effect if PEG is not the currently active device.

De-emphasis control

To configure the De-emphasis control on PEG.

3.5.2.3 Memory Configuration

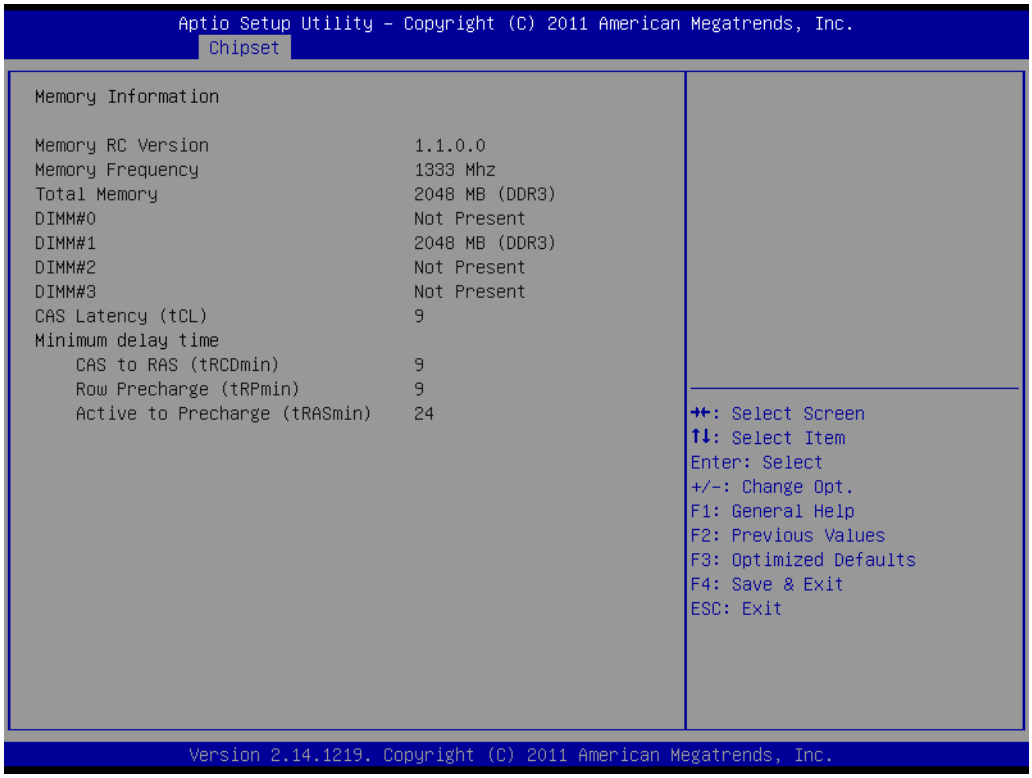


Figure 3.33 Memory Configuration

ECC Support

Enables or disables DDR3 ECC support.

