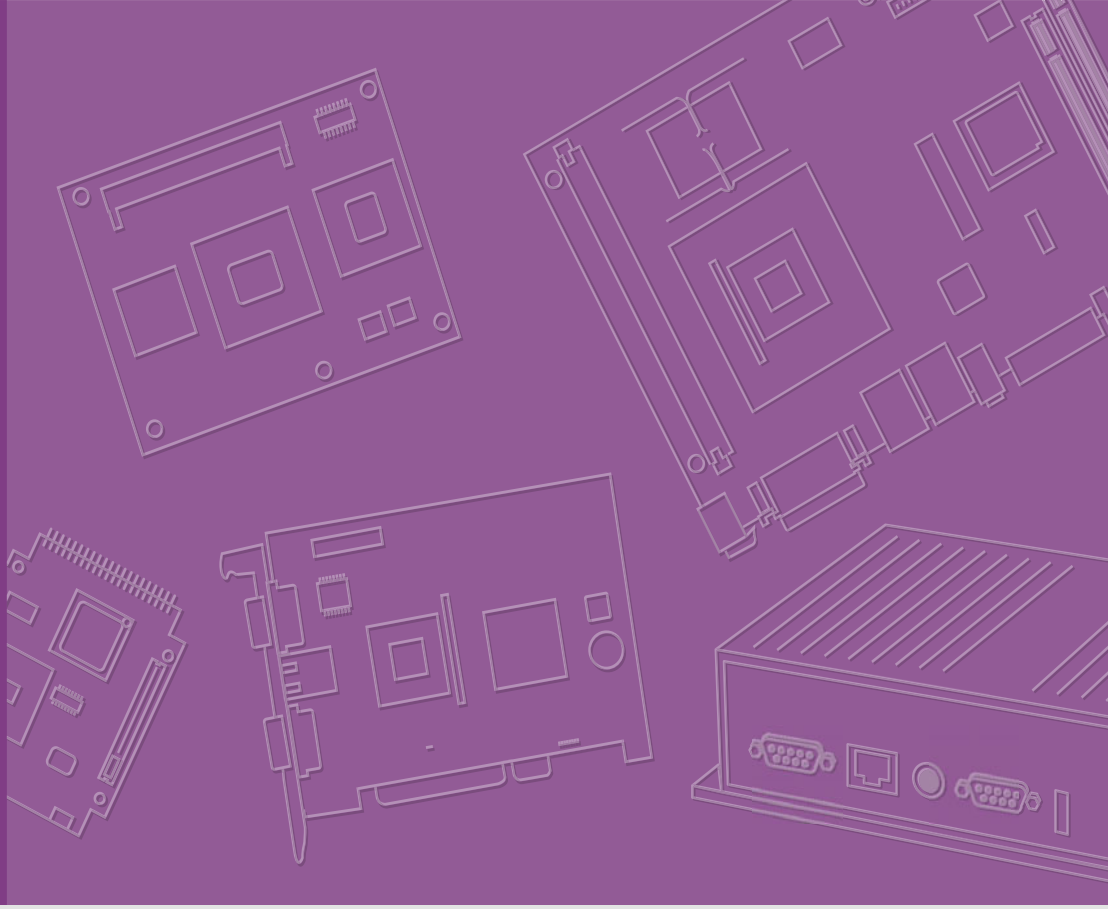

User Manual

AIMB-281

Intel® Xeon E3/ Core™ i7/i5/i3/ Celeron LGA1155 Mini-ITX with CRT/DVI/LVDS, 6 COM, Dual LAN, PCIe x4

ADVANTECH

Enabling an Intelligent Planet

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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.*

CPU Compatibility

Test Item	**Description**				
CPU Family	**Base Freq**	**Power**	**L3 Cache**	**Mfg Tech**	**Result**
Intel i5-3550	3.3GHz	77W	6MB	22nm	PASS
Intel i5-3570T	2.3GHz	45W	6MB	22nm	PASS
Intel i5-3550S	3.0GHz	65W	6MB	22nm	PASS
Intel i5-3450	3.1GHz	77W	6MB	22nm	PASS
Intel i5-3570K	3.4GHz	77W	6MB	22nm	PASS
Intel i5-2500T	2.3GHz	45W	6MB	32nm	PASS
Intel i7-3770T	2.5GHz	45W	8MB	22nm	PASS
Intel i7-3770S	3.1GHz	65W	8MB	22nm	PASS
Intel i7-3770	3.4GHz	77W	8MB	22nm	PASS
Intel i7-3770K	3.5GHz	77W	8MB	22nm	PASS
Intel i7-2600K	3.4GHz	95W	8MB	32nm	PASS
Intel i3-2125	3.3GHz	65W	3MB	32nm	PASS
Intel i3-3220	3.3GHz	55W	3MB	22nm	PASS
Intel Xeon E3-1275	3.4GHz	84W	8MB	22nm	PASS
Intel Xeon E3-1225	3.1GHz	95W	6MB	32nm	PASS
Intel Pentium G620	2.6GHz	65W	3MB	32nm	PASS
Intel Celeron G460	1.8GHz	35W	1.5MB	32nm	PASS

Memory Compatibility

Memory module information			
Item	**MEM-01**	**MEM-02**	**MEM-03**
Module Vendor	Transcend	Transcend	Transcend
Module P/N	TS1GSK64V3H	TS256MSK64V3N	TS256MSK64V6N
Chip Vendor	micron	hynix	micron
Chip P/N	2AD27 D9PBC	H5TQ2G83CFR	IVM77 D9PFJ
Capacity	8GB	2GB	2GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered
Type	SO DIMM	SO DIMM	SO DIMM
Speed	1333	1333	1600
ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID			

Memory module information			
Item	**MEM-04**	**MEM-05**	**MEM-06**
Module Vendor	ATP	DSL	DSL
Module P/N	AW24M64F8BLK0S	DDR3 1600 2GB CL11	DDR3 1333 4GB CL9
Chip Vendor	SEC	SEC	ELPIDA
Chip P/N	216 HYKO	113 HCK0	J4208BASE-DJ-F
Capacity	8GB	2GB	4GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered
Type	SO DIMM	SO DIMM	SO DIMM
Speed	1600	1600	1066
ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID			

Memory module information			
Item	**MEM-07**	**MEM-08**	**MEM-09**
Module Vendor	Transcend	Kingston	ADATA
Module P/N	TS128MSK64V1U	KVR1333D3S8S9/2G	HY7YG1B16
Chip Vendor	ELPIDA	ELPIDA	hynix
Chip P/N	J1108BDBG-DJ-F	J2108BCSE	H5TQ1G83BFR
Capacity	1GB	2GB	2GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered
Type	SO DIMM	SO DIMM	SO DIMM
Speed	1066	1333	1066

ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID	SD3-039/040	SD3-126/127	SD3-087/088

Memory module information			
Item	**MEM-10**	**MEM-11**	**MEM-12**
Module Vendor	Innodisk	Innodisk	Transcend
Module P/N	M3SP-2GMJCL0C-M	M3SP-4GMJDL0C-M	JM1333KSN-2G
Chip Vendor	micron	micron	SpecTek
Chip P/N	IQM22 D9PFJ	IIM22 D9PFJ	PE901
Capacity	2GB	4GB	2GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered
Type	SO DIMM	SO DIMM	SO DIMM
Speed	1600	1600	1333
ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID	SD3-142/143	SD3-145/146	SD3-116/117

Memory module information			
Item	**MEM-13**	**MEM-14**	**MEM-15**
Module Vendor	DSL	Panram	ADATA
Module P/N	DDR3 1333 2GB CL9	200D38G328,NB, K2BASESF	EL73I1B0873ZV
Chip Vendor	ELPIDA		ELPIDA
Chip P/N	J1108BDSE-DJ-F	F140X8A09481	J2108BCSE-DJ-F
Capacity	2GB	8GB	2GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered
Type	SO DIMM	SO DIMM	SO DIMM
Speed	1333	1333	1333
ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID	SD3-019/020	SD3-140/141	SD3-132/133

Memory module information			
Item	**MEM-16**	**MEM-17**	**MEM-18**
Module Vendor	Kingston	pqi	Apacer
Module P/N	KVR1066D3S7/1G	MFCBR502SA0101	78.A2GC3.421
Chip Vendor	Kingston	hynix	ELPIDA
Chip P/N	D1288JPNDPLD9U	H5TQ2G83AFR	J1108BDBG-DJ-F
Capacity	1GB	4GB	2GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered

Type	SO DIMM	SO DIMM	SO DIMM
Speed	1066	1066	1066
ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID	SD3-064/065	SD3-075/076	SD3-027/028

Memory module information			
Item	**MEM-19**	**MEM-20**	**MEM-21**
Module Vendor	Kingston	hynix	Transcend
Module P/N	KVR1333D3S9/1G	HMT112S6TFR8C-H9	TS512MSK64V1N
Chip Vendor	Kingston	hynix	hynix
Chip P/N	D1288JPNDPLD9U	H5TQ1G83TFR	H5TQ2G83BFR
Capacity	1GB	1GB	4GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered
Type	SO DIMM	SO DIMM	SO DIMM
Speed	1333	1333	1066
ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID	SD3-066/067	SD3-128/129	SD3-055/056

Memory module information			
Item	**MEM-22**	**MEM-23**	**MEM-24**
Module Vendor	Transcend	pqi	ADATA
Module P/N	TS256MSK64V6N	MFCBR402PA0105	AD73I1A0873EG
Chip Vendor	micron	hynix	ADATA
Chip P/N	IVM77 D9PFJ	H5TQ1G83BFR	AD3BC8A-13339H
Capacity	2GB	2GB	1GB
Unbuffered/Regis-	Unbuffered	Unbuffered	Unbuffered
Type	SO DIMM	SO DIMM	SO DIMM
Speed	1600	1066	1333
ECC/Non-ECC	Non-ECC	Non-ECC	Non-ECC
Wide temp. sup-	NIL	NIL	NIL
Device ID	SD3-151/152	SD3-077/078	SD3-123/124

*Use external VGA card to do this test, DO NOT use on board internal VGA.

Memory No.	Test Procedure	Result
MEM-01	System can boot up	Pass
	Check if BIOS can detect correct capacity and Speed	Pass
	System can power on/off 10 times.	Pass
	Run Memtest86 for 3 loops	Pass
	Run Prime 95 for 1 hr.	Pass

Ordering Information

Part Number	Chipset	CRT	DVI	LVDS	GbE LAN	COM
AIMB-281G2-00A1E	H61	Yes	Yes	Yes	2	6

*() not populated on MP version.

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 x AIMB-281 Mini-ITX Motherboard
- 1 x Driver CD
- 2 x COM cable (2 x 10 pin)
- 2 x SATA cable (2 in 1,7-pin)
- 1 x I/O shield
- 1 x Startup manual
- 1 x Warranty card

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the AIMB-281 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the AIMB-281, 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

General Information

1.1 Introduction

AIMB-281 is designed with the Intel H61 for industrial applications that require both performance computing and enhanced power management capabilities. The motherboard supports Intel Core i7-3770 3.4 GHz/Core i5-3550S 3.0 GHz/Core i7-2600 3.4 GHz/Core i5-3570 2.3 GHz/Core i5-3450 3.1 GHz/Core i5-2500T 2.3 GHz/Core i3-2125 3.3 GHz/Core i3-3220 3.3 GHz/Xeon E3-1275 3.4 GHz/Xeon E3-1225 3.1 GHz/Pentium G620 2.6 GHz/Celeron G460 1.8 GHz processor up to 8 MB L3 cache and DDR3 1066/1333/1600 up to 16 GB. It has rich I/O connectivity of 6 serial ports, 8 USB 2.0, dual GbE LAN and 3 SATA II ports.

1.2 Features

- **Rich I/O connectivity:** Dual GbE LAN via PCIe x 1 bus, 8 USB 2.0 ports, 6 serial ports, 1 mini PCIe, and 1 PCIe x 4.
- **Standard mini ATX form factor with industrial feature:** The AIMB-281 is a full featured mini ATX motherboard with balanced expandability and performance.
- **Wide selection of storage devices:** SATA HDD, customers benefit from the flexibility of using the most suitable storage device for larger capacity.
- **Optimized integrated graphic solution:** With Intel® Flexible Display Interface, it supports versatile display options and 32-bit 3D graphics engine.

1.3 Specifications

1.3.1 System

- **CPU:** Intel Core i7-3770 3.4 GHz/Core i5-3550S 3.0GHz/Core i7-2600 3.4GHz/Core i5-3570 2.3 GHz/Core i5-3450 3.1 GHz/Core i5-2500T 2.3 GHz/Core i3-2125 3.3 GHz/Core i3-3220 3.3 GHz/Xeon E3-1275 3.4 GHz/Xeon E3-1225 3.1 GHz/Pentium G620 2.6 GHz/Celeron G460 1.8 GHz processor
- **BIOS:** AMI EFI 32 Mbit SPI BIOS
- **System chipset:** Intel® H61
- **SATA hard disk drive interface:** Three on-board SATA connectors with data transmission rate up to 300 MB

1.3.2 Memory

- **RAM:** Up to 16 GB in 2 slots 204-pin DIMM sockets. Supports dual-channel DDR3 1066/1333/1600f MHz SDRAM.
  - Supports non-ECC unbuffered DIMMs and do not support any memory configuration that mixes non-ECC with ECC unbuffered DIMMs.

Note! *A 32-bit OS may not fully detected 16 GB of RAM when 16 GB is installed.*

1.3.3 Input/Output

- **PCIe slot:** 1 mini-PCIe expansion slot and 1 PCIe x4 expansion slot.
- **Parallel port:** Configured to LPT1 or disabled. LPT1 supports EPP/SPP/ECP.
- **Serial port:** Six serial ports, two RS-232 with hardware auto-flow control and four RS-232.
- **PS/2 mouse connector:** One connector is located on the mounting bracket for easy connection to PS/2 keyboard and mouse.
- **USB port:** Supports up to 8 USB 2.0 ports with transmission rates up to 480 Mbps.
- **GPIO:** AIMB-281 supports 8-bit GPIO from super I/O for general purpose control application.

1.3.4 Graphics

- **Controller:** Intel® HD Graphics
- **Display memory:** 256 MB maximum shared memory with 2GB and above system memory installed
- **DVI:** Supports DVI up to resolution 1920 x 1200 @ 60Hz refresh rate
- **CRT:** Supports VGA up to resolution 2048 x 1536 @ 75Hz refresh rate
- **LVDS:** Supports LVDS up to resolution 1920 x 1200

1.3.5 Ethernet LAN

- Supports dual 10/100/1000 Mbps Ethernet port (s) via PCI Express x1 bus which provides 500 MB/s data transmission rate
- **Controller:** LAN 1: Realtek 8111E; LAN 2: Realtek 8111E

1.3.6 Industrial features

- **Watchdog timer:** Can generate a system reset. 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:** -20 ~ 70° C (-4 ~ 158° F)
- **Humidity:** 5 ~ 95% non-condensing
- **Power supply voltage:** +3.3 V, +5 V, +12 V, -12 V, 5 Vsb
- **Power consumption:**

  - Intel LGA1155 Core i7-2600 3.4 GHz, 8MB L3 cache, 2pcs 4GB DDR3 1600 MHz, +5V @1.38A, +3.3V @ 1.2A, +12V @ 7.25A, 5Vsb @ 0.15A, -12V @ 0.24A

  Measure the maximum current value which system under maximum load (CPU: Top speed, RAM: Full loading)
- **Board size:** 170 mm x 170 mm (6.69" x 6.69")
- **Board weight:** 1.04 kg

1.4 Jumpers and Connectors

Connectors on the AIMB-281 motherboard link it to devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure your system for your application.

The tables below list the function of each of the board 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: Jumpers

Label	Function	Note
JCMOS1	Clear CMOS	3 x 1 header, pitch 2.0mm
JPSON	AT/ATX Mode Select	3 x 1 header, pitch 2.0mm
JLVDS_BKL1	BL Selec	3 x 1 header, pitch 2.0mm
SelectCOM	SelectCOM	9 x 2 header, pitch 2.0mm
SPI1		4 x 2 header, pitch 2.54mm
JLPC		6 x 2 header, pitch 2.0mm
LPT		13 x 2 header, pitch 2.54mm

Table 1.2: Rear Panel Connector

Label	Function	Note
KBMS_USB	PS/2 KB/Mouse/2 USB 2.0	6-pin Mini-Din
DVI	DVI Port	29-pin DVI-D port
VGA1	VGA Port	D-sub 15-pin, female
LAN1USB12	RJ-45 Ethernet Connector x 1 USB 2.0 Connector x 2	
LAN2USB34	RJ-45 Ethernet Connector x 1 USB 2.0 Connector x 2	
Audio1	Audio , Line-Out , Mic.-In	

Table 1.3: Internal Connector

Label	Function	Note
CPU_FAN	CPU Fan Connector	4 x 1 wafer, pitch 2.54mm
SYS_FAN1	System Fan Connector	3 x 1 wafer, pitch 2.54mm
COM3~6	Pin Header Connector * 2	10X2 header, pitch 2.0mm
JDIO	GPIO Connector	5 x 2 header, pitch 2.0mm
F_PANEL1	Intel Front Panel Connector	5 x 2 header, pitch 2.54mm
EATXPWR	EATX power Connectors	12 x 2 header
FPAUD1	Audio Mic.-In & Line-Out Connector	5 x 2 header, pitch 2.54mm
JLVDS	24-bit LVDS Connector	2 x 20 connector
JBKL	LCD Inverter Connector	1 x 5 connector
SATA1 ~ 3	SATA Data Connector * 3	7P Male connector
ATX12V	ATX Power Connector	2x2 pin power connector
USB78	USB Connector * 1	5 x 2 header, pitch 2.0mm

1.5 Board layout: Jumper and Connector Locations

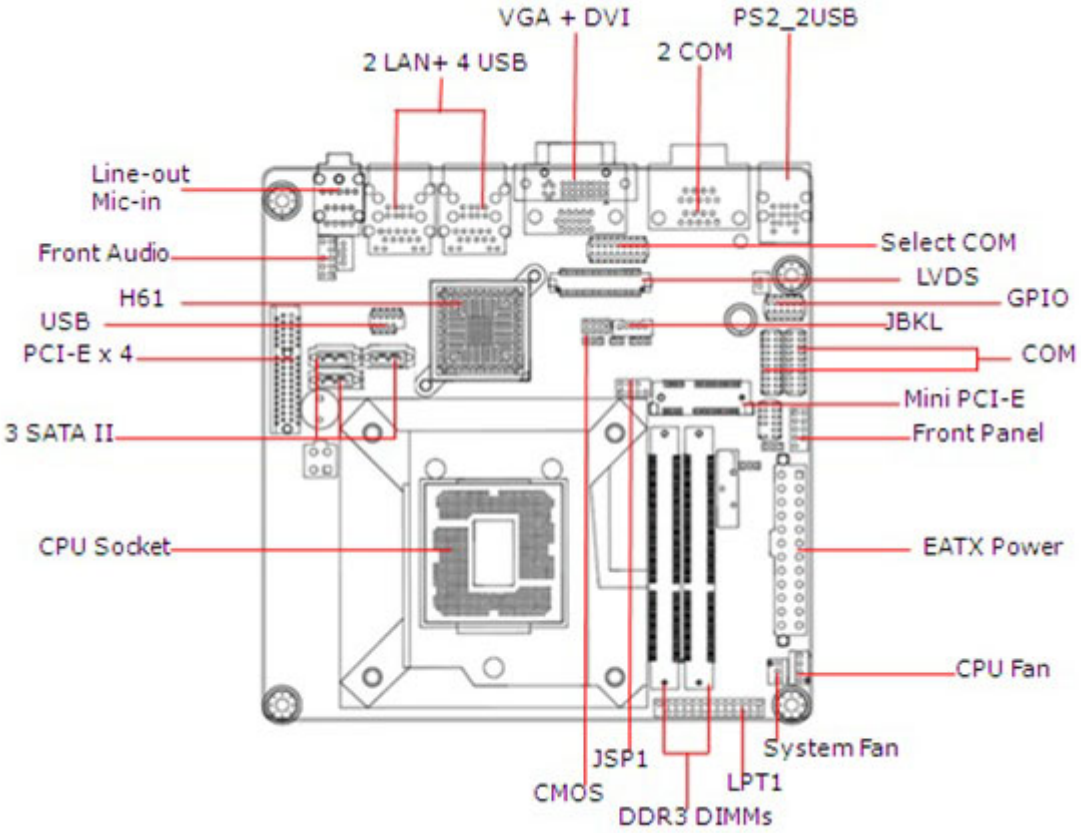


Figure 1.1 Jumper and Connector Location

Figure 1.2 I/O Connectors

1.6 AIMB-281 Board Diagram

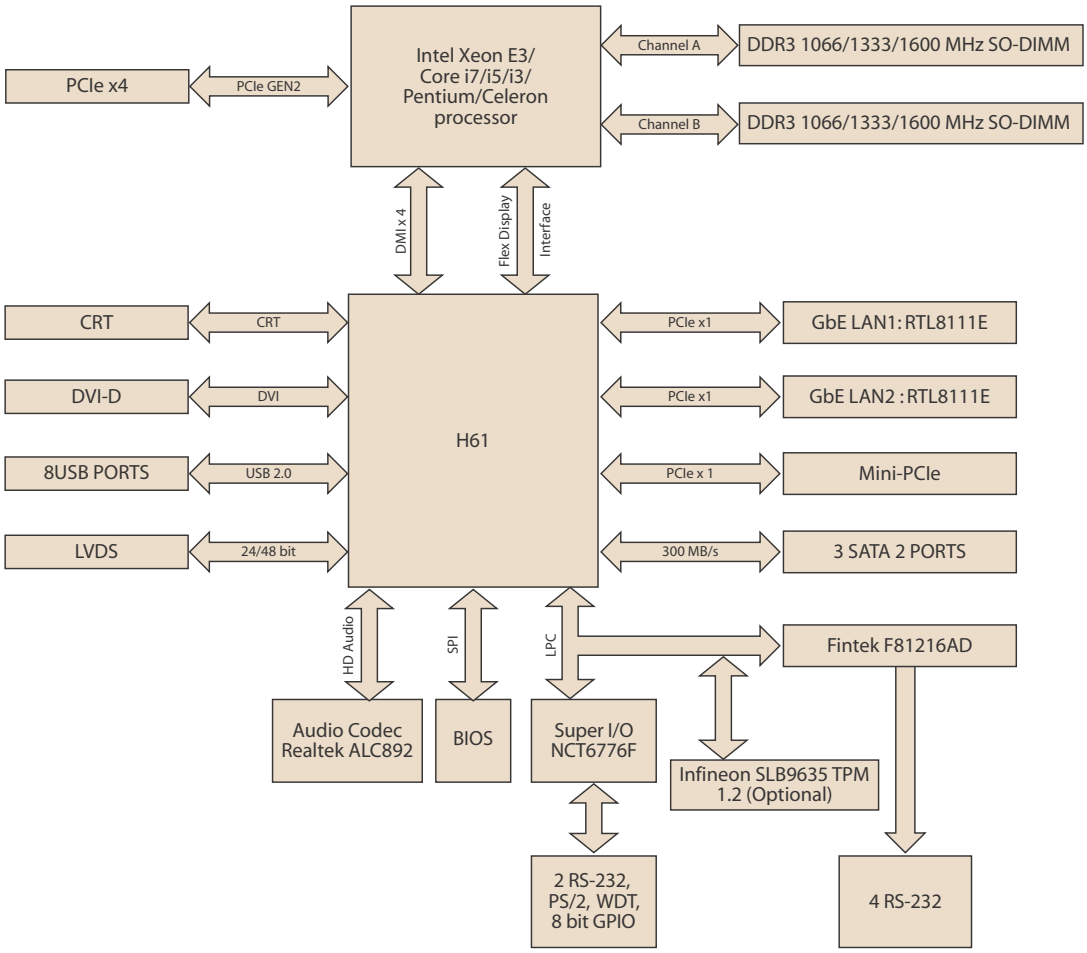


Figure 1.3 AIMB-281 Block Diagram

1.7 Safety Precautions

Warning! *Always completely disconnect the power cord from 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 electro-static 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 motherboards's 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.