3.6 Boot

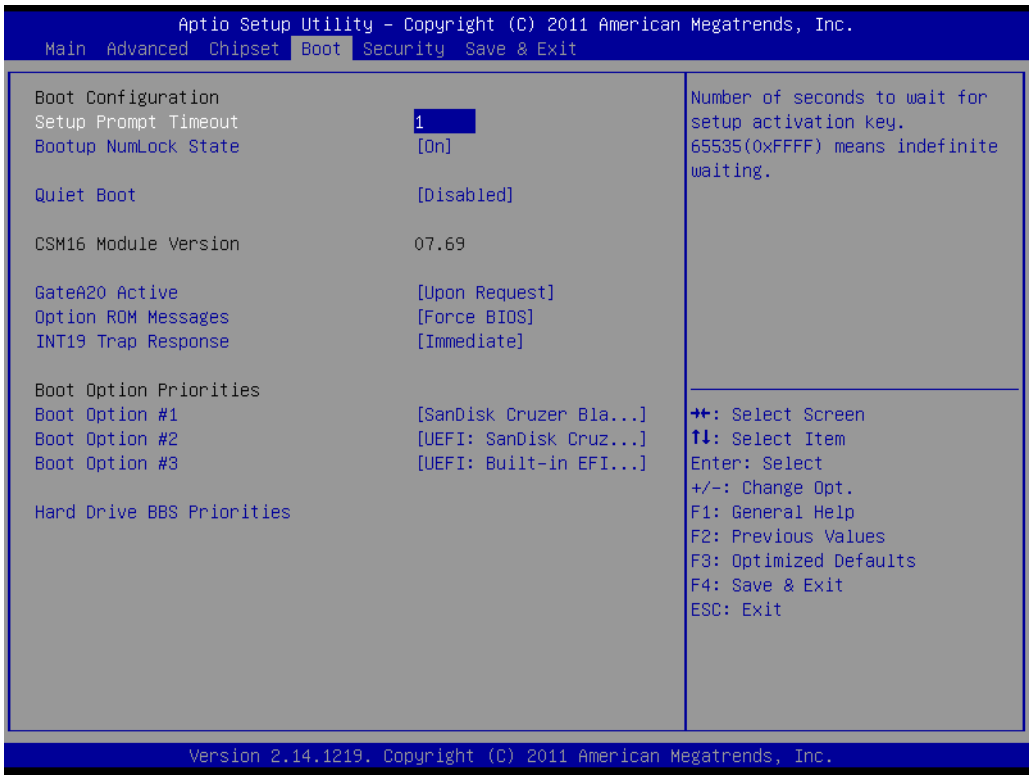


Figure 3.34 Boot

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.

GateA20 Active

This items is useful When RT code is executed above 1MB. When this it's set as "UPON RQUEST", GA20 can be disabled using BIOS services. When it's set as "Always", it does not allow disabling 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 Priorities

Choose boot priority from boot device.

3.7 Security

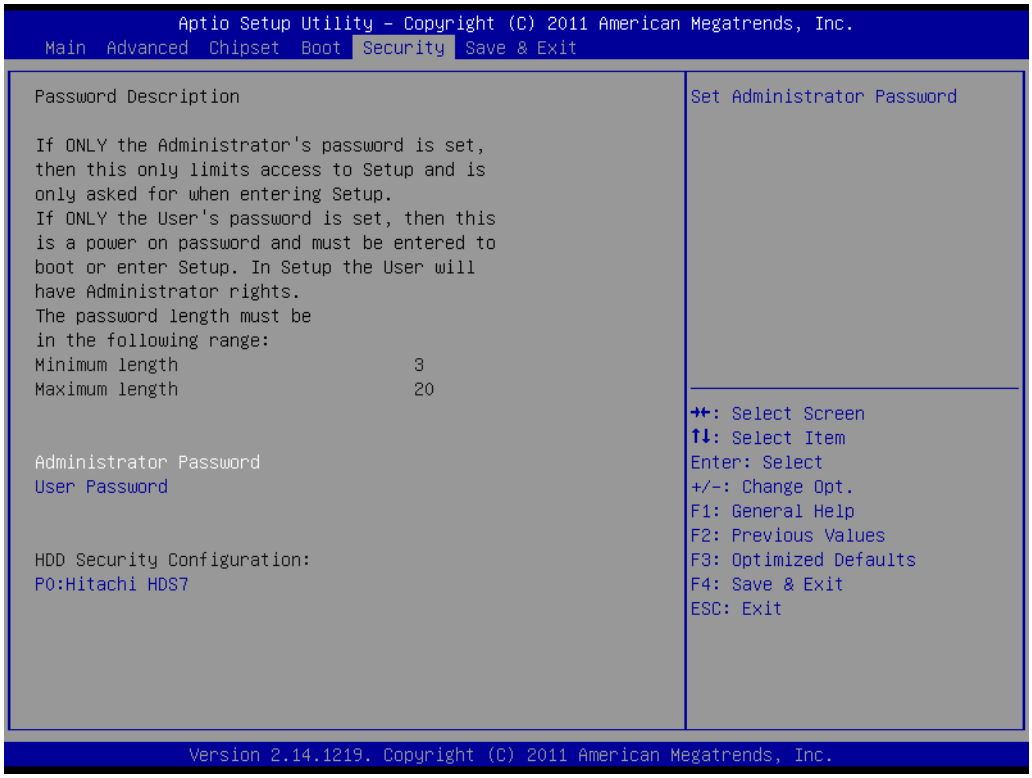


Figure 3.35 Security

Select Security Setup from the ASMB-782 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>.

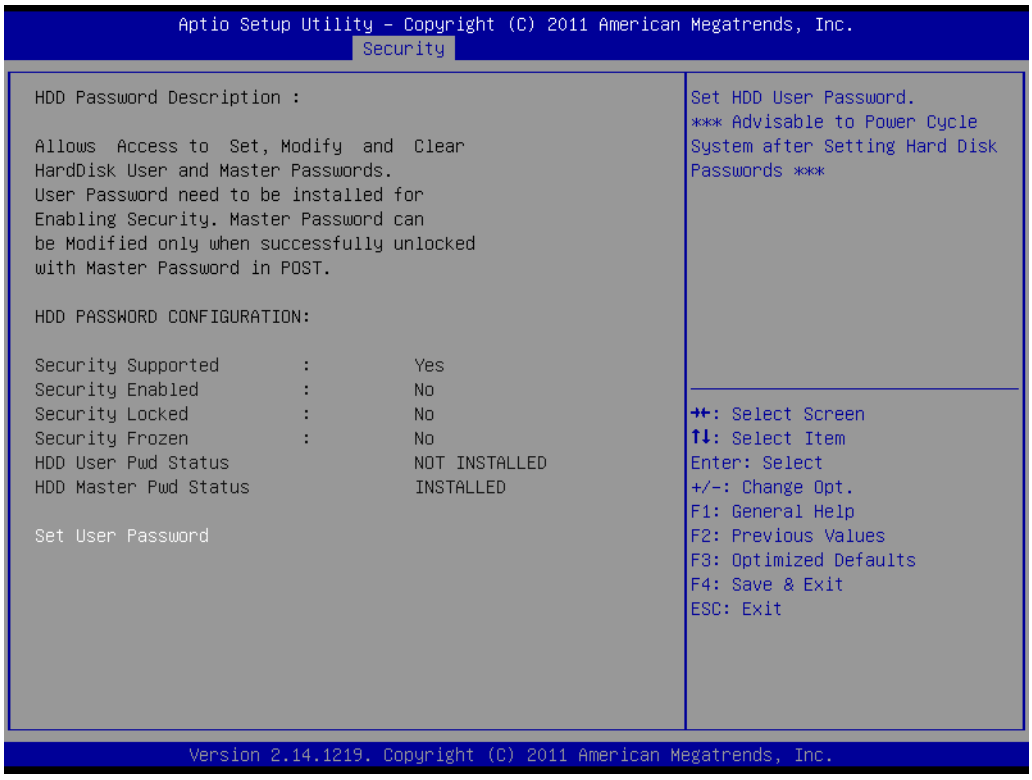


Figure 3.36 HDD Password Configuration

HDD Password Configuration

This item sets HDD password.

3.8 Save & Exit

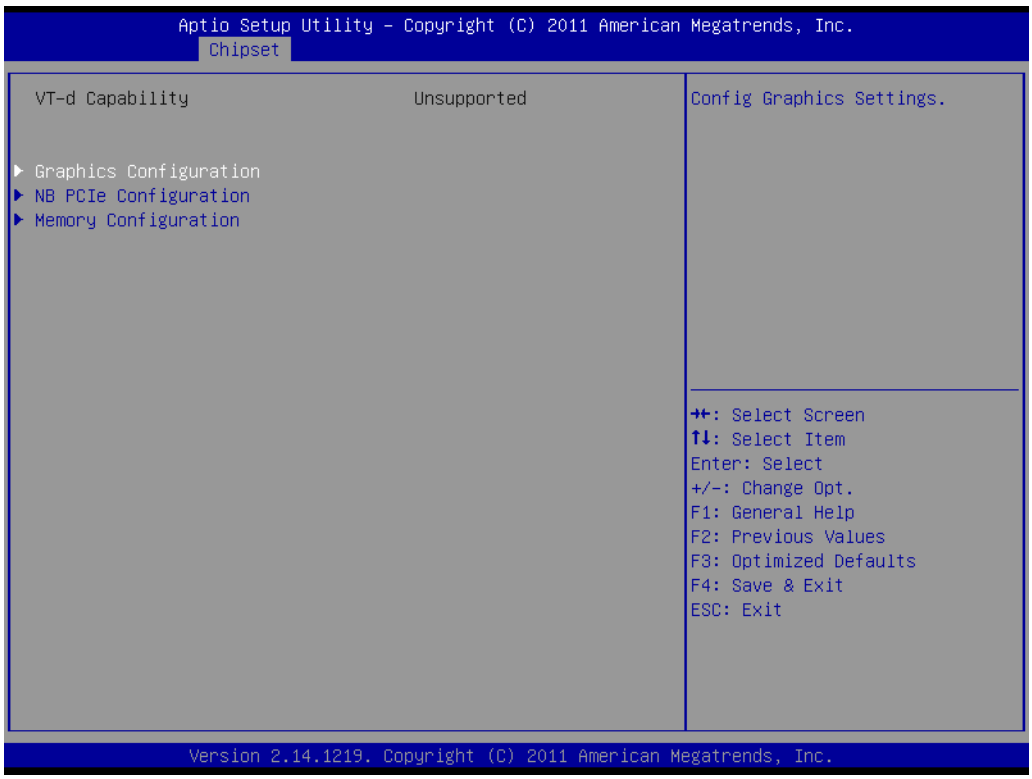


Figure 3.37 Save & Exit

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.

Boot Override

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-782 are located on the software installation CD.