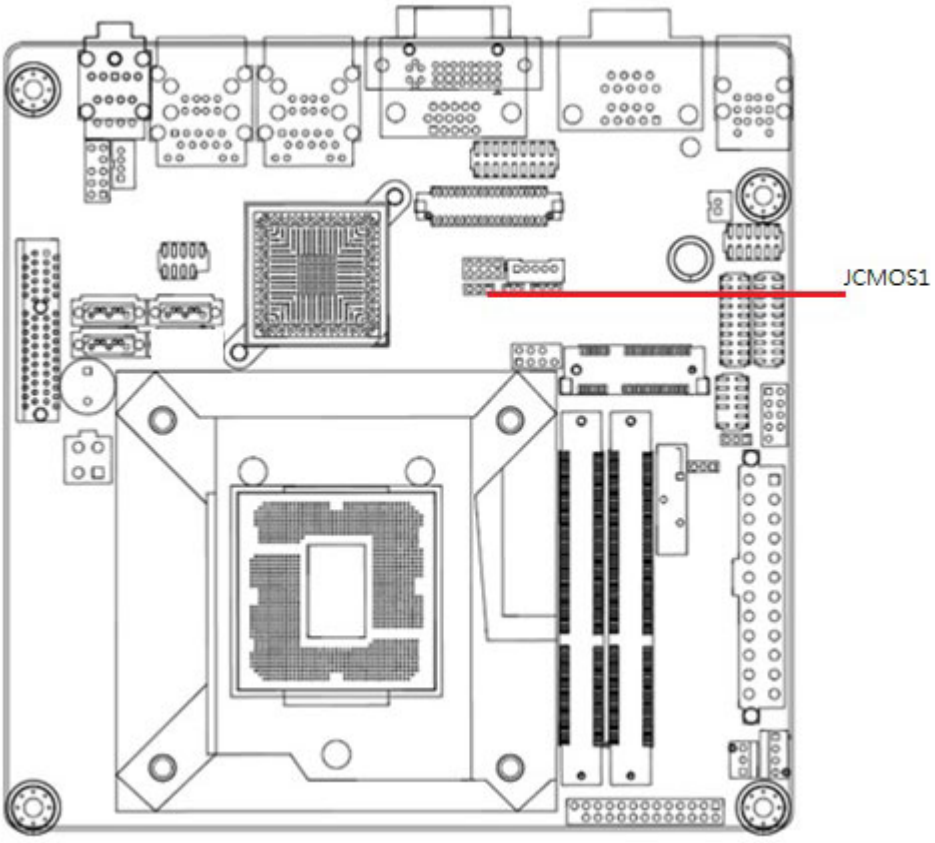
1.8.2 Clear CMOS (JCMOS1)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Note! *Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!*

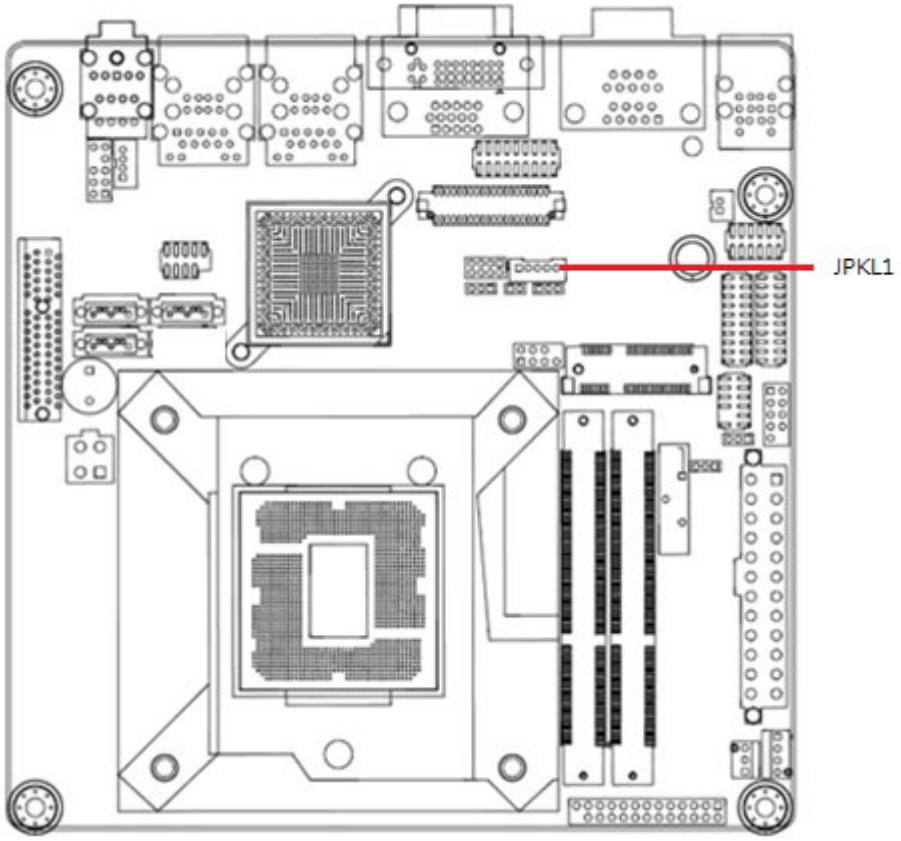


Normal (Default)

Clear CMOS

Note! *You do not need to clear the RTC when the system hangs due to over-clocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.*

1.8.3 LVDS Back Light Power Selection

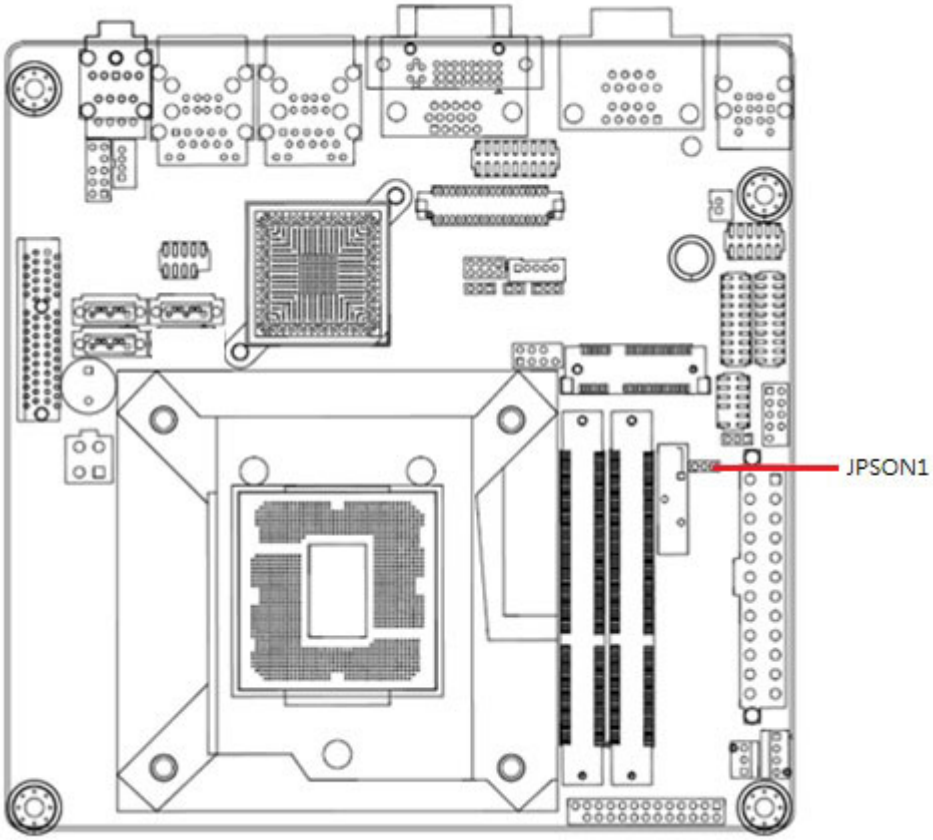


+5V

+3.3V

1.8.4 AT/ATX Power Mode Select (JPSON)

This jumper allows you to select ATX Mode or AT mode.



ATX MODE (Default)

AT MODE

1.9 System Memory

AIMB-281 has two 204-pin memory sockets for 1066/1333/1600 MHz memory modules with maximum capacity of 16GB (Maximum 8GB for each DIMM). AIMB-281 supports only non-ECC DDR3 memory modules.

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. Then firmly but gently (avoid pushing down too hard) press the DIMM module well down into the socket, until you hear a click 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.

1.11 Cache Memory

The AIMB-281 supports a CPU with one of the following built-in full speed L3 caches:

8 MB for Intel Core i7-3770

6 MB for Intel Core i5-3550

3 MB for Intel Core i3-3220

8 MB for Intel Core i7-2600

6 MB for Intel Core i5-3570

3 MB for Intel Core i3-2125

6 MB for Intel Core i5-3450

6 MB for Intel Core i5-2500

8 MB for Intel Xeon E3-1275

6 MB for Intel Xeon E3-1225

3 MB for Intel Pentium G620

1.5 MB for Intel Celeron G460

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

1.12 Processor Installation

The AIMB-281 is designed for LGA1155, Intel Core i7/Core i5/Core i3/Pentium/Celeron processor.

Chapter 2

Connecting Peripherals

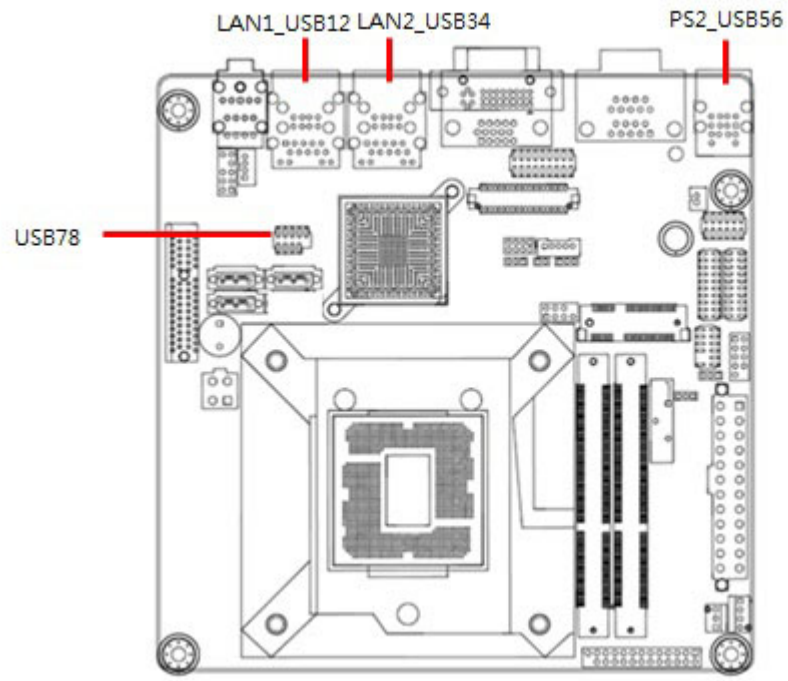
2.1 Introduction

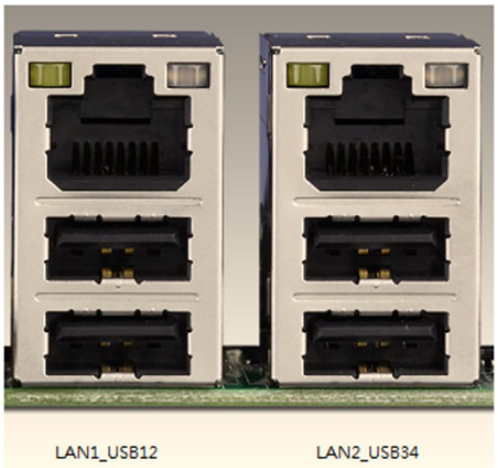
You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed or have a packed chassis, you may need to partially remove the card to make all the connections.

2.2 USB Ports

The AIMB-281 provides up to 8 USB ports. The USB interface complies with USB Specification Rev 2.0 supporting transmission rates up to 480 Mbps. The USB interface can be disabled in the system BIOS setup.

The AIMB-281 is equipped with two high-performance 1000 Mbps Ethernet LAN adapters, both of which are supported by all major network operating systems. The RJ-45 jacks on the rear panel provides convenient LAN connection.





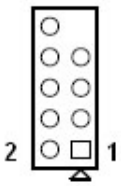
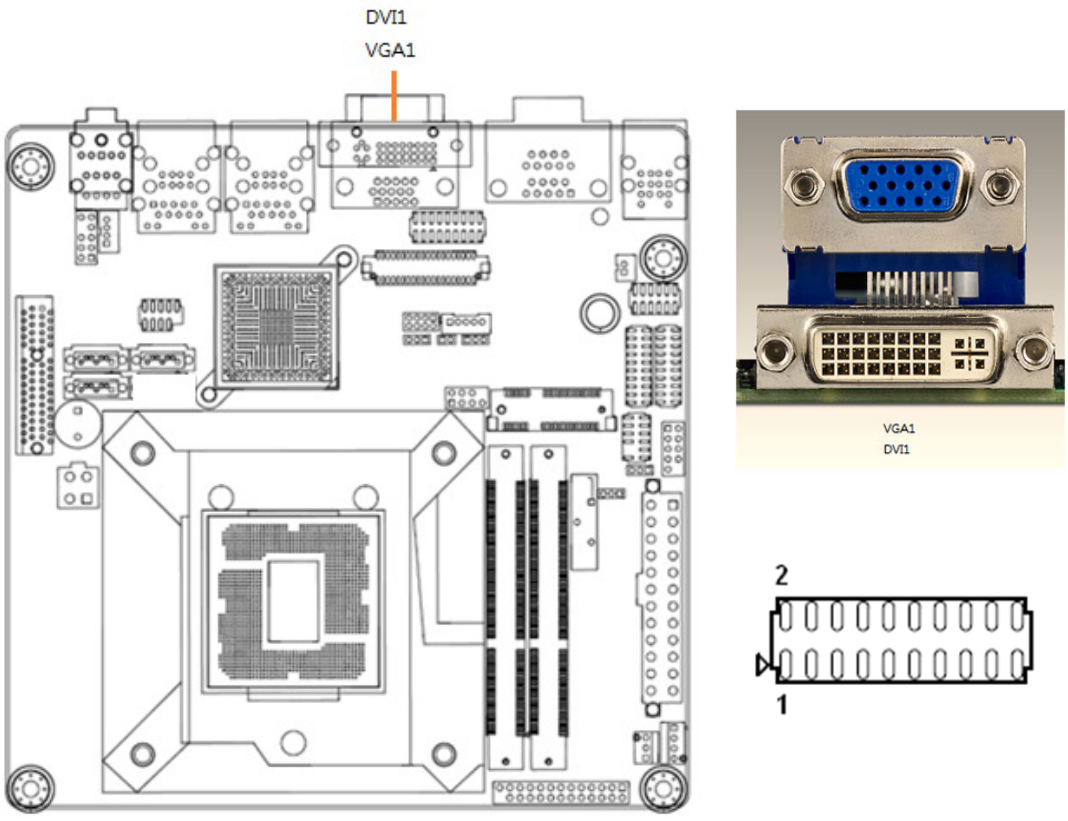


Table 2.1: AT/ATX Power Mode Select (JPSON)			
Pin	**Signal**	**Pin**	**Signal**
1	USB+5V	2	USB+5V
3	USB	4	USB-
5	USB+	6	USB+
7	GND	8	GND
9	NC		

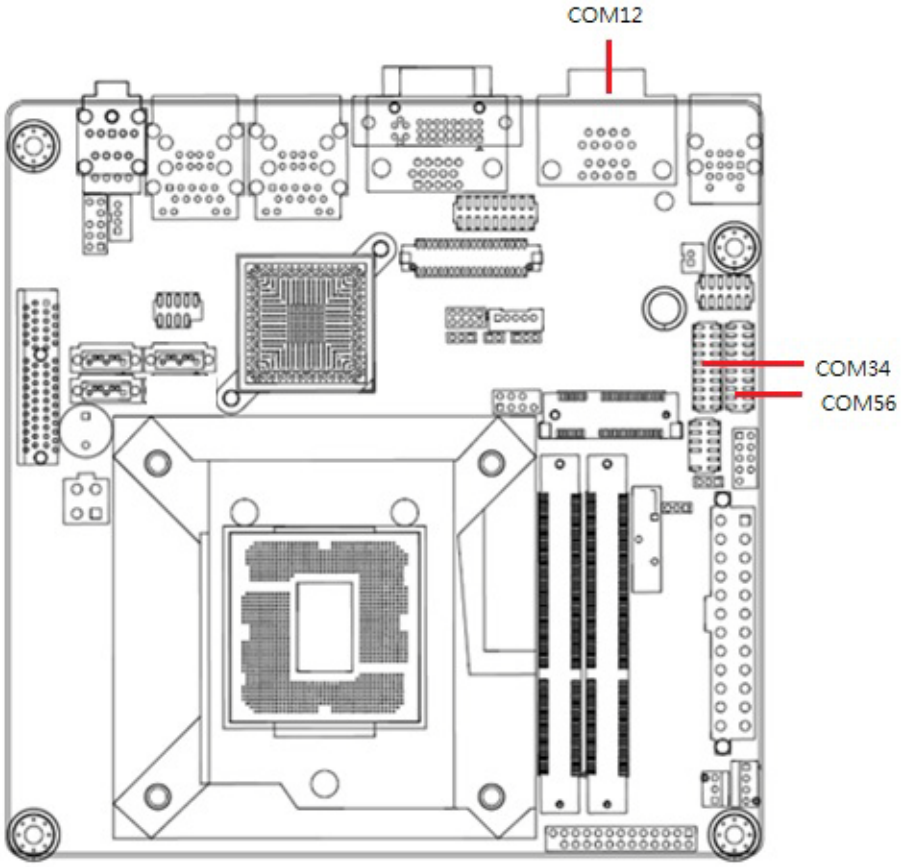
2.3 VGA/DVI-D Connector



AIMB-281 includes VGA and DVI interfaces that can drive conventional VGA and DVI displays. VGA is a standard 15-pin D-SUB connector commonly used for VGA. Pin assignments for VGA and DVI connectors are detailed in Appendix B.

Table 2.2: VGA/DVI-D Connector			
Pin	**Signal**	**Pin**	**Signal**
1	DCD#	2	DSR#
3	RXD	4	RTS#
5	TXD	6	CTS#
7	DTR#	8	RI#
9	GND	10	GND
11	DCD#	12	DSR#
13	RXD	14	RTS#
15	TXD	16	CTS#
17	DTR#	18	RI#
19	GND	20	GND

2.4 Serial Ports (COM12 ~ COM56)



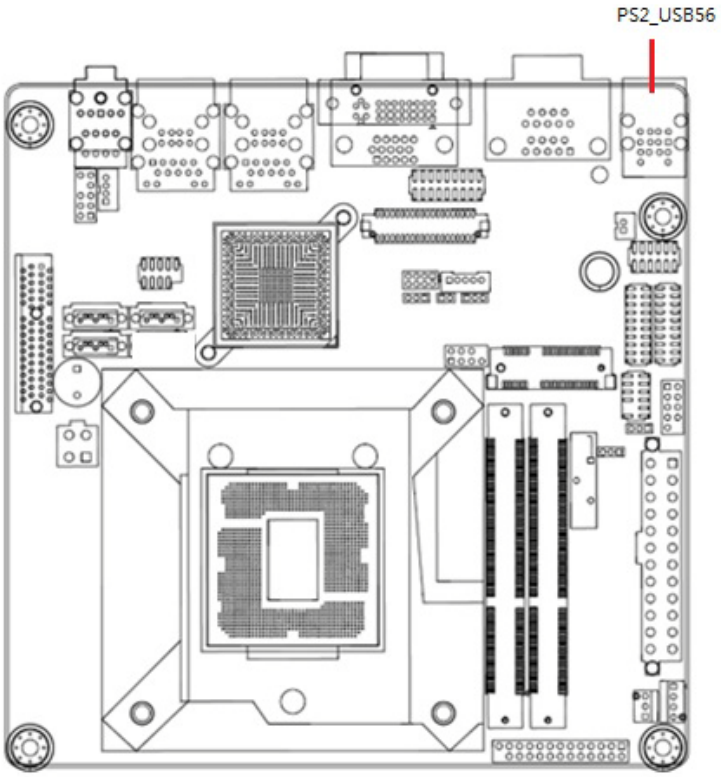
AIMB-281 supports six serial ports. COM34. COM56 supports RS-232. COM12 supports RS-232/422/485 (supports RS-485 auto flow control). JSETCOM3 &

These ports can connect to serial devices, such as a mouse or a printer, or to a communications network.