Note! *The files on the software installation CD 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:

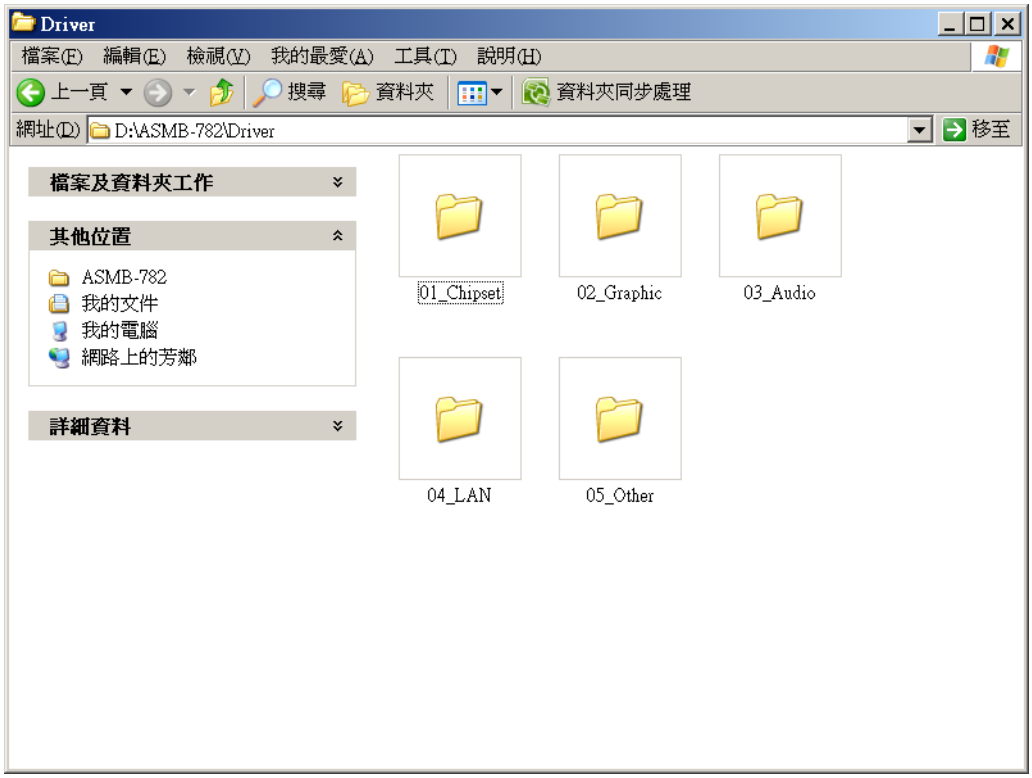
- Core PCI PnP services
- Serial ATA interface support
- USB 1.1/2.0 support (USB 2.0 driver needs to be installed separately for Windows 98)
- USB 3.0 driver support is for Windows 7 and 2008 only. Under the other Windows OS (for example XP or 2003), USB 3.0 port will be operated at USB 2.0 speed.
- 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:*

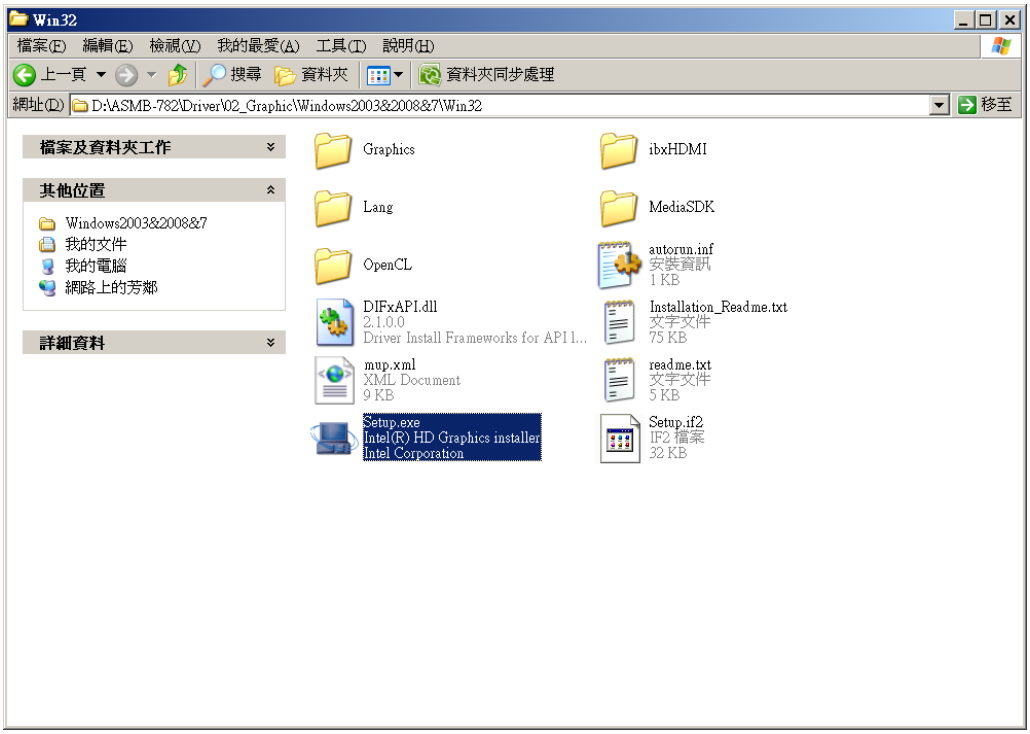
- *Windows® server 2003 R2 (32-bit)*
- *Windows® server 2003 R2 (64-bit)*
- *Windows® server 2008 R2 (64-bit)*
- *Windows® 7 SP1 (32-bit)*
- *Windows® 7 SP1 (64-bit)*
- *Windows® XP Professional SP3 (32-bit)*
- *Windows® XP Professional SP3 (64-bit)*

4.3 Windows XP / Windows 7 Driver Setup

1. Insert the driver CD into your system's CD-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.



2. Click setup to execute program.



Chapter 5

VGA Setup

5.1 Introduction

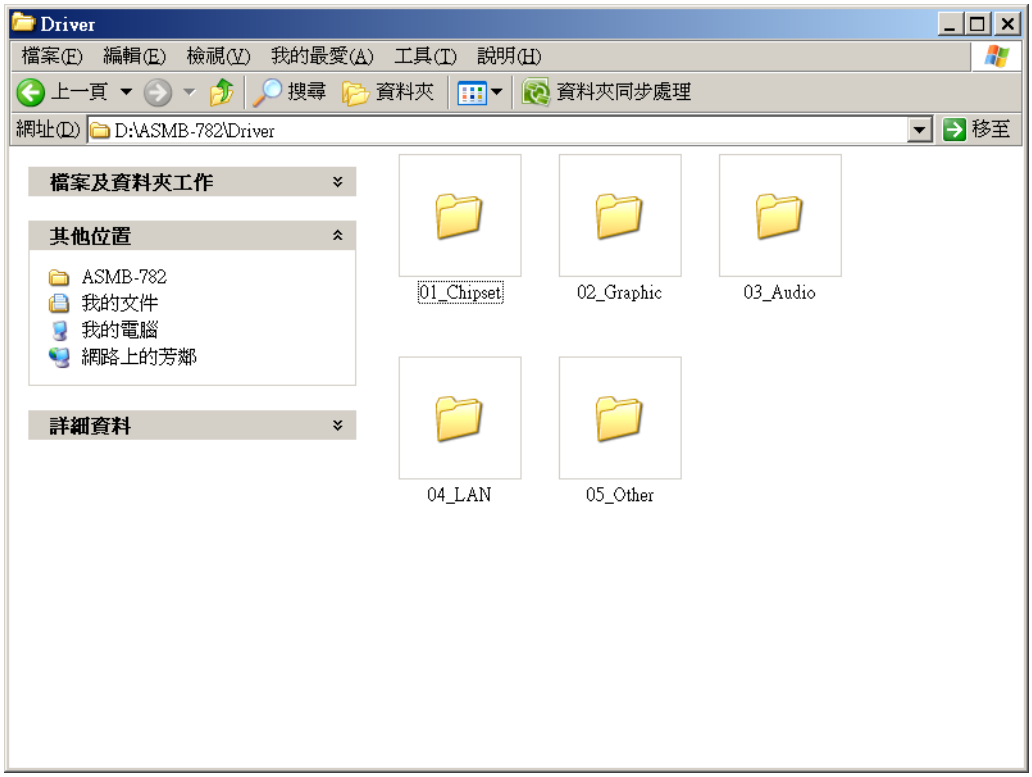
The 2nd Gen Intel® Core™ i processors are embedded with integrated graphics controller. You need to install the VGA driver to enable this function, which includes the following features:

- 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 XP/Windows 7 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 CD into your system's CD-ROM drive. You can see the driver folders items. Navigate to the "02-Graphic" folder and click the executable file to complete the installation of the drivers for Windows® 7, XP.



Note! *Please use Windows 2008 server R2(WinS08R2) VGA driver version for Windows 7 VGA driver.*

Chapter 6

LAN Configuration

6.1 Introduction

The ASMB-782 has four Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (GbE LAN1: Intel 82579LM; GbE LAN2~4: Intel 82574L (LAN3/4 is optional for G4 SKU) 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