The IRQ and address ranges for both 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.

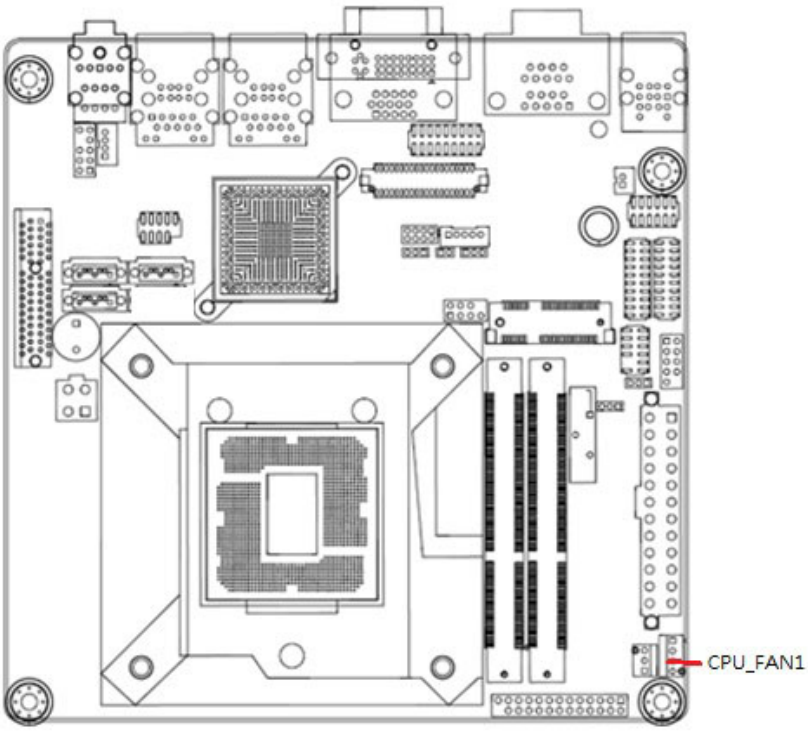
Different devices implement the RS-232 standards in different ways. If you have problems with a serial device, be sure to check the pin assignments for the connector.

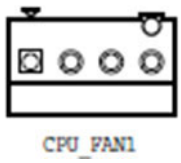
2.5 PS/2 Keyboard/Mouse Connector



One 6-pin mini-DIN connector on the motherboard provide connection to a PS/2 keyboard or a PS/2 mouse, respectively.

2.6 CPU Fan Connector (CPU_FAN1)

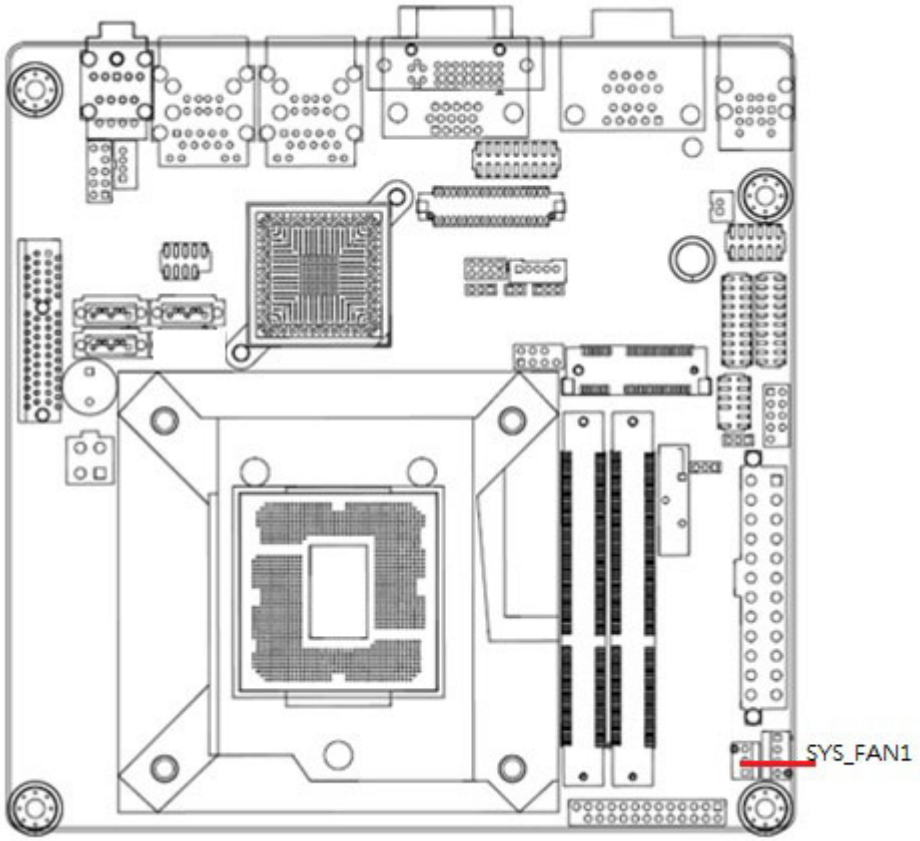




If a fan is used, this connector supports cooling fans of 500 mA (6 W) or less.

Table 2.3: VGA/DVI-D Connector	
Pin	**Pin Name**
1	GND
2	+12V
3	Tach
4	PWM

2.7 System FAN Connector (SYS_FAN1)



If a fan is used, this connector supports cooling fans of 500 mA (6 W) or less.

Table 2.4: VGA/DVI-D Connector	
Pin	**Pin Name**
1	GND
2	SYSFAN1_VCC(PWM)
3	SYSFAN1_IO

2.8 System Panel (F_PANEL)

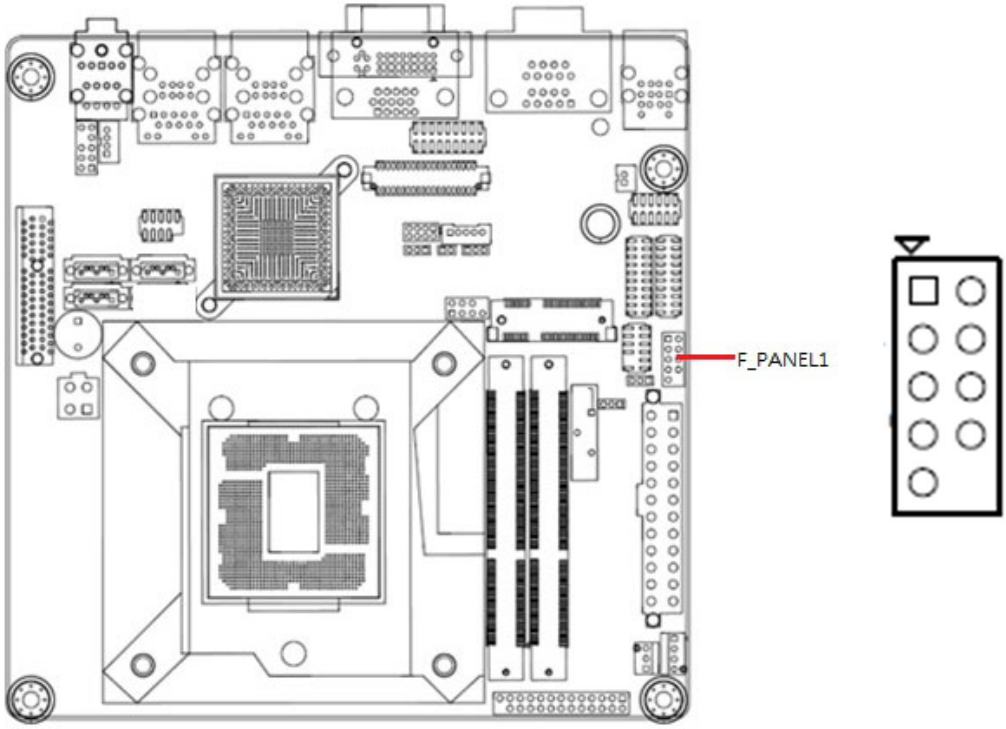
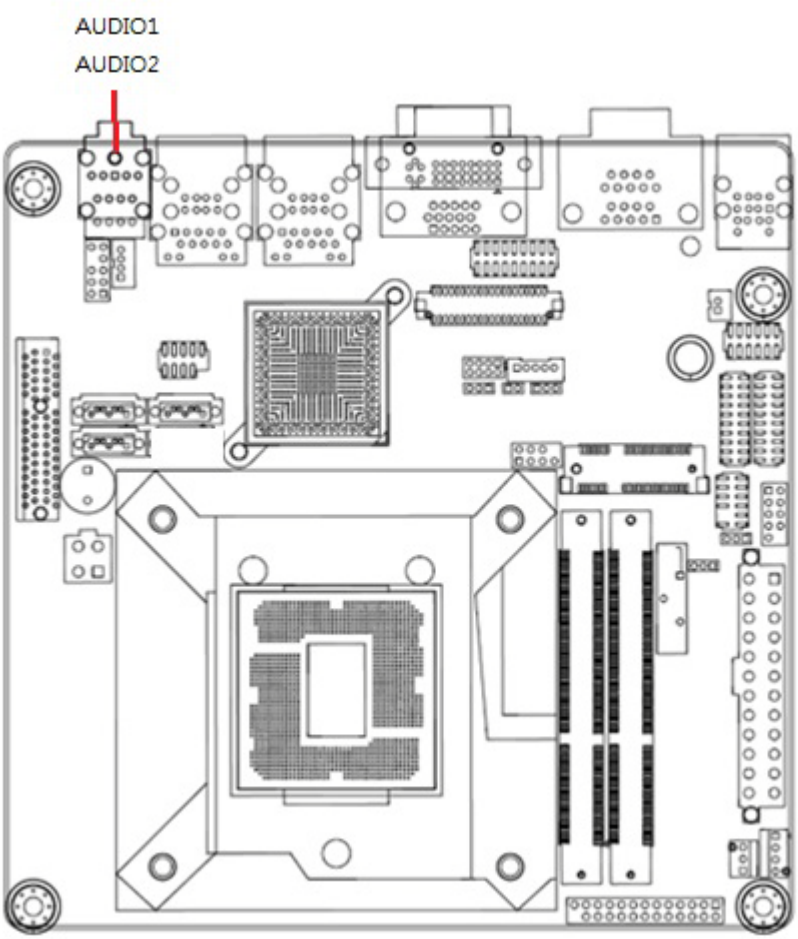


Table 2.5: System Panel (F_PANEL)

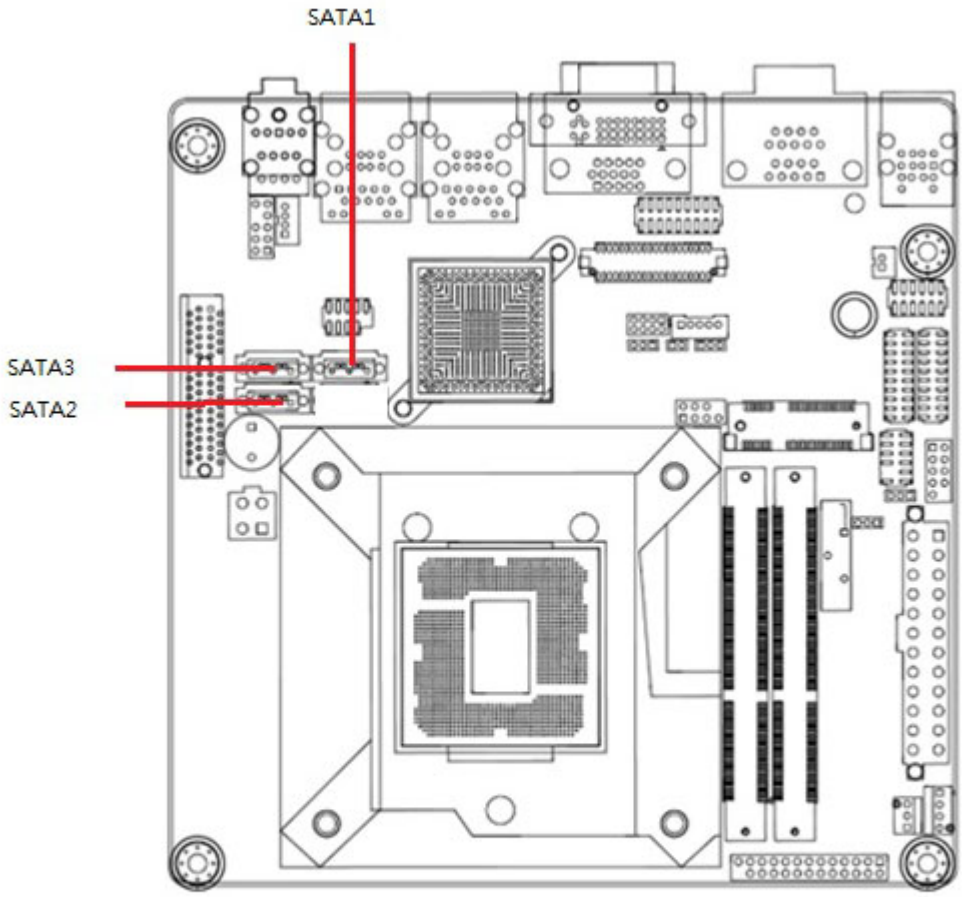
Pin	Signal	Pin	Signal
1	HDDLED+	2	POWERLED+
3	HDDLED-	4	POWERLED-
5	GND	6	PWSWITCH
7	RESET	8	GND
9	NC		

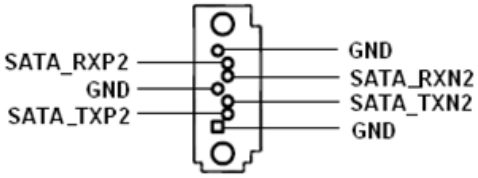
- **ATX Power Button/Soft-off Button (Pin 6-8 PWRBT)**
  This 2-pin connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch and holding it for more than four seconds while the system is ON turns the system OFF.
- **Reset Button (Pin 5-7 SYS_RST)**
  This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.
- **Power LED (Pin 2-4 PWRLED)**
  This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.
- **Hard Disk Drive Activity LED (Pin 1-3 HDLED)**
  This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

2.9 Line Out, Mic In Connector (AUDIO1/AUDIO2)



2.10 Serial ATA Interface (SATA1 ~ SATA3)

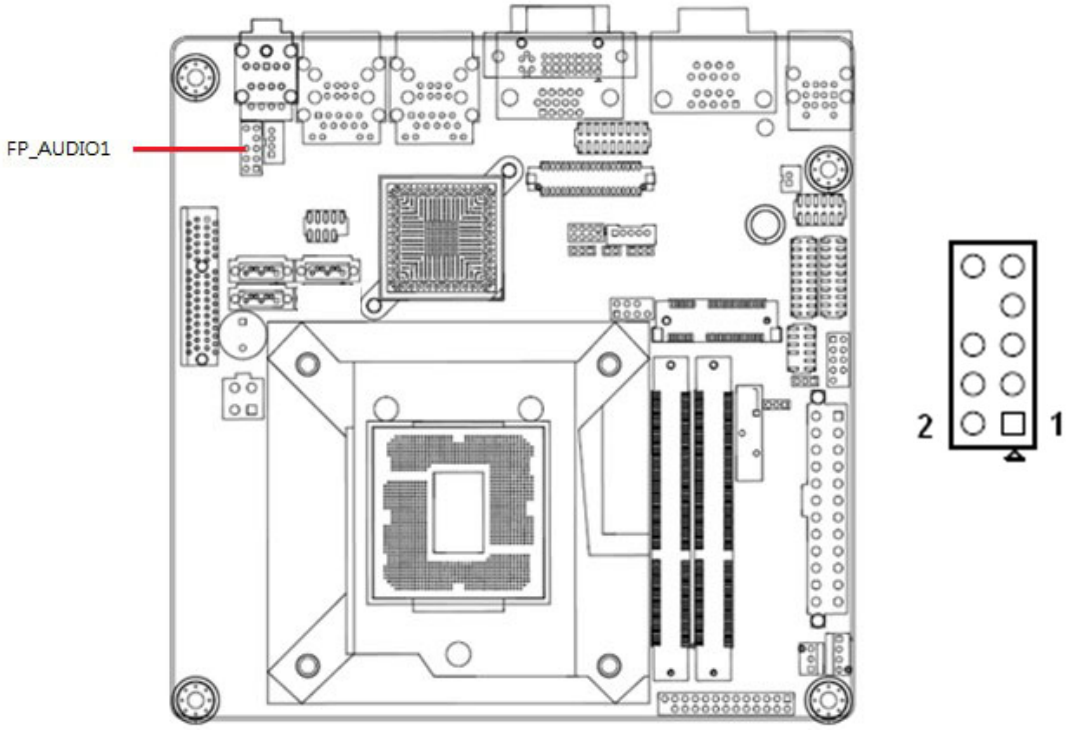




AIMB-281 features a high performance Serial ATA interface (up to 300 MB/s) which eases hard drive cabling with thin, space-saving cables.

2.11 Front Headphone Connector (FP_AUDIO1)

This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 (optional) audio standard. Connect this connector with the front panel audio I/O module cable.



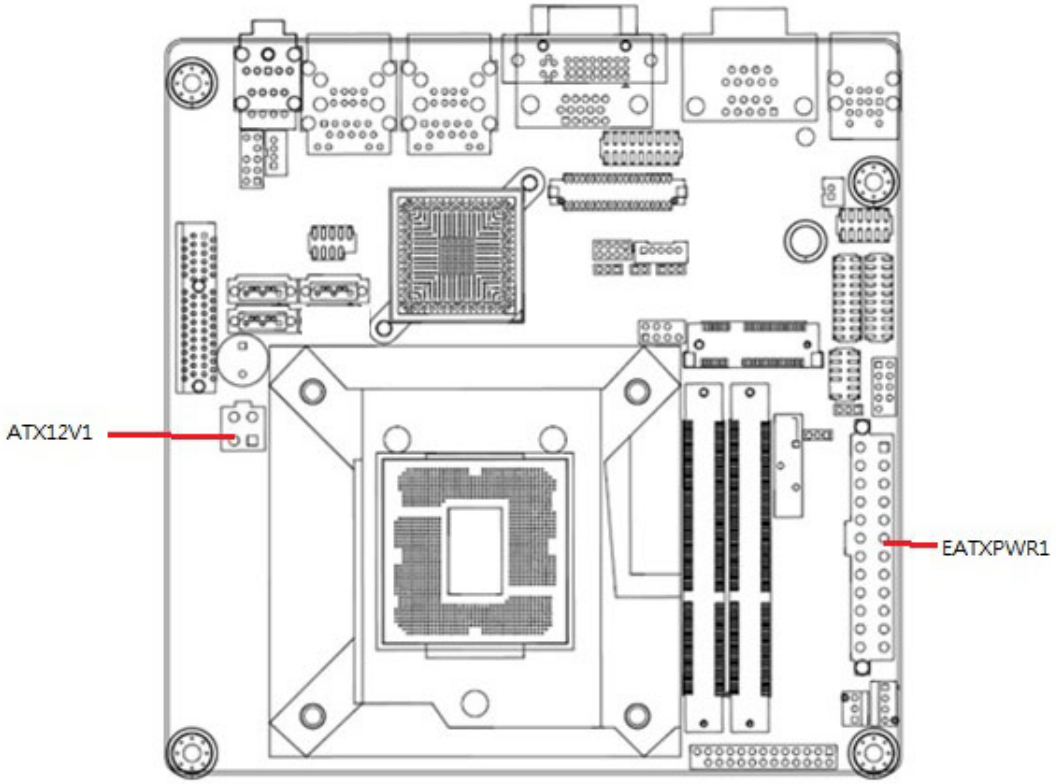
Note! *For motherboards with the optional HD Audio feature, we recommend that you connect a high-definition front panel audio module to this connector to take advantage of the motherboard's high definition audio capability.*

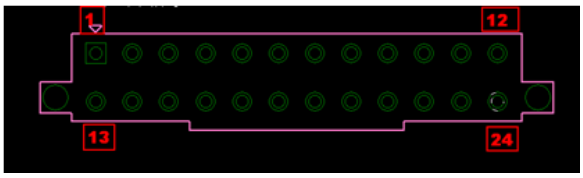
Table 2.6: Front Headphone Connector (FP_AUDIO1)

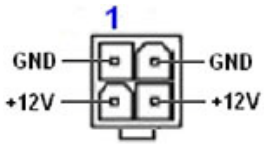
Pin	Signal	Pin	Signal
1	MIC2_L	2	GND
3	MIC2_R	4	PRESENSE
5	LIN2_R	6	MIC2_JD
7	FIO_SENSE	8	NC
9	LIN2_L	10	LINE_JD

2.12 ATX Power Connector (EATXPWR1, ATX12V1)

This connector is for an ATX Micro-Fit power supply. The plugs from the power supply are designed to fit these connectors in only one direction. Determine the proper orientation and push down firmly until the connectors mate completely.







Note!

1. Please connect the ATX12V1 connector with the PSU ATX 12V 4-pin connector.
2. 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) and provides a minimum power of 180 W.

Table 2.7: ATX Power Connector (EATXPWR1, ATX12V1)

Pin	Signal	Pin	Signal
1	+3.3V	2	+3.3V
3	Ground	4	+5V
5	Ground	6	+5V
7	Ground	8	PWRGD (Power Good)
9	+5V (Standby)	10	+12V
11	+12V	12	+3.3V
13	+3.3V	14	+12V

Table 2.7: ATX Power Connector (EATXPWR1, ATX12V1)			
15	Ground	16	PS-ON# (power supply remote on/off)
17	Ground	18	Ground
19	Ground	20	No connect
21	+5V	22	+5V
23	+5V	24	Ground

2.13 SPI Flash Connector (JSPI)

Is a point-to-point interface standard, which allows network equipment designers to develop an array of next-generation multi-service switches and routers to support multi-service traffic with aggregate bandwidths up to OC-192 (10 Gb/s) and beyond, enabling them to dramatically increase system performance.

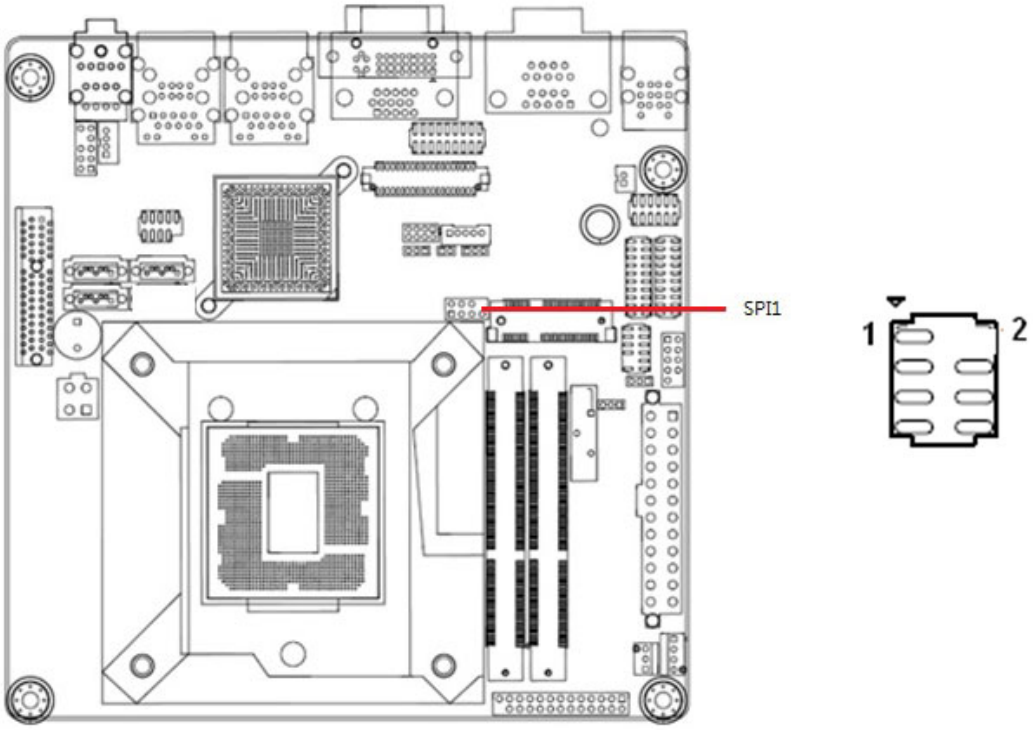
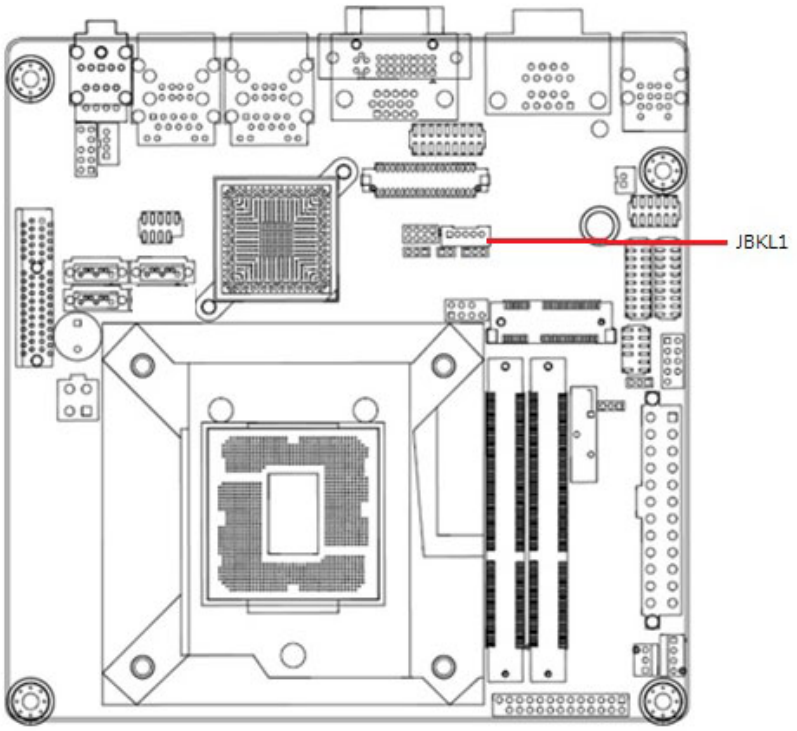
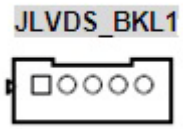


Table 2.8: ATX Power Connector (EATXPWR1, ATX12V1)			
Pin	**Signal**	**Pin**	**Signal**
1	+3V	2	GND
3	SP1_CS#	4	SPI_CLK
5	SPI_MISO	6	SPI_MOSI
7	SPI_HOLD#		

2.14 LCD Inverter Connector (JBKL1)

The connector is for the control of internal LVDS brightness.





2.15 LVDS Connector (JLVDS1)

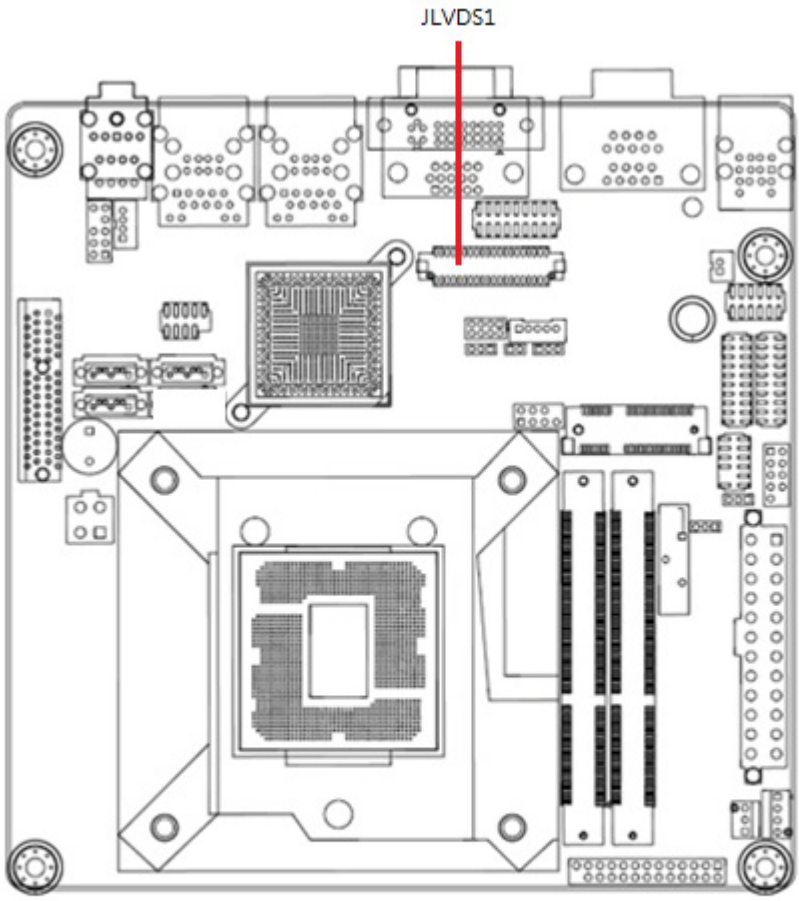


Table 2.9: LVDS Connector (JLVDS1)

Pin	Signal	Pin	Signal
1	VDD(+3.3V)	2	VDD(+5V)
3	VDD(+3.3V)	4	VDD(+5V)
5	I2C_CLK	6	I2C_DATA
7	GND	8	GND
9	LVDS_A1+	10	LVDS_A0+
11	LVDS_A1-	12	LVDS_A0-
13	GND	14	GND
15	LVDS_A3+	16	LVDS_A2+
17	LVDS_A3-	18	LVDS_A2-
19	GND	20	GND
21	LVDS_B1+	22	LVDS_B0+
23	LVDS_B1-	24	LVDS_B0-
25	GND	26	GND
27	LVDS_B3+	28	LVDS_B2+

Table 2.9: LVDS Connector (JLVDS1)			
29	LVDS_B3-	30	LVDS_B2-
31	GND	32	GND
33	LVDS_B_CK+	34	LVDS_A_CK+
35	LVDS_B_CK-	36	LVDS_A_CK-
37	GND	38	GND
39	VDD(+12V)	40	VDD(+12V)

2.16 General Purpose I/O Connector (JDIO1)

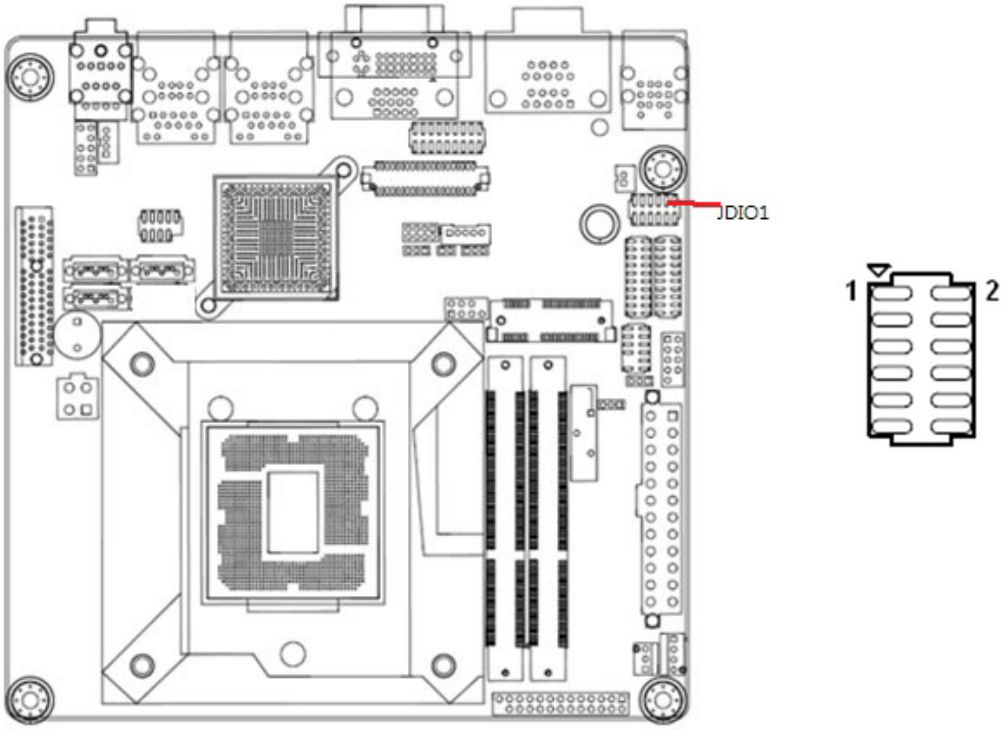


Table 2.10: General Purpose I/O Connector (JDIO1)			
Pin	**Signal**	**Pin**	**Signal**
1	SIO_SPIO0	2	SIO_SPIO4
3	SIO_SPIO1	4	SIO_SPIO5
5	SIO_SPIO2	6	SIO_SPIO6
7	SIO_SPIO3	8	SIO_SPIO7
9	SMB_CLK_MAIN	10	SMB_DAT_MAIN
11	GND	12	SVCC GPIO

2.17 LPC Connector for Debug (JLPC1)

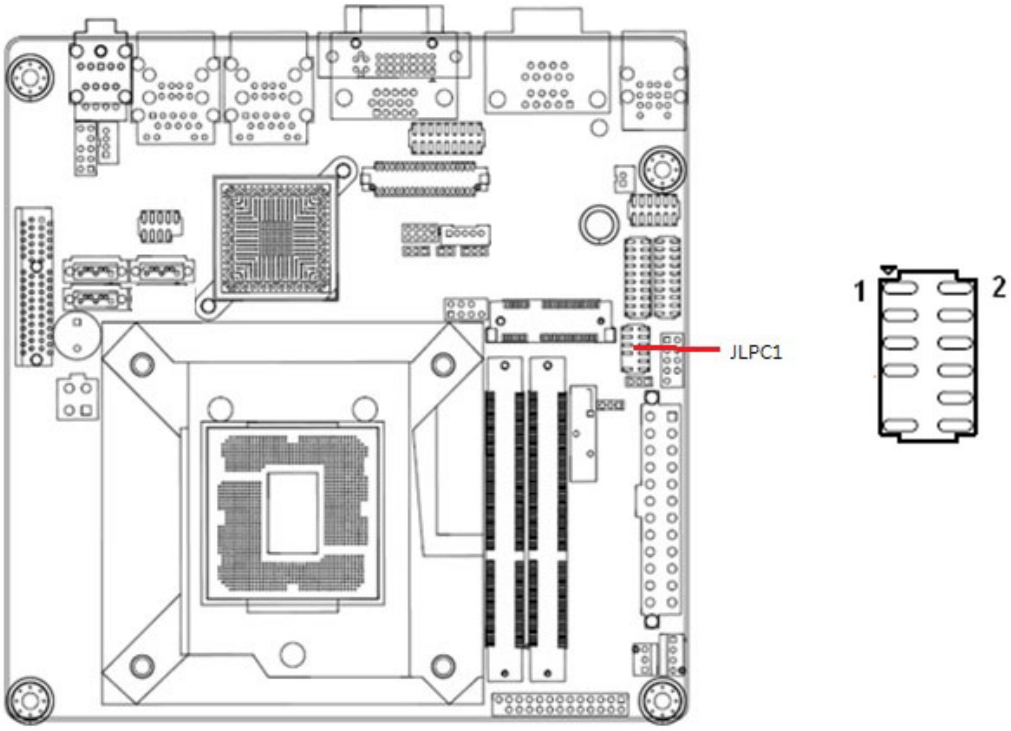


Table 2.11: General Purpose I/O Connector (JDIO1)

Pin	Signal	Pin	Signal
1	NC	2	+3.3
3	LPC_AD3	4	PRST_SIO#
5	LPC_AD1	6	LPC_AD2
7	LPC_FRAME#	8	LPC_AD0
9	CLK33M_LPC	10	GND
11	CLK33M_LPC	12	GND

2.18 JSETCOM1

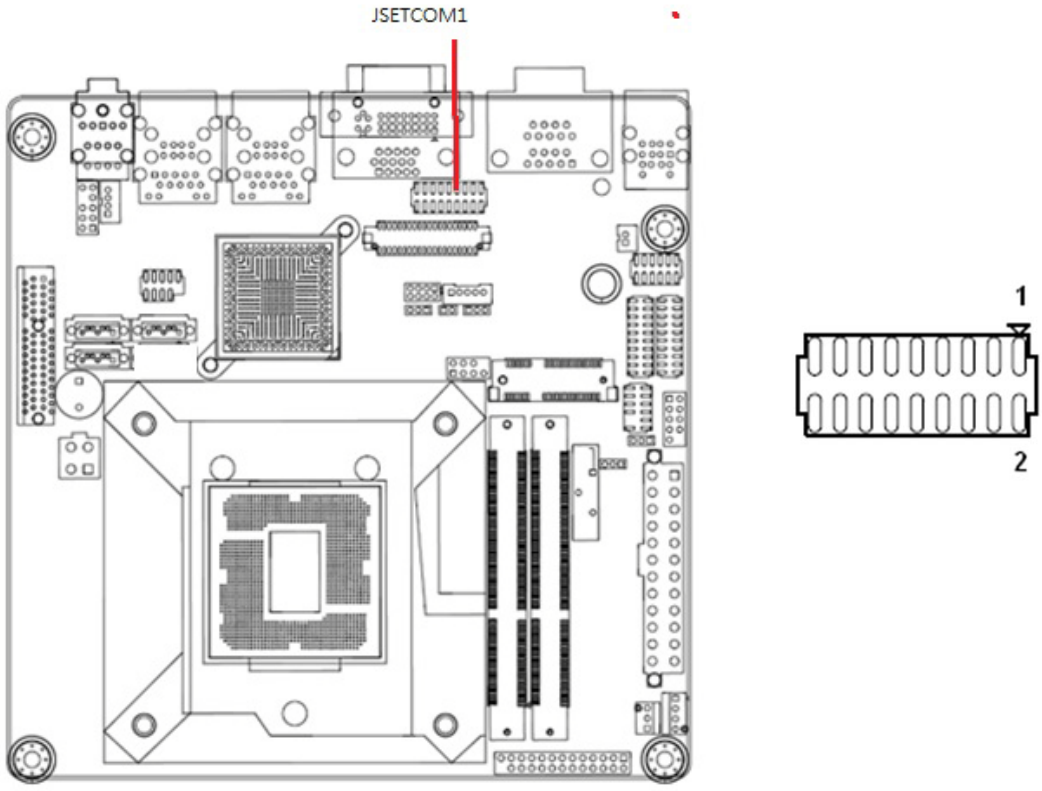


Table 2.12: JSETCOM1

Pin	Signal	Pin	Signal
1	UART1_RXD	2	COM1_485_RXD
3	UART1_RXD	4	COM1_422_RXD
5	UART1_RXD	6	COM1_232_RXD
7	COM1_BUF_DCD#	8	COM1_BUF_TXD
9	COM1_DCD#	10	COM1_TXD
11	COM1_TXD422-	12	COM1_RXD422+
13	COM1_BUF_RXD	14	COM1_BUF_DTR#
15	COM1_RXD	16	COM1_DTR#
17	COM1_TXD422+	18	COM1_RXD422-

2.19 LPT1

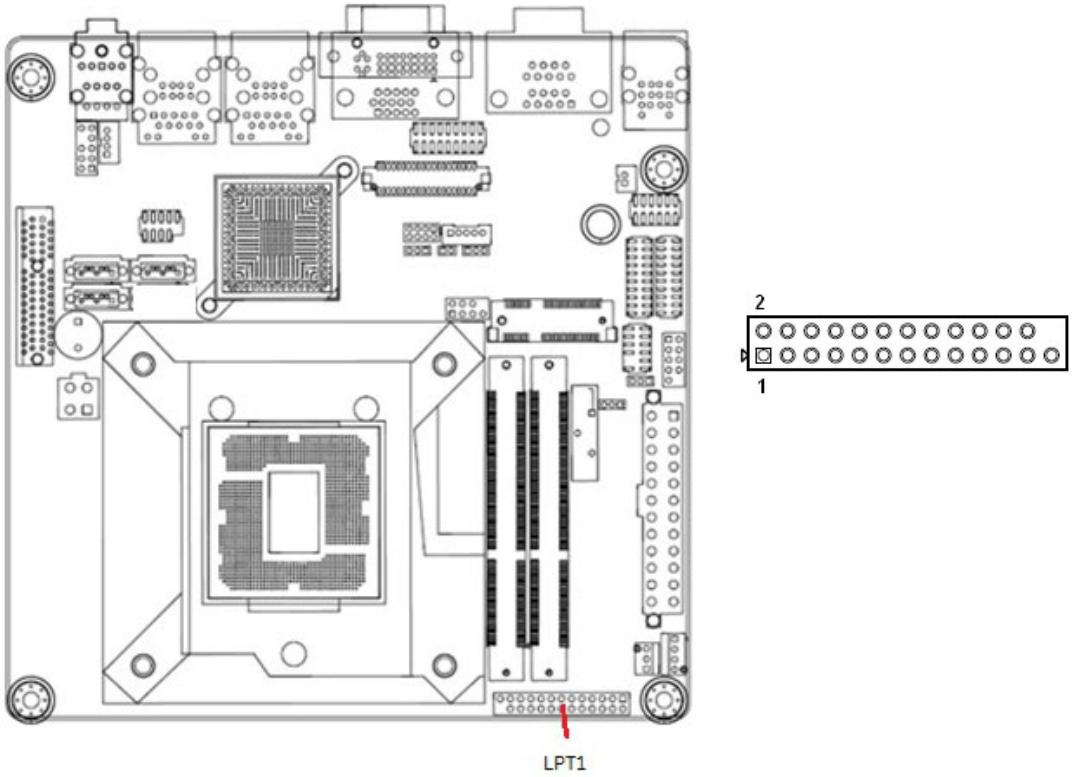


Table 2.13: LPT1

Pin	Signal	Pin	Signal
1	STB#	2	AFD#
3	DATA0	4	ERR#
5	DATA1	6	.INIT#
7	DATA2	8	SLIN#
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC

Chapter 3

BIOS Operation

3.1 Introduction

AMI BIOS has been integrated into many motherboards, and has been very popular for over a decade. People sometimes refer to the AMI BIOS setup menu as BIOS, BIOS setup or CMOS setup.