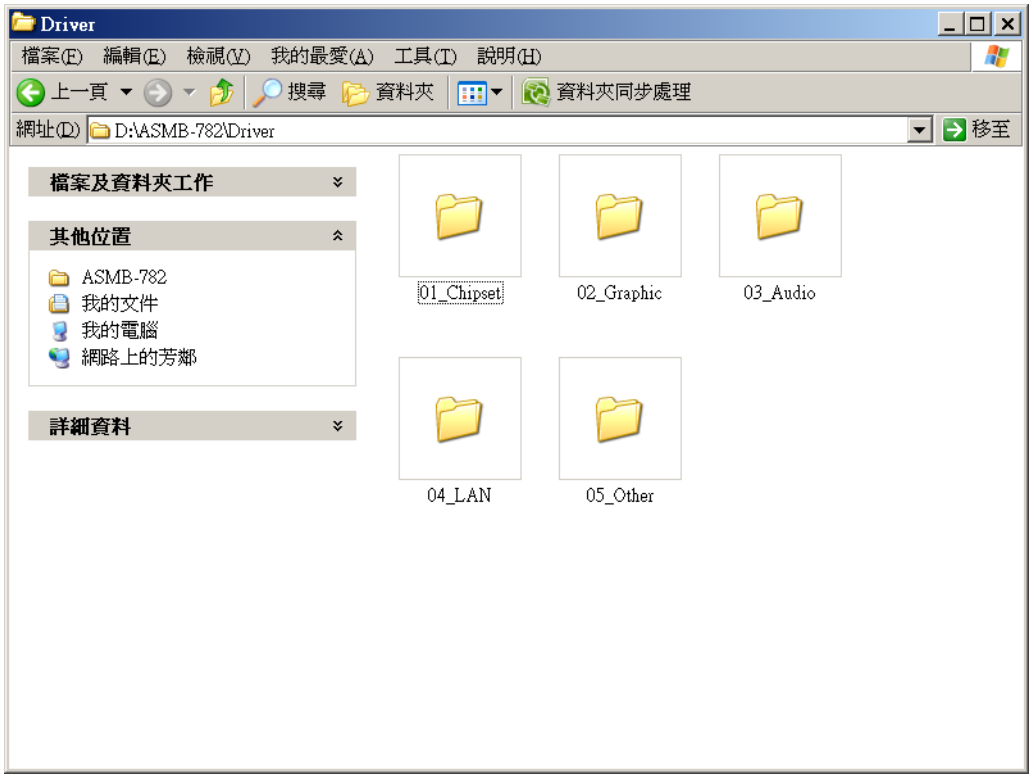
6.3 Installation

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 Win XP /Win 7 Driver Setup (LAN)

Insert the driver CD into your system's CD-ROM drive. Select folder "04-LAN" then click the proper LAN driver for the OS.



Appendix A

Programming the Watchdog Timer

The ASMB-782'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 or 1 to 255 minutes
- 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).

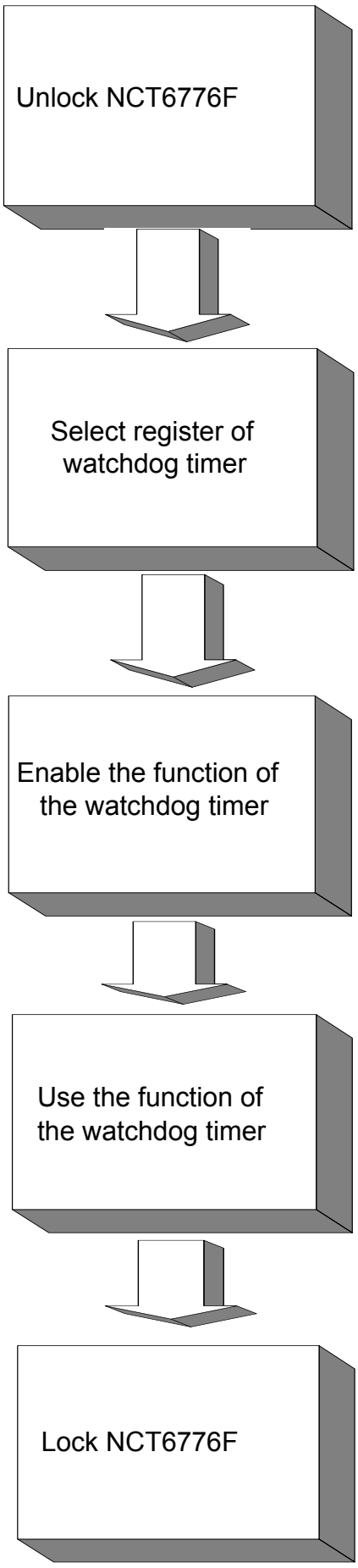

Unlock NCT6776F
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock NCT6776F

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. 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] 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] Bit 5: Write 1 to generate a timeout signal immediately and automatically return to 0. [default=0] 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 Parallel Port (LPT1)

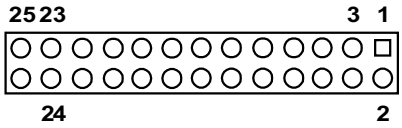


Table B.1: Parallel Port (LPT1)			
Pin	**Signal**	**Pin**	**Signal**
1	STROBE*	14	GND*
2	AFD*	15	D6
3	D0	16	IGND
4	ERR*	17	D7
5	D1	18	GND
6	INIT*	19	ACK*
7	D2	20	GND
8	SLIN*	21	BUSY
9	D3	22	GND
10	GND	23	PE
11	D4	24	GND
12	GND	25	SLCT
13	D5	26	N/C