With the AMI BIOS Setup program, you can modify BIOS settings to control the special features of your computer. The Setup program uses a number of menus for making changes. This chapter describes the basic navigation of the AIMB-281 setup screens.

3.2 BIOS Setup

The AIMB-281 Series system has AMI BIOS built in, with a CMOS SETUP utility that allows users to configure required settings or to activate certain system features.

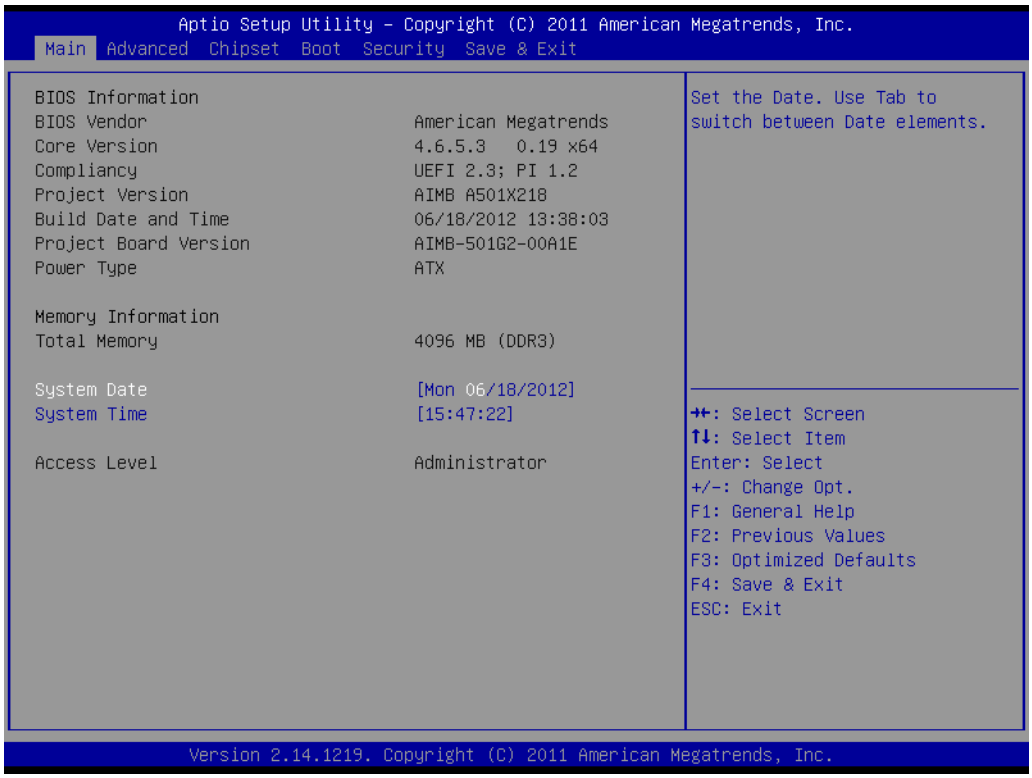
The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to preserve the CMOS RAM.

When the power is turned on, press the <Del> button during the BIOS POST (Power-On Self Test) to access the CMOS SETUP screen.

Control Keys	
< ↑ >< ↓ >< ← >< → >	Move to select item
<Enter>	Select Item
<Esc>	Main Menu - Quit and not save changes into CMOS Sub Menu - Exit current page and return to Main Menu
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Item Help
<F5>	Load Previous Values
<F7>	Load Setup Defaults
<F10>	Save all CMOS changes

3.3 Main BIOS Setup

Press <Del> 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.



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. The right frame displays the key legend.

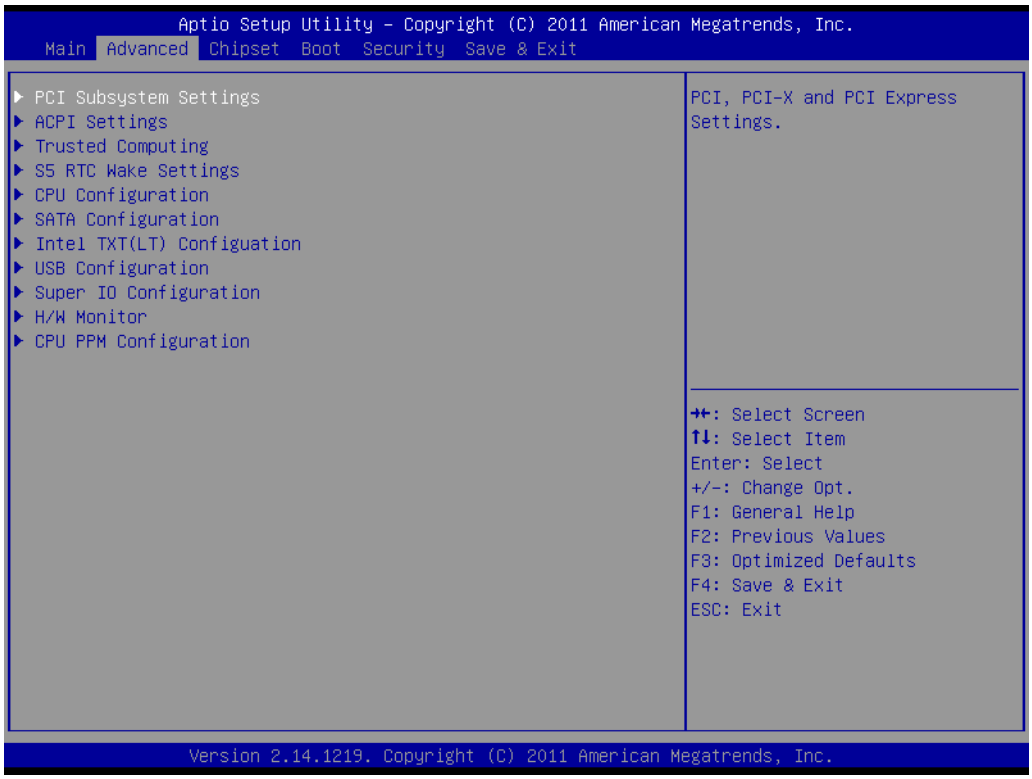
Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System time / System date**

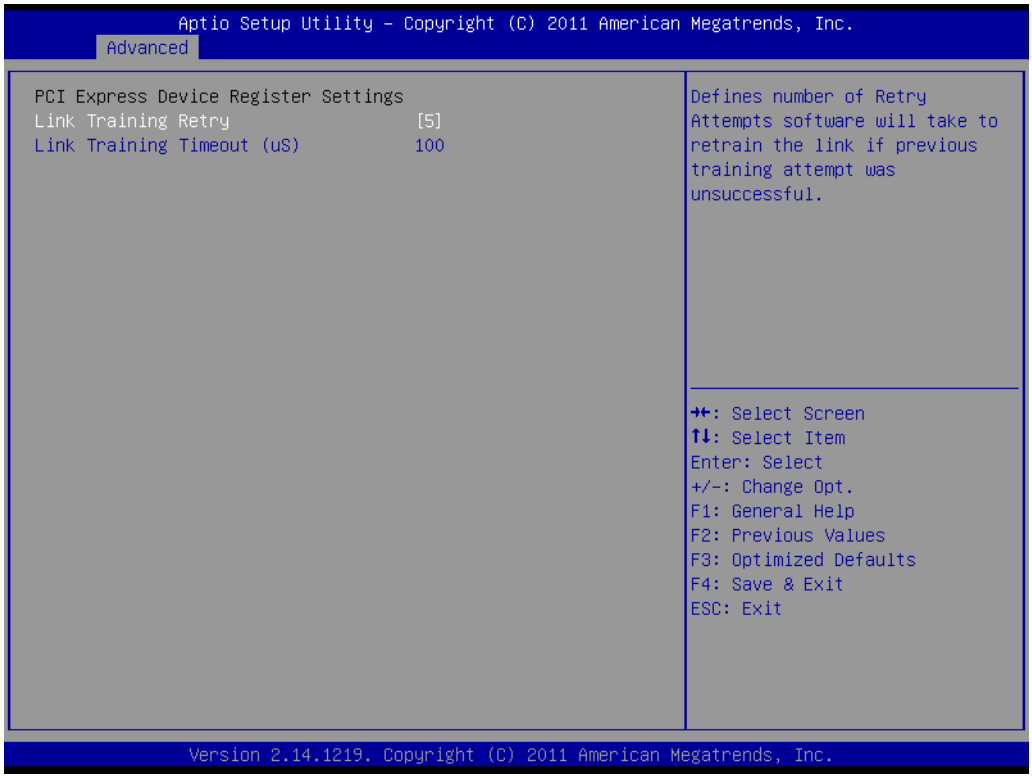
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.3.1 Advanced BIOS Features

Select the Advanced tab from the AIMB-281 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 screen is shown below. The sub menus are described on the following pages.

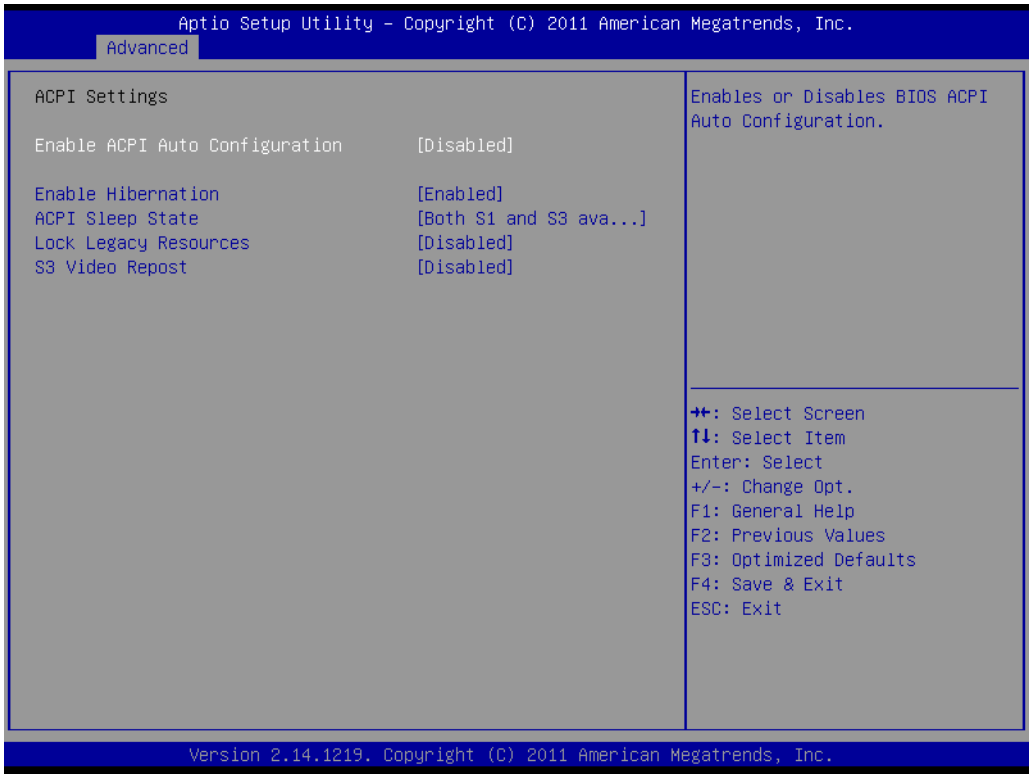


3.3.2 PCI Express Settings



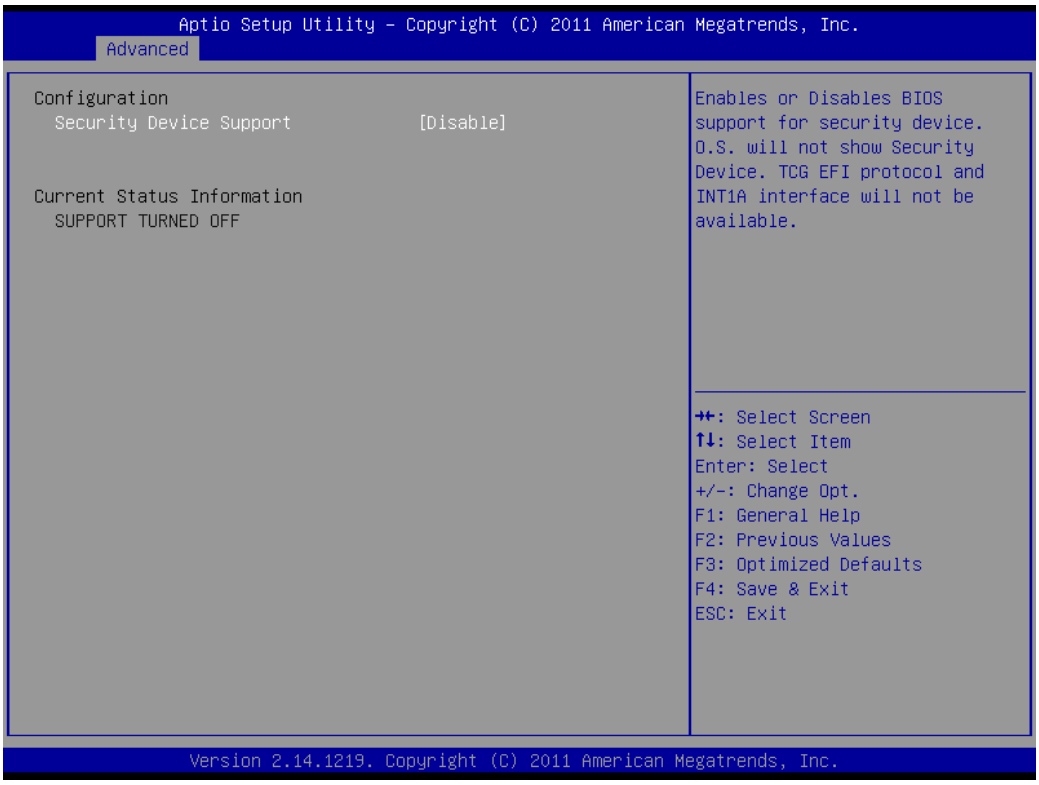
- **Link Training Retry**
  To adjust the retry times when PCIE Link failure
- **Link Training Timeout**
  To set up timeout for link training

3.3.3 ACPI settings



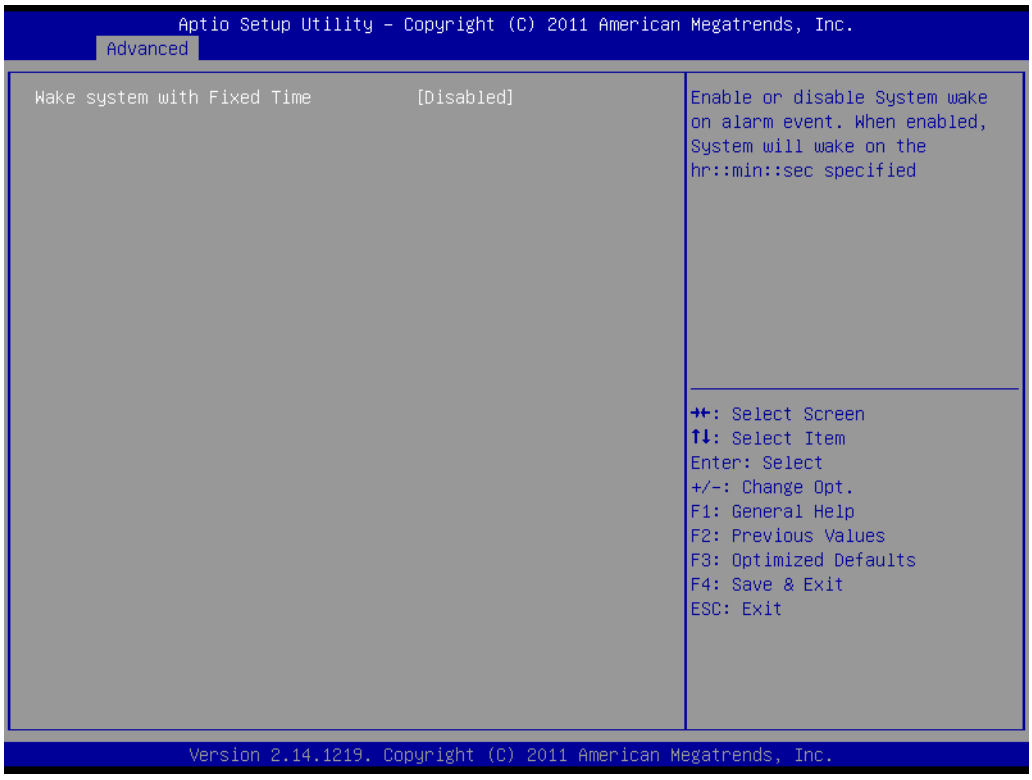
- **Enable ACPI Auto Configuration**
  Enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
  This item allows users to enable or disable Hibernation.
- **ACPI Sleep State**
  This item allows users to set the ACPI sleep state
- **Lock Legacy Resources**
  This item allows users to lock legacy devices' resources.
- **S3 Video Repost**
  Enable or disable video repost.

3.3.4 Trusted Computing



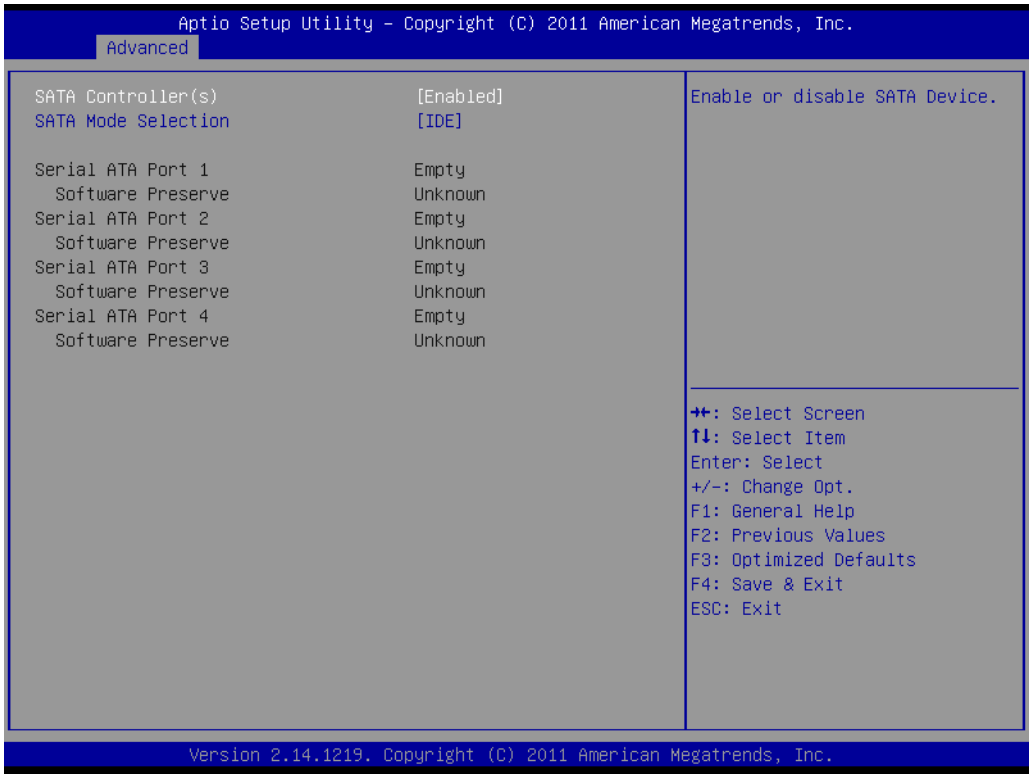
- **Security Device Support**
  Enable or disable BIOS support for security device.

3.3.5 S5 RTC wake Settings



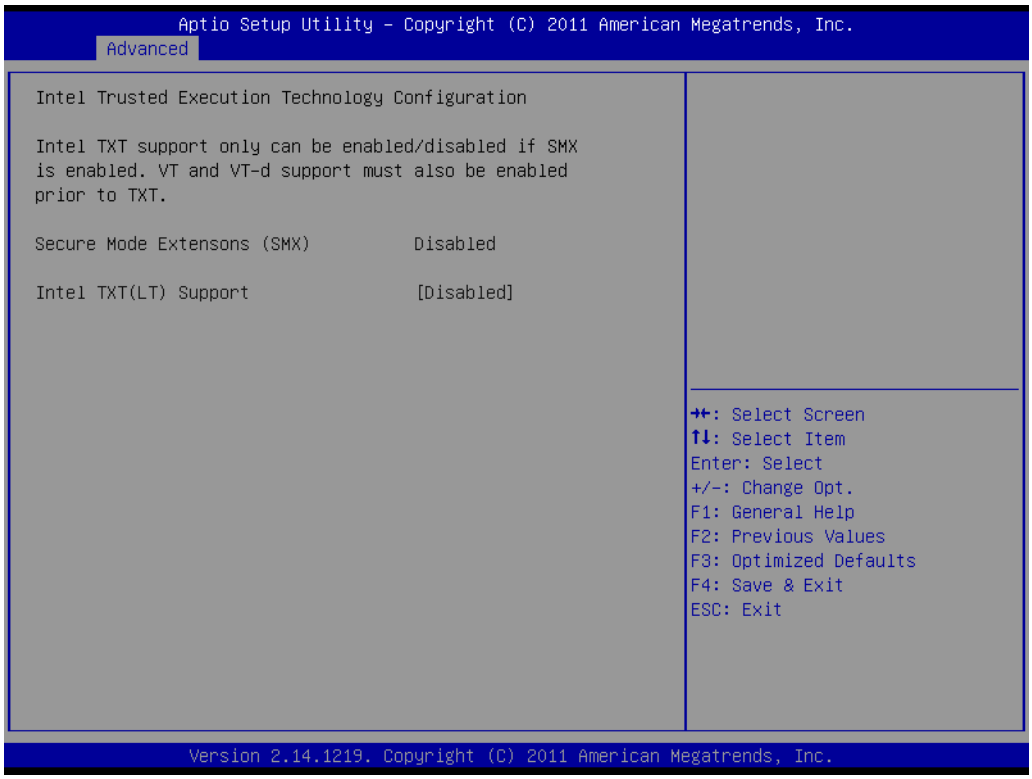
- **Wake system with fixed time**
  Enable or disable system wake on alarm event.

3.3.6 SATA Configuration



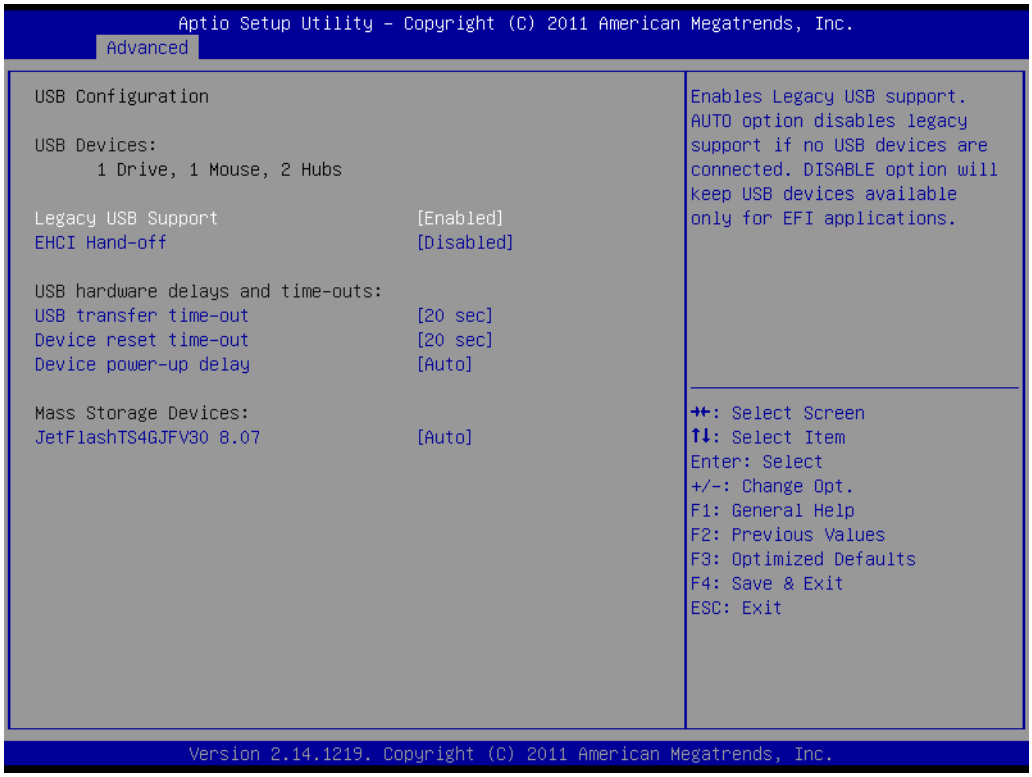
- **SATA Controllers**
  To enable or disable SATA controller.
- **SATA Mode Selection**
  This can be configured as IDE or AHCI mode.

3.3.7 Intel Trusted Execution Technology Configuration



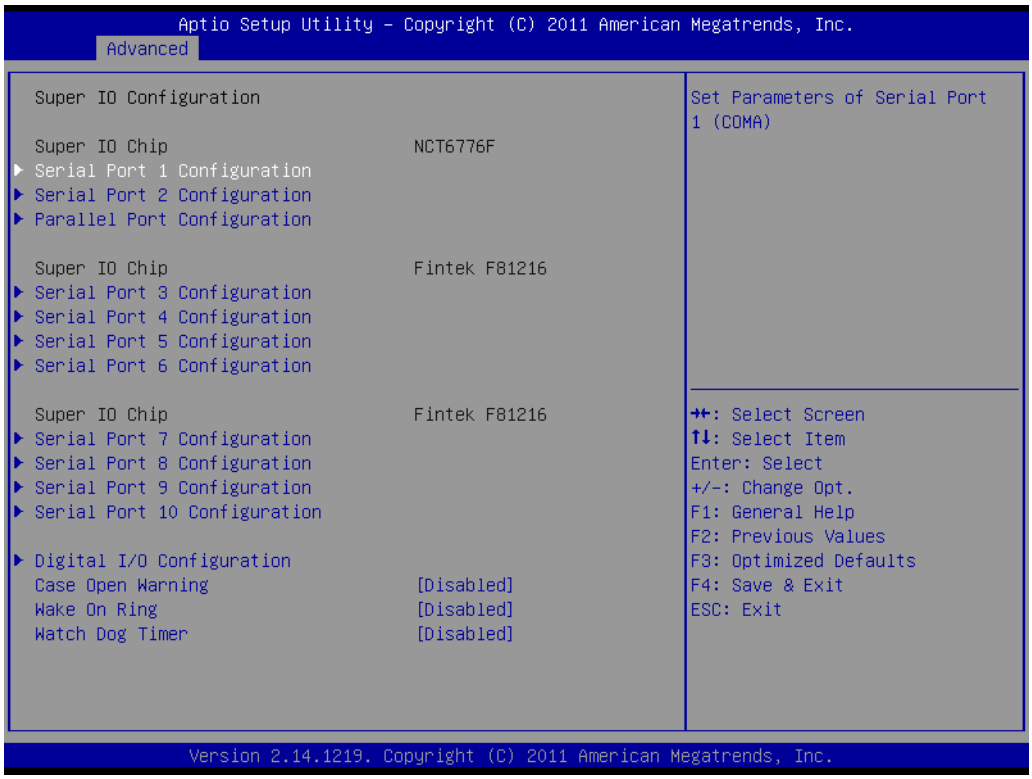
- **Secure Mode Extension (SMX)**
  This item allows users to enable or disable SMX.
- **Intel TXT Configuration**
  This item allow users to enable or disable Intel Trusted Execution Technology.

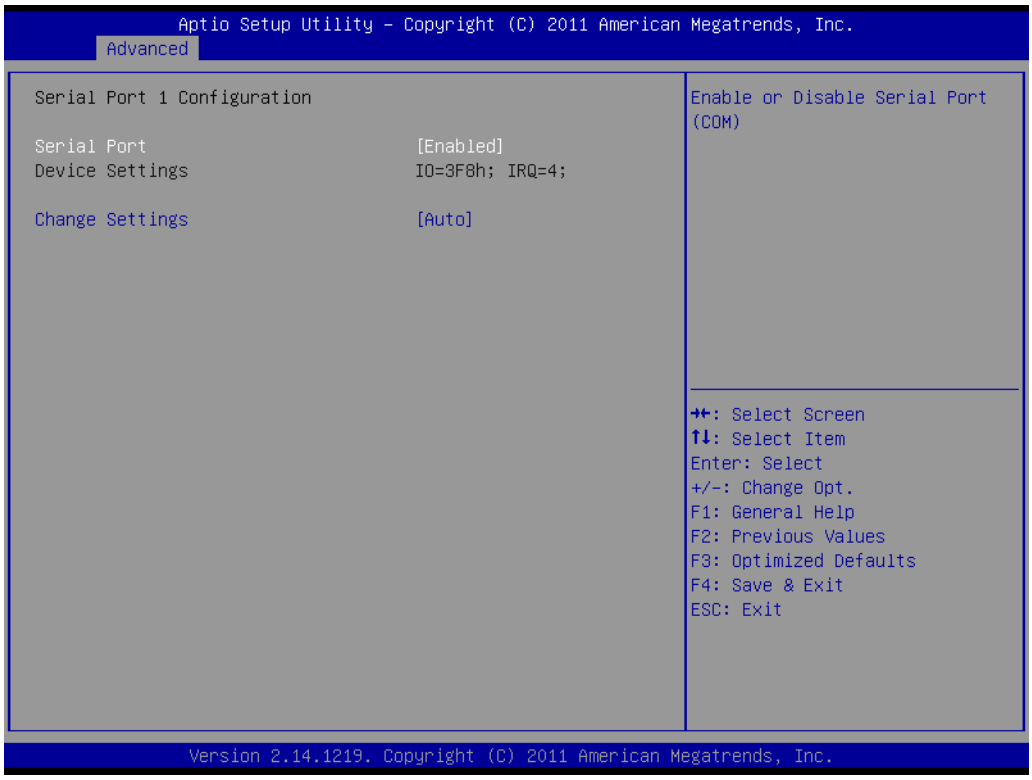
3.3.8 USB Configuration



- **Legacy USB Support**
  Enables support for legacy USB. Auto option disables legacy support if no USB devices are connected.
- **EHCI Hand-off**
  This is just a workaround item under OS without EHCI hand-off support.
- **USB hardware delays and time-outs**
  To set up parameter for detect USB device.
- **Mass Storage Devices**
  Shows USB mass storage device information.

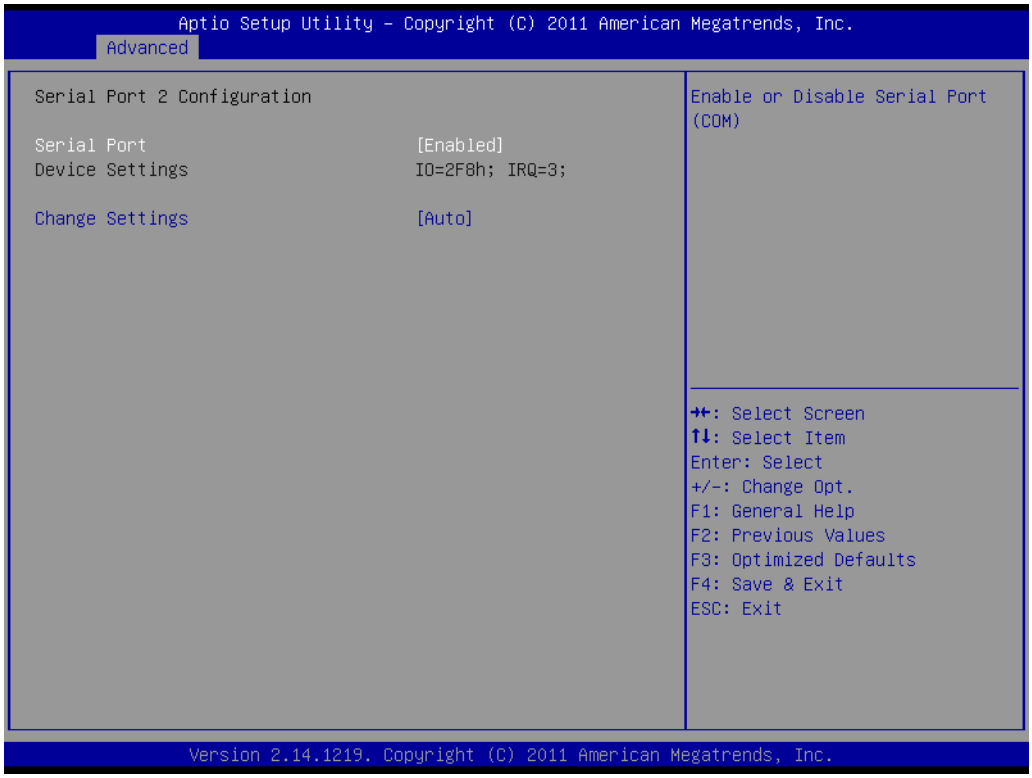
3.3.9 Super IO Configuration





Serial Port 1 Configuration

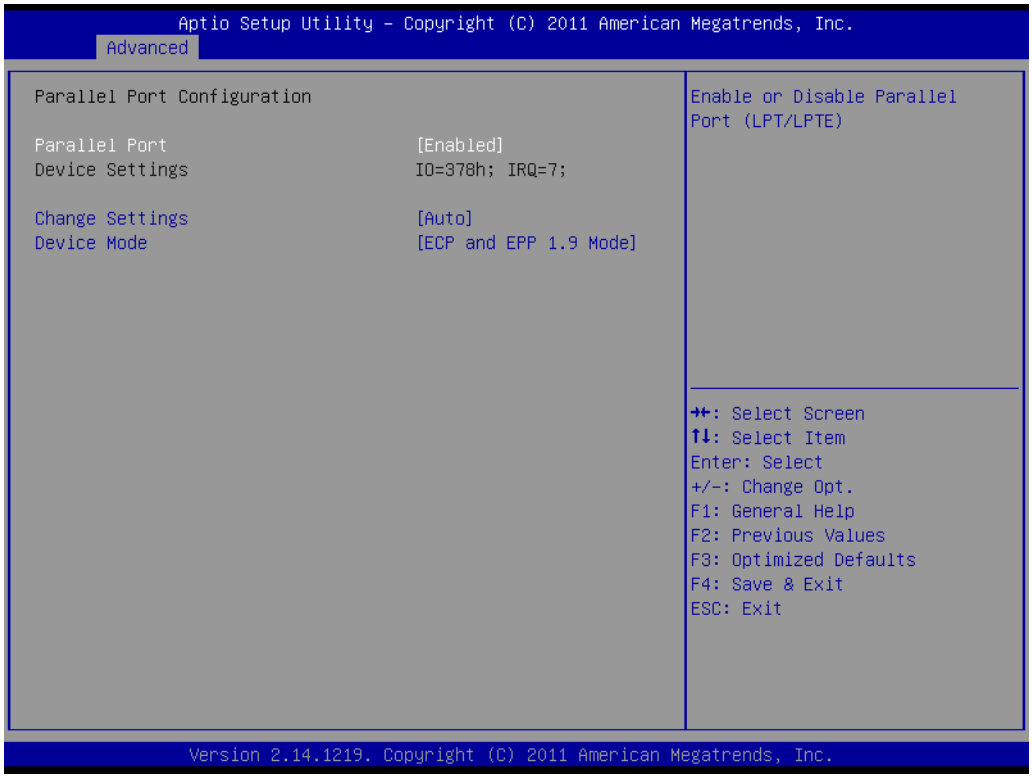
- **Serial Port**
  To “enable” or “disable” Serial Port 1.
- **Change Settings**
  To select the IO address/IRQ setting for serial port 1.



Serial Port 2 Configuration

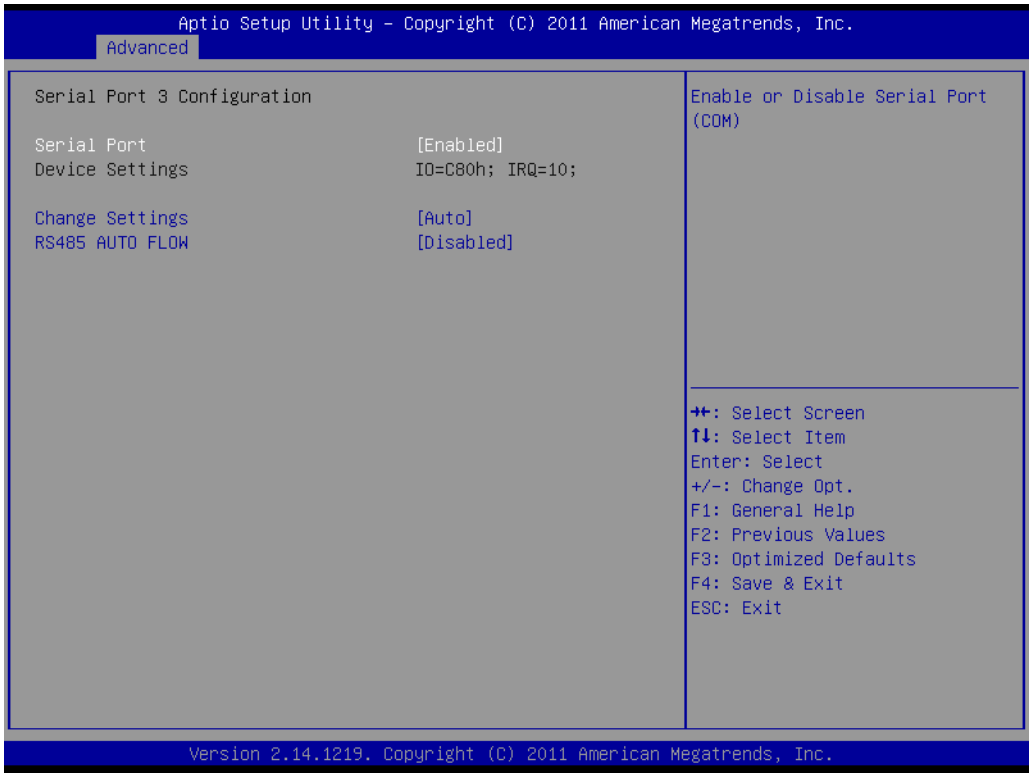
- **Serial Port**
  To “enable” or “disable” Serial Port 2.
- **Change Settings**
  To select the IO address/IRQ setting for serial port 2.

Parallel Port Configuration



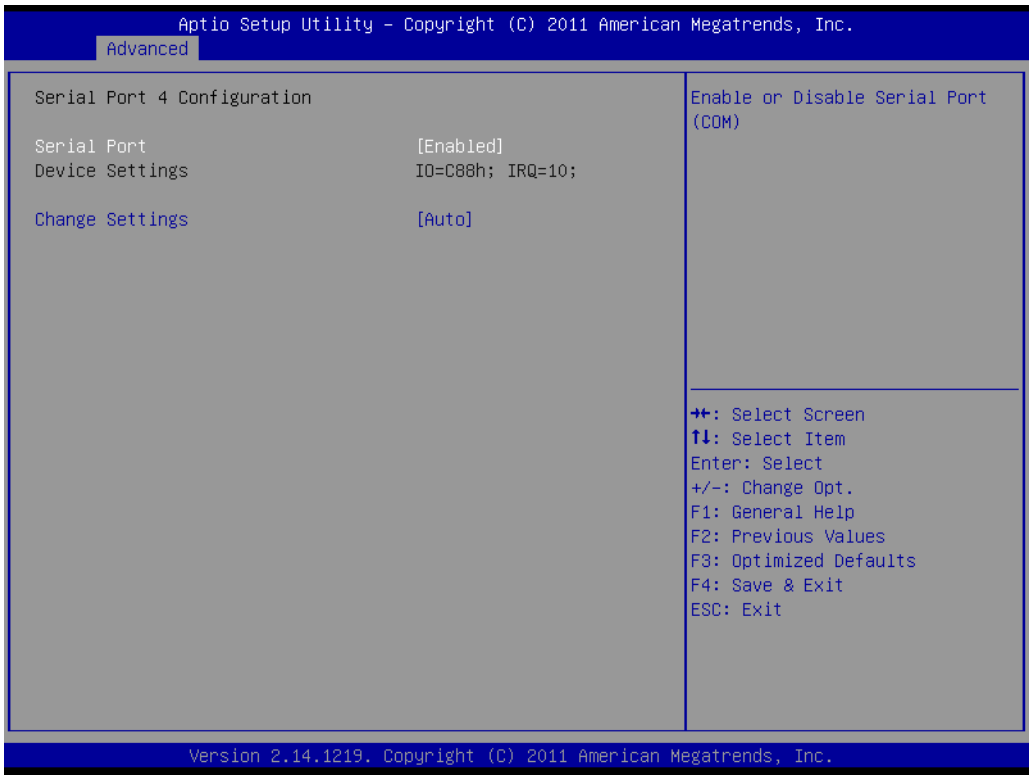
- **Parallel Port**
  To enable or disable Parallel Port.

Super IO Configuration



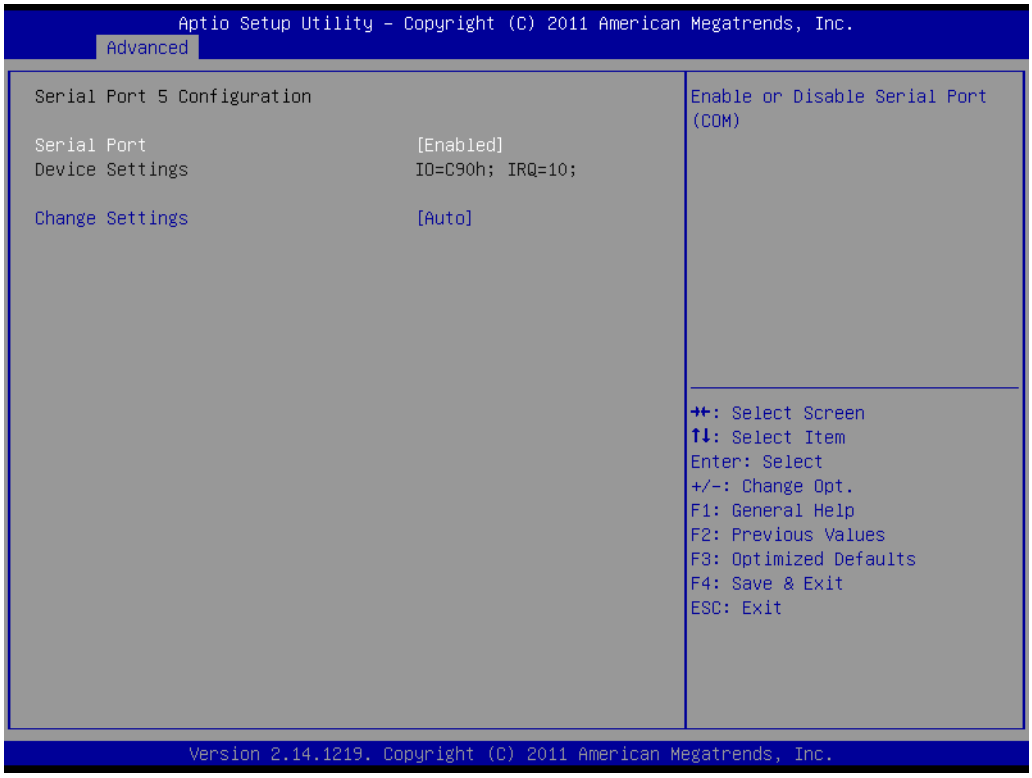
Serial Port 3 Configuration

- **Serial Port**
  To “enable” or “disable” Serial Port 3.
- **Change Settings**
  To select the IO address/IRQ setting for serial port 3.
- **Auto flow control**
  When the COM is to set as RS-485, it supports auto flow control function.