B.2 USB2.0 Header (USB7~12)

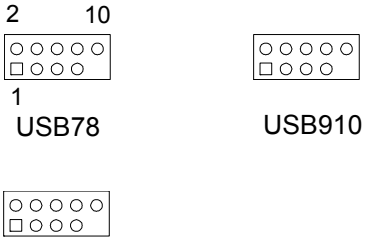


Table B.2: USB Header (USB7~12)			
Pin	**Signal**	**Pin**	**Signal**
1	USB_VCC5	2	USB_VCC5
3	USB_D-	4	USB_D-
5	USB_D+	6	USB_D+
7	GND	8	GND
9	Key	10	N/C

B.3 USB3.0 Header (USB34)

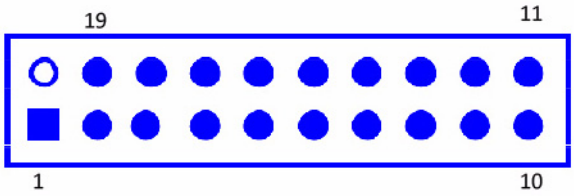


Table B.3: USB 3.0 Header (USB34)			
Pin	**Signal**	**Pin**	**Signal**
1	USBV2	20	NC
2	EUSB3_P3RXN	19	USBV2
3	EUSB3_P3RXP	18	EUSB3_P4RXN
4	GND	17	EUSB3_P4RXP
5	EUSB3_P3TXN	16	GND
6	EUSB3_P3TXP	15	EUSB3_P4TXN
7	GND	14	EUSB3_P4TXP
8	USB3_z_N	13	GND
9	USB3_z_P	12	USB4_z_N
10	USB_OC	11	USB4_z_P

B.4 VGA Connector (VGA)

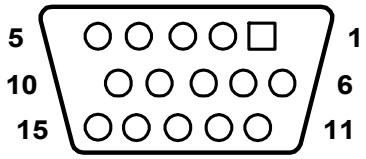
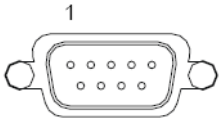
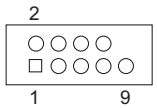


Table B.4: VGA Connector (VGA)			
Pin	**Signal**	**Pin**	**Signal**
1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	SDT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	SCK
8	GND		

B.5 RS-232 Interface (COM12)



COM1



COM2

Table B.5: RS-232 Interface (COM12)

COM1		COM2	
Pin	**Signal**	**Pin**	**Signal**
1	DCD	1	DCD
2	SIN	2	DSR
3	SOUT	3	SIN
4	DTR	4	RTS
5	GND	5	SOUT
6	DSR	6	CTS
7	RTS	7	DTR
8	CTS	8	RI
9	RI	9	GND

B.6 PS/2 Keyboard and Mouse Connector (KBMS1)

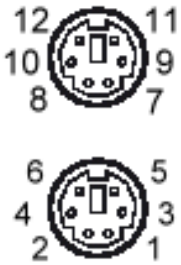


Table B.6: Keyboard and Mouse Connector (KBMS1)

Pin	Signal
1	KB DATA
2	N/C
3	GND
4	KB VCC
5	KB CLK
6	N/C
7	M_DATA
8	N/C
9	GND
10	M_VCC
11	M_CLK
12	N/C

B.7 External Keyboard and Mouse Connector (KBMS2)

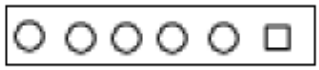


Table B.7: External Keyboard and Mouse Connector (KBMS2)	
Pin	**Signal**
1	KB CLK
2	KB DATA
3	MS DATA
4	GND
5	VCC
6	MS CLK

B.8 System Fan Power Connector (SYSFAN1~4)

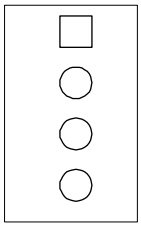


Table B.8: Fan Power Connector (SYSFAN1/SYSFAN2)	
Pin	**Signal**
1	GND
2	+12 V
3	DETECT
4	PWM

B.9 Power LED (JFP1)

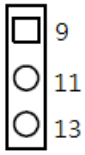


Table B.9: Power LED (JFP1)	
Pin	**Function**
9	LED power (3.3 V)
11	NC
13	Ground

B.10 External Speaker Connector (JFP1)

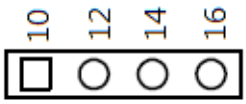


Table B.10: External Speaker Connector (JFP1)	
Pin	**Function**
10	SPK_VCC
12	SPK_OBS
14	SPK_BUZ
16	SPK_OUT