Serial Port 4 Configuration

- **Serial Port**
  To “enable” or “disable” Serial Port 4.
- **Change Settings**
  To select the IO address/IRQ setting for serial port 4.



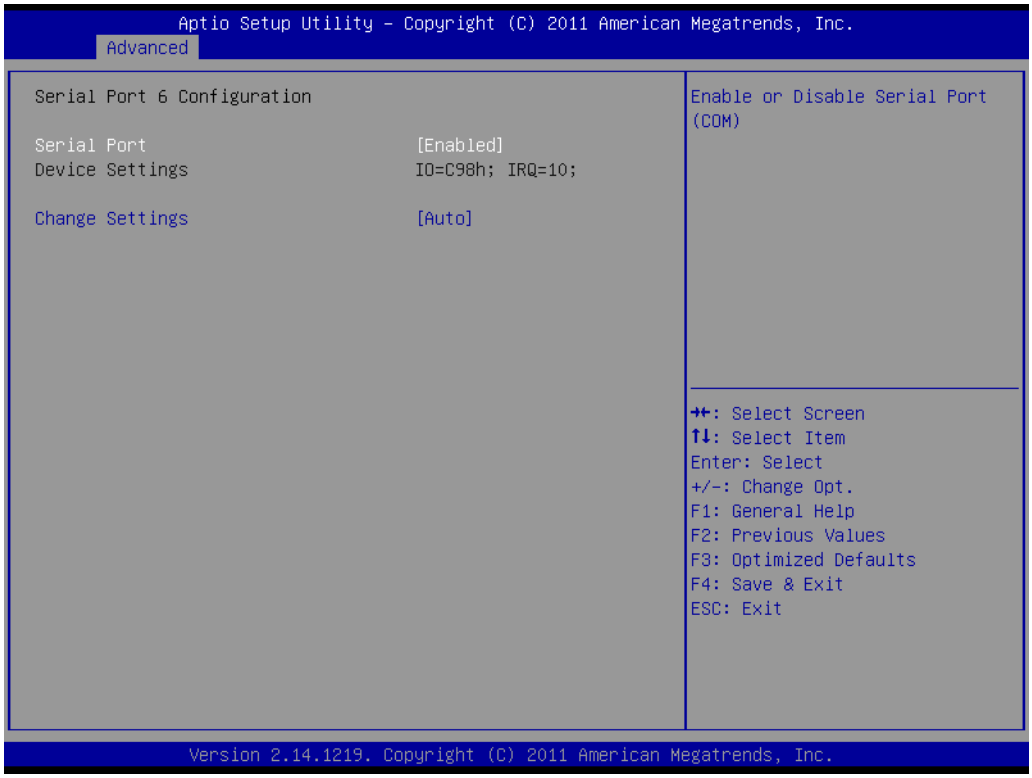
Serial Port 5 Configuration

- **Serial Port**

  To ,"enable" or "disable" Serial Port 5.

- **Change Settings**

  To select the IO address/IRQ setting for serial port 5.



Serial Port 6 Configuration

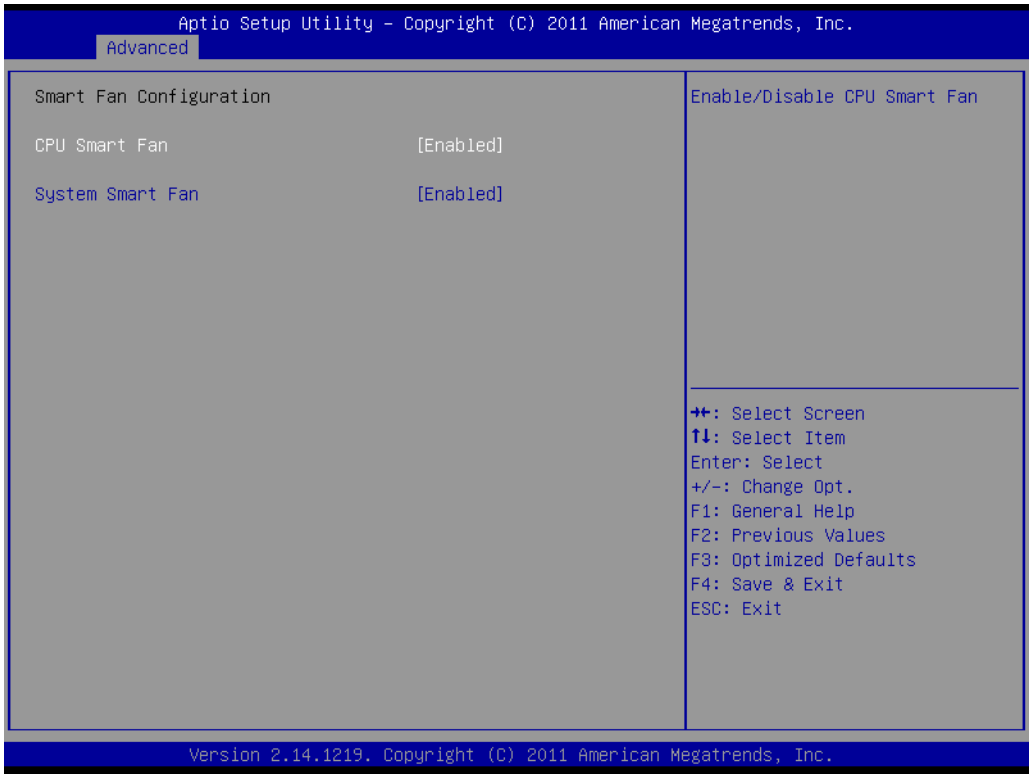
- **Serial Port**

  To "enable" or "disable" Serial Port 6.

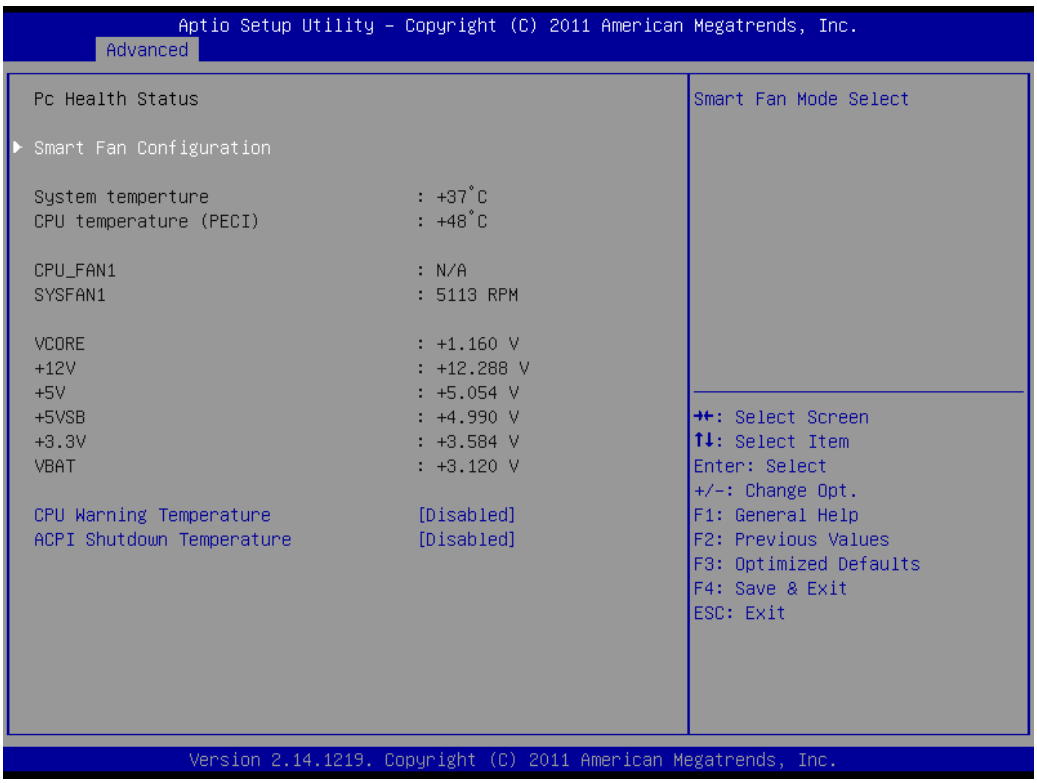
- **Change Settings**

  To select the IO address/IRQ setting for serial port 6.

3.3.10 Smart Fan Configuration



- **CPU Smart Fan**
  To enable or disable CPU smart fan.
- **System Smart Fan**
  To enable or disable System Smart Fan.



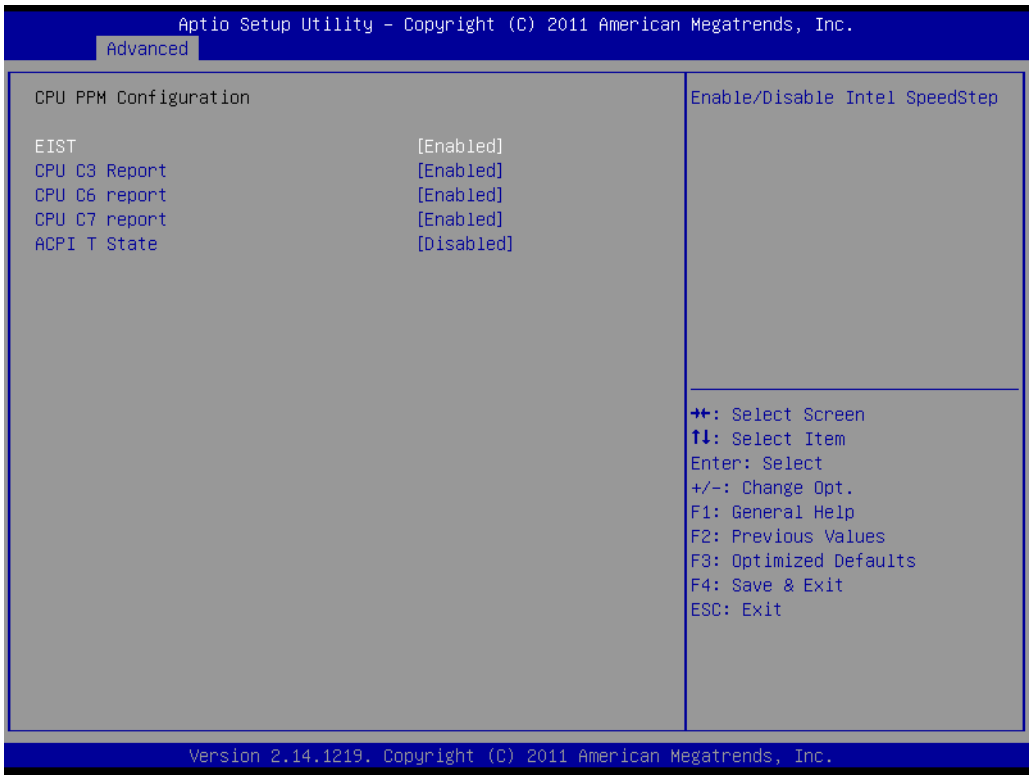
- **CPU Warning Temperature**

  Use this to set the CPU warning temperature threshold. When the system CPU reaches the warning temperature, the buzzer will beep.

- **ACPI Shutdown Temperature**

  This screen allows users to set the CPU temperature at which the system will automatically shut down to prevent the CPU from overheating damage.

3.3.11 CPU PPM Configuration

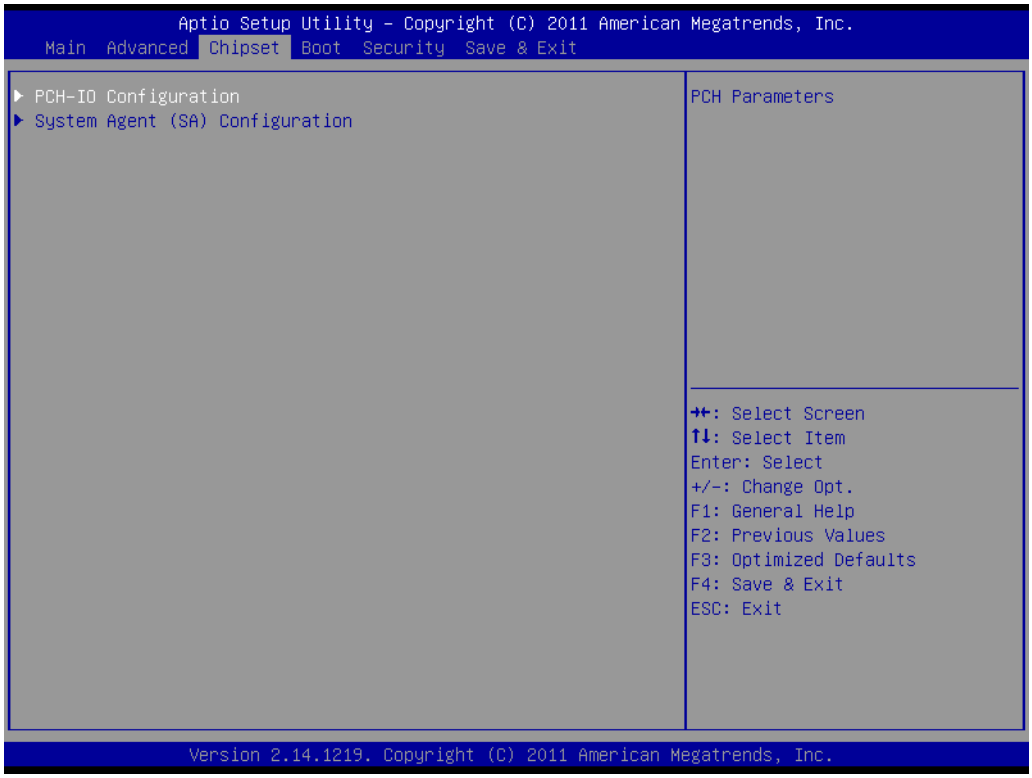


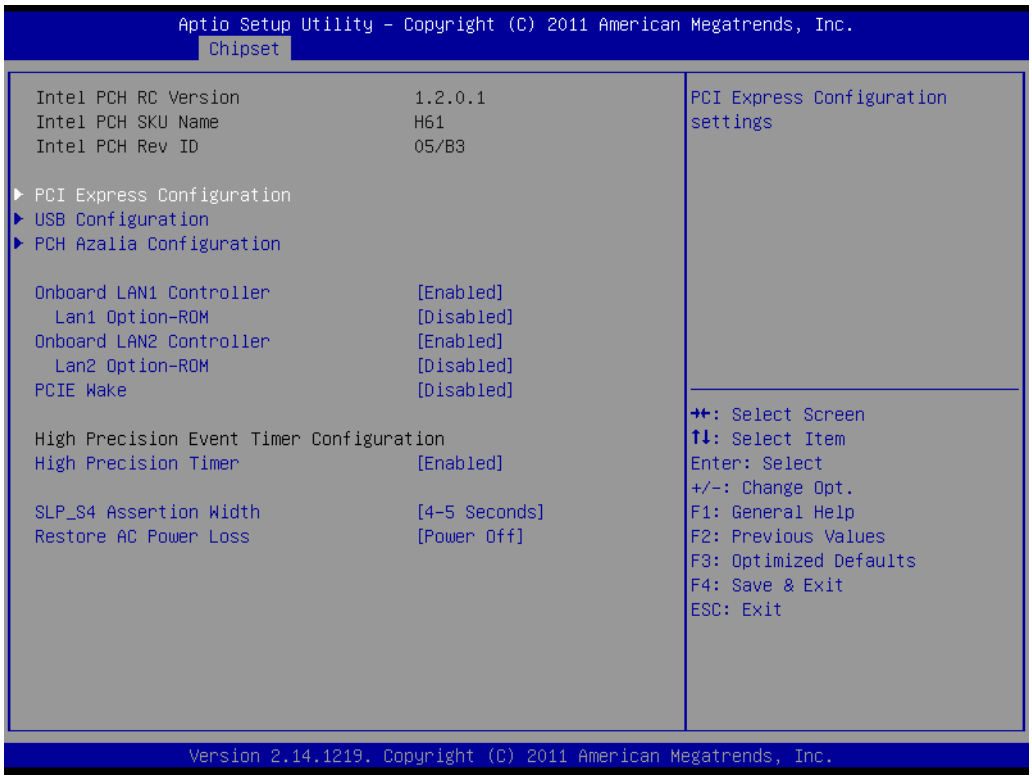
- **EIST**
  CPU runs at its default speed if disabled; CPU speed is controlled by the operating system if enabled.
- **CPU C3/C6/C7 Report**
  This item allows users to enable or disable CPU C-state support.
- **ACPI T state**
  This item allows users to enable or disable ACPI T state function.

3.4 Chipset Configuration Setting

Select the chipset tab from the BIOS setup screen to enter the Chipset Setup screen. Users can select any item in the left frame of the screen, such as PCI express Configuration, to go to the sub menu for that item. Users can display a Chipset Setup option by highlighting it using the <Arrow> keys. All Chipset Setup options are described in this section. The Chipset Setup screens are shown below. The sub menus are described on the following pages.

3.4.1 PCH-IO Configuration

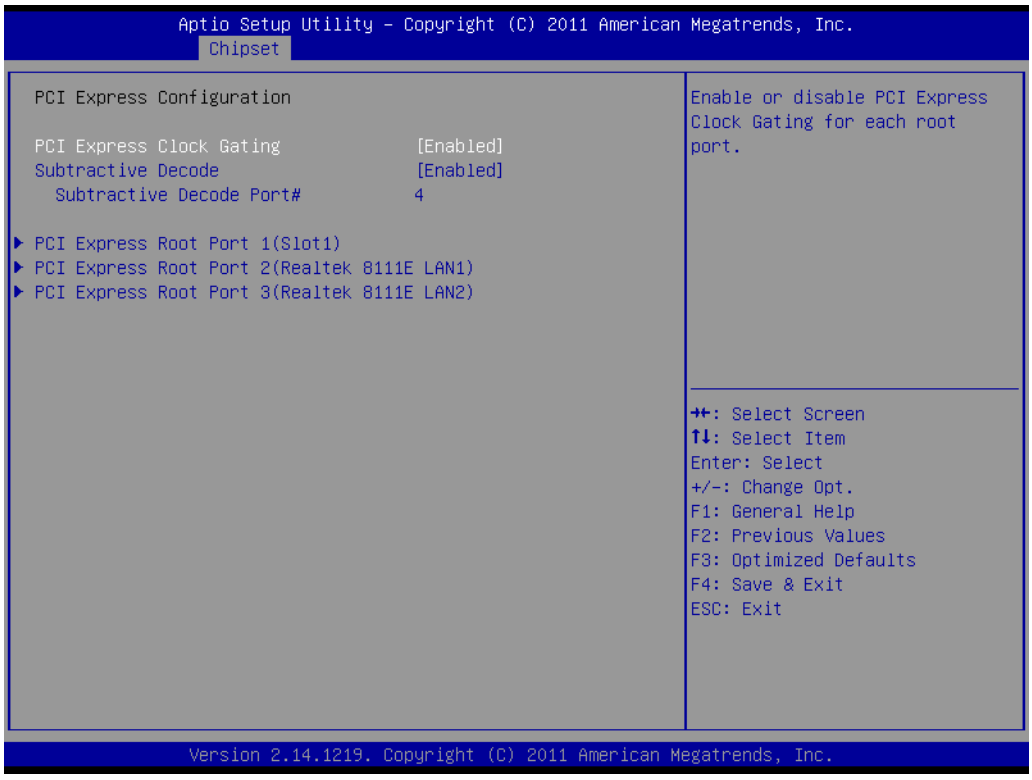




- **PCI Express Configuration**
  Detail of PCI Express items.
- **USB Configuration**
  Details of USB items.
- **PCH Azalia Configuration**
  Details of PCH azalia items.

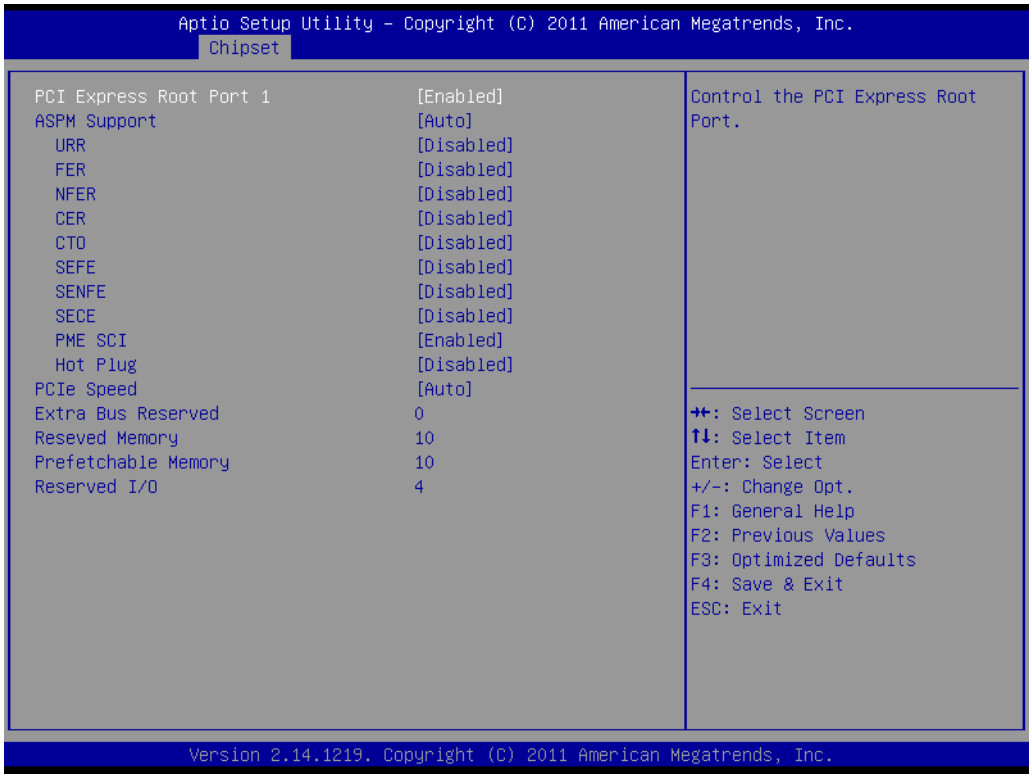
- **LAN controller**
  Enables or disables the LAN1/2 controller.
- **LAN option-ROM**
  Enables or disables the LAN1/2 option-ROM.
- **PCIE Wake**
  Enables or disables PCIE device wake up from sleep state.
- **High Precision Timer**
  Enables or disables the high precision timer.
- **SLP_S4 Assertion Width**
  This item allows users to set a delay of sorts.
- **Restore AC Power Loss**
  This item allows users to select off, on and last state.