B.11 Reset Connector (JFP1)

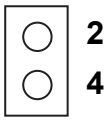


Table B.11: Reset Connector (JFP1)	
Pin	**Signal**
2	RESET
4	GND

B.12 HDD LED Connector (JFP1)

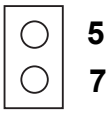


Table B.12: HDD LED Connector (JFP1)	
Pin	**Signal**
5	HDD_LED+
7	HDD_LED-

B.13 ATX Soft Power Switch (JFP1)

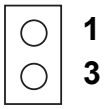


Table B.13: ATX Soft Power Switch (JFP1)	
Pin	**Signal**
1	PWR-BTN
3	GND

B.14 Front panel SMBus connector (FP_SMB1)

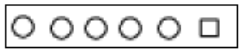


Table B.14: Front panel SMBus connector(FP_SMB1)	
Pin	**Signal**
1	GND
2	SMB_FP_ALERT
3	SMB_FP_DATA
4	SMB_FP_CLK
5	NC
6	+3.3 V

B.15 USB/LAN ports (LAN1_USB12 and LAN2_USB34)

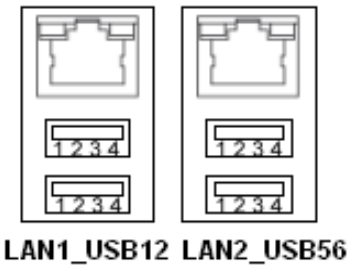


Table B.15: USB Port			
Pin	**Signal**	**Pin**	**Signal**
1	VCC_DUAL	3	Data0+
2	Data0-	4	GND

Table B.16: 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.16 Front Panel Audio Connector (FPAUD1)

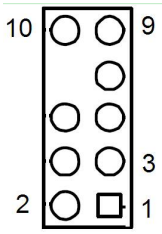


Table B.17: Front Panel Audio Connector (FPAUD1)	
Pin	**Signal**
1	MIC2_L
2	AGND
3	MIC2_R
4	PRESENSE
5	LIN2_R
6	MIC_DEC
7	FIO_JD
8	N/A
9	LIN2_L
10	LINEOUT2_DEC

B.17 8-pin Alarm Board Connector (VOLT1)

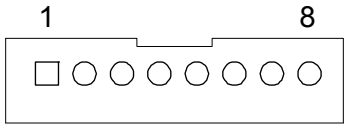


Table B.18: 8-pin Alarm Board Connector (VOLT1)			
Pin	**Signal**	**Pin**	**Signal**
1	5VSB	5	VCC
2	GND	6	VCC3
3	GND	7	-12V
4	-5V	8	+12V

B.18 Case Open Connector (JFP1)

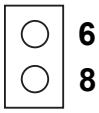


Table B.19: Case Open Connector (JFP1)	
Pin	**Signal**
6	CASEOP
8	GND

B.19 Front Panel LAN LED Connector (LAN_LED1/2)

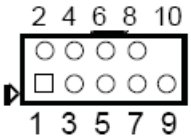


Table B.20: LAN LED Connector (LAN_LED1/2)			
Pin	**Signal**	**Pin**	**Signal**
1	LAN1/3_LED0_ACT	2	LAN2/4_LED1_ACT
3	VCC3_LAN1/3LED	4	VCC3_LAN2/4LED
5	LAN1/3_LED1_1000M	6	LAN2/4_LED2_1000
7	LAN1/3_LED2_100M	8	LAN2/4_LED0_100
9	VCC3	10	N/C

B.20 SPI_CN1: SPI flash card pin connector

Table B.21: 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.21 System I/O Ports

Table B.22: System I/O ports

Addr. range (Hex)	Device
000-01F	DMA controller
020-021	Interrupt controller 1, programmable interrupt controller
022-03F	Motherboard resources
040-05F	8254 timer
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI) mask
081-09F	DMA page register
0A0-0BF	Interrupt controller 2, programmable interrupt controller
0C0-0DF	DMA controller
0F0-0FF	Numeric data processor
A35-A36	On-board hardware monitor
2F8-2FF	Serial port 2
378-37F	Printer port (LPT1)
3B0-3BB	Intel HD Graphics
3C0-3DF	Intel HD Graphics
3F8-3FF	Serial port 1

B.22 Interrupt Assignments

Table B.23: 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 7 series/C216 Chipset Family SMBus Host 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.23 1st MB Memory Map

Table B.24: 1st MB memory map

Addr. range (Hex)	Device
E0000h - FFFFFh	BIOS
CC000h - DFFFFh	Unused
C0000h - CBFFFh	VGA BIOS
A0000h - BFFFFh	Video Memory
00000h - 9FFFFh	Base memory

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