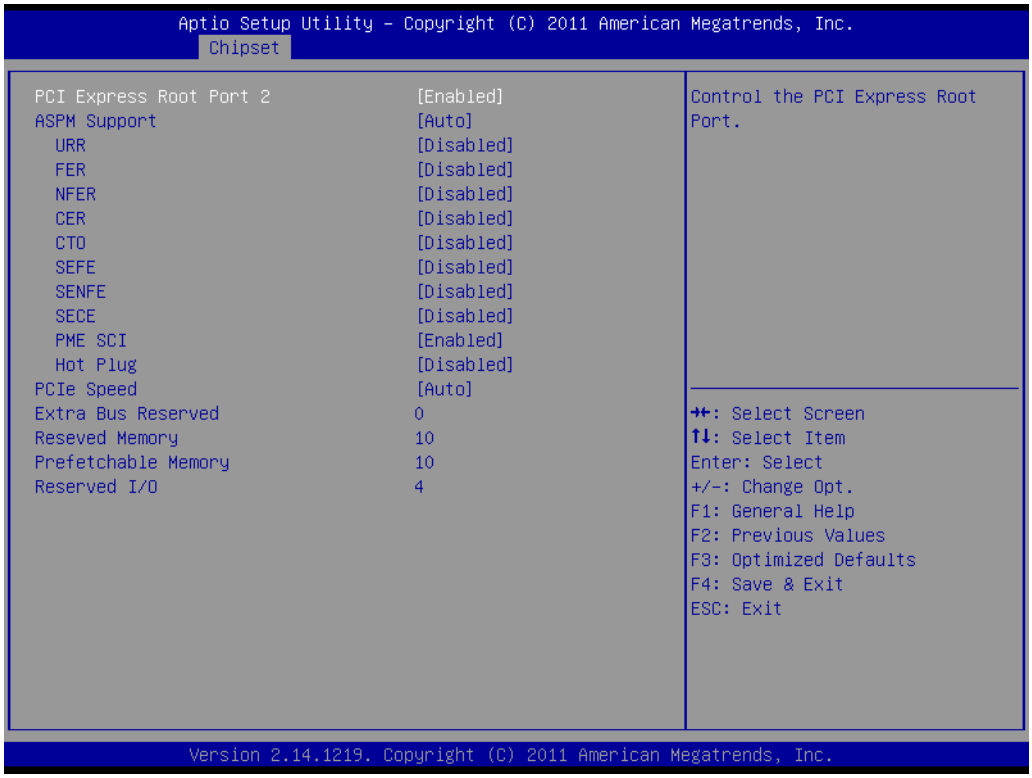
3.4.1.1 PCI Express Configuration

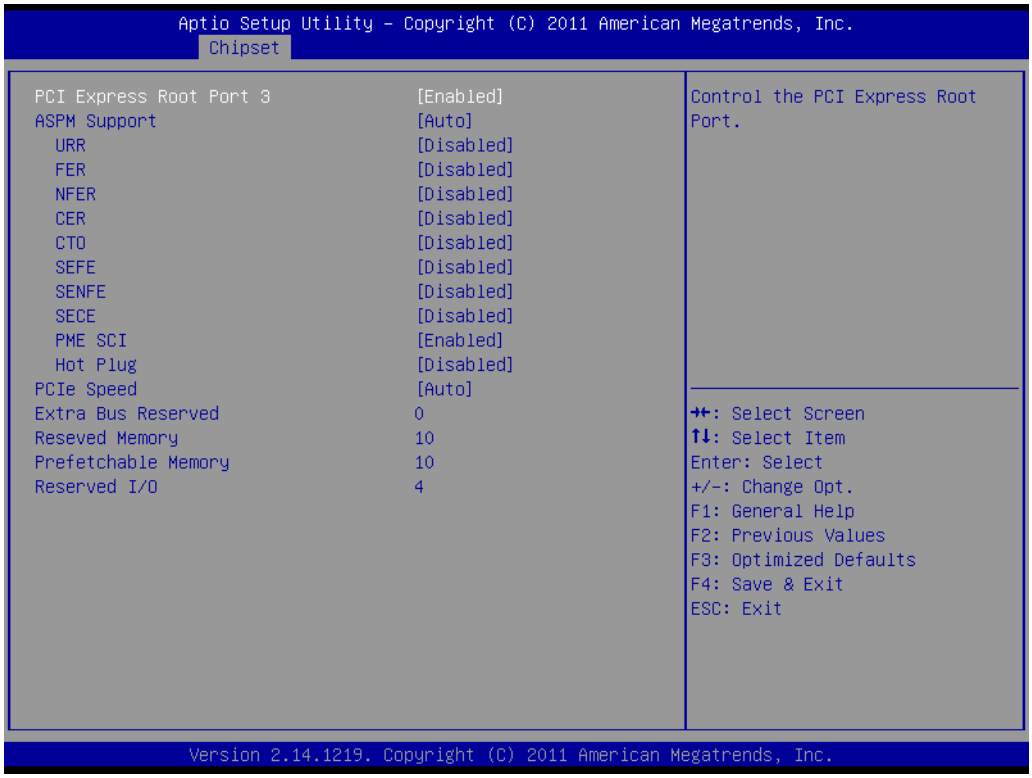


- **PCI Express Clock Gating**
  Enable or disable PCI express clock gating.
- **Subtractive Decode**
  Enable or disable Subtractive decode.

3.4.1.2 PCI Express Root Port 1/2/3







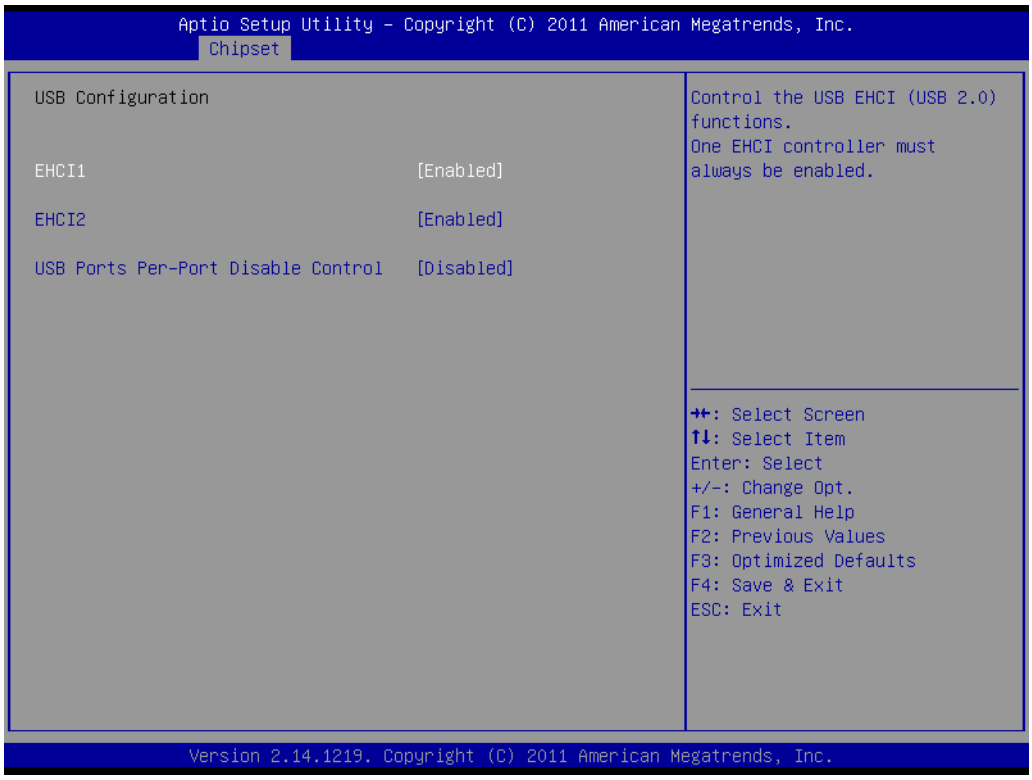
This pages allow users to adjust parameter for PCI express root port 1&2&3.

- **ASPM Support**
  Allow user to set the ASPM Level. Force L0s - Force all links to L0s State. AUTO - BIOS auto configure. DISABLE - Disables ASPM.
- **URR**
  Enable or disable PCI Express Unsupported Request Reporting.
- **FER**
  Enable or disable PCI Express Device Fatal Error Reporting.
- **NFER**
  Enable or disable PCI Express Device Non-Fatal Error Reporting.
- **CER**
  Enable or disable PCI Express Device Correctable Error Reporting.
- **CTO**
  Enable or disable PCI Express Completion Timer TO.
- **SEFE**
  Enable or disable Root PCI Express System Error on Fatal Error.
- **SENFE**
  Enable or disable Root PCI Express System Error on Non-Fatal Error.
- **SECE**
  Enable or disable Root PCI Express System Error on Correctable Error.
- **PME SCI**
  Enable or disable PCI Express PME SCI.
- **Hot Plug**
  Enable or disable PCI Express Hot Plug.
- **PCIe Speed**
  Select PCI Express port speed.
- **Extra Bus Reserved**

Extra Bus Reserved for bridges behind this Root Bridge.

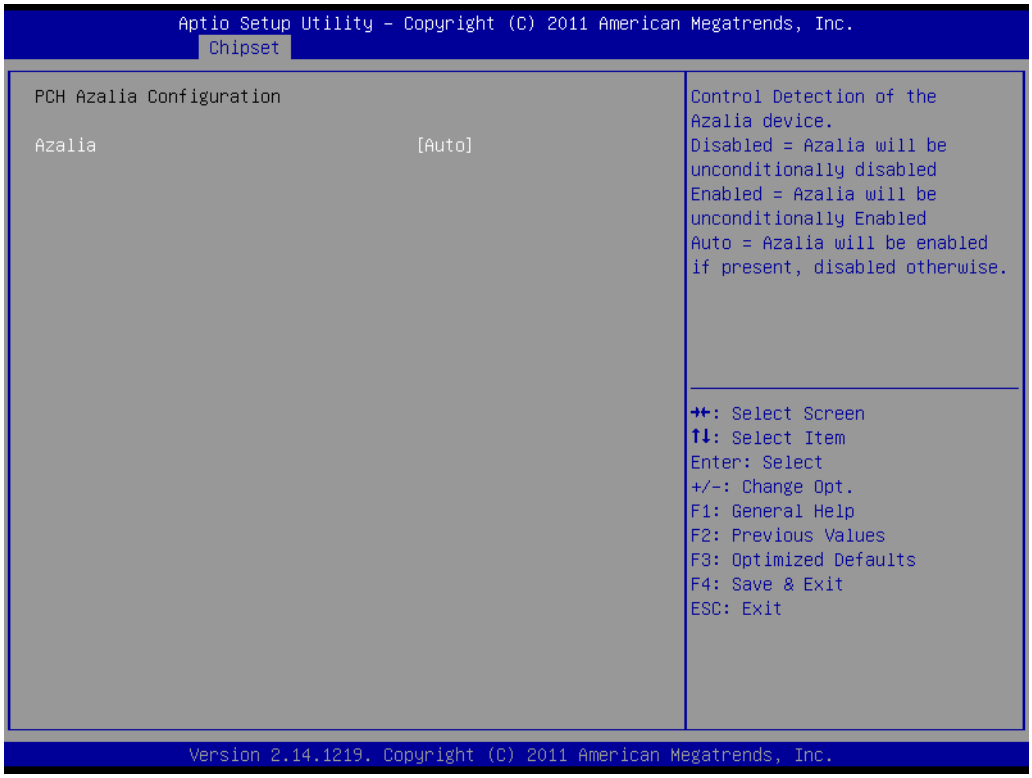
- **Reserved Memory**
  Reserved Memory Range for this Root Bridge.
- **Prefetchable Memory**
  Prefetchable Memory Range for this Root Bridge.
- **Reserved I/O**
  Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge

3.4.2 USB Configuration



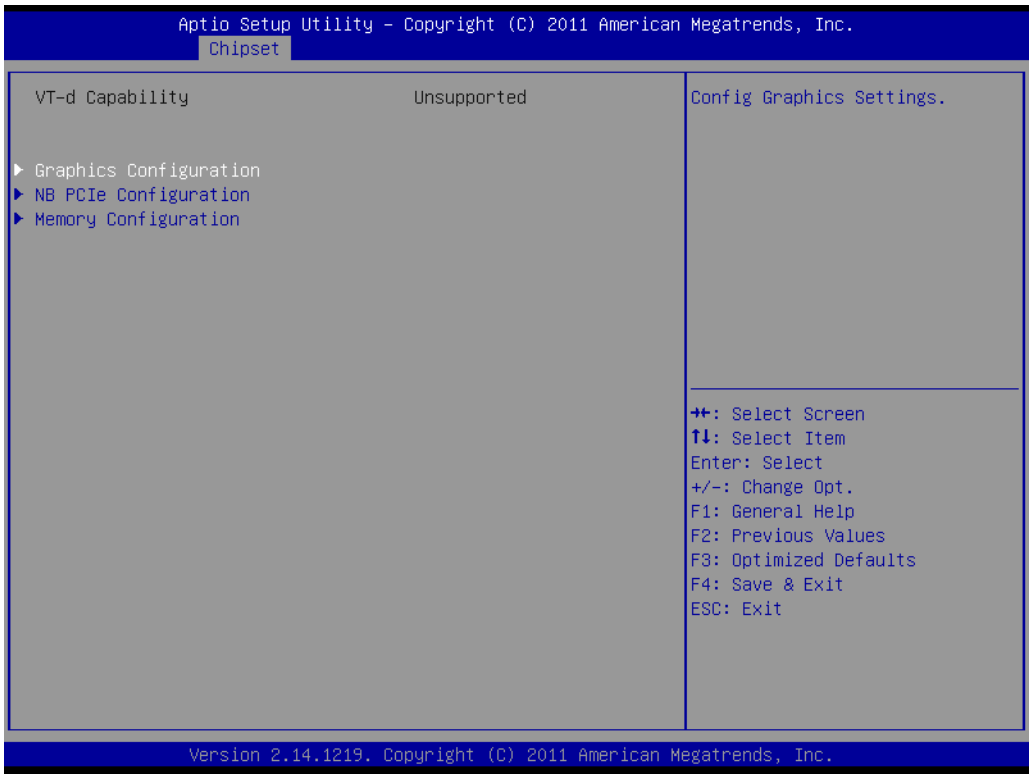
- **EHCI 1/2**
  Enables or disables the EHCI controller.
- **USB Ports pre-port Disable Control**
  This item allows users to enable or disable each USB port individually.

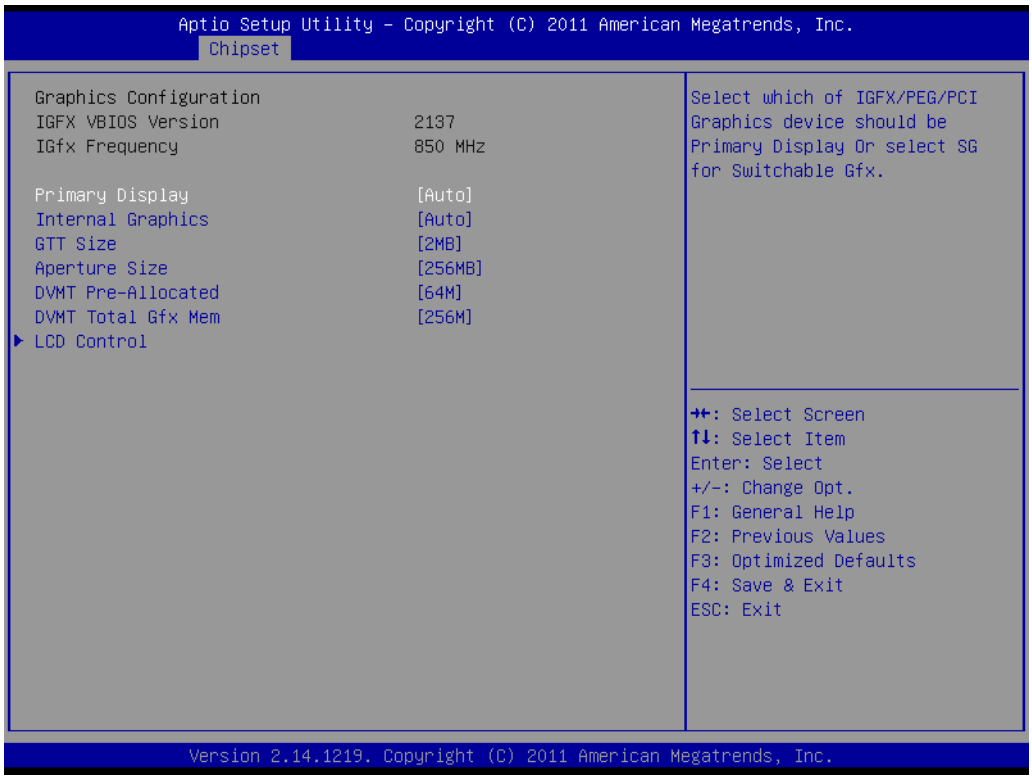
3.4.3 PCH Azalia Configuration



- **Azalia**
  This item allows user to enable or disable azalea device.

3.4.4 System agent Configuration





- **Primary Display**
  This item allows users to select which graphics controller to use as the primary boot device.
- **Internal Graphics**
  This item allows users to enable or disable IGD.
- **GTT Size**
  This item allows users to select GTT size.
- **Aperture Size**
  This item allows users to select aperture size.
- **DVMT Pre-Allocated**
  This item allows users to select DVMT pre-allocated memory size.
- **DVMT Total Gfx Mem**
  This item allows users to select DVMT total memory size.
- **LCD Control**
  This item allows users to setup Display Control configuration.

3.4.4.1 LCD Control configuration

- **Primary IGFX Boot Display**

  This items allow users to select the video device which will be activated during post. The available options are VBIOS Default, VGA, LVDS, DVI.

- **SDVO-LFP Panel Type:**

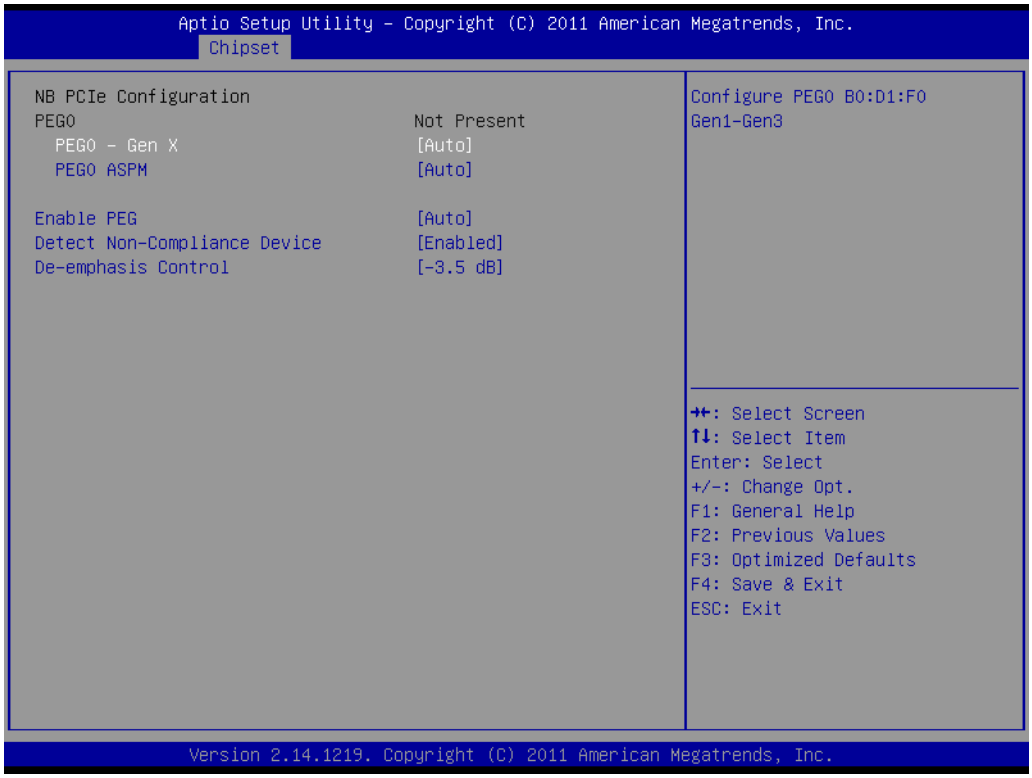
  1024 x 768 18-bit

  1024 x 768 24-bit

  1280 x 1024 48-bit

  1366 x 768 24-bit

3.4.5 NB PCIe Configuration



- **PEG0 - Gen x**

  Select PEG0 speed.

  – PEG0 ASPM=> Enable/Disable PEG0 ASPM function. (ASPM: Active State Power Management)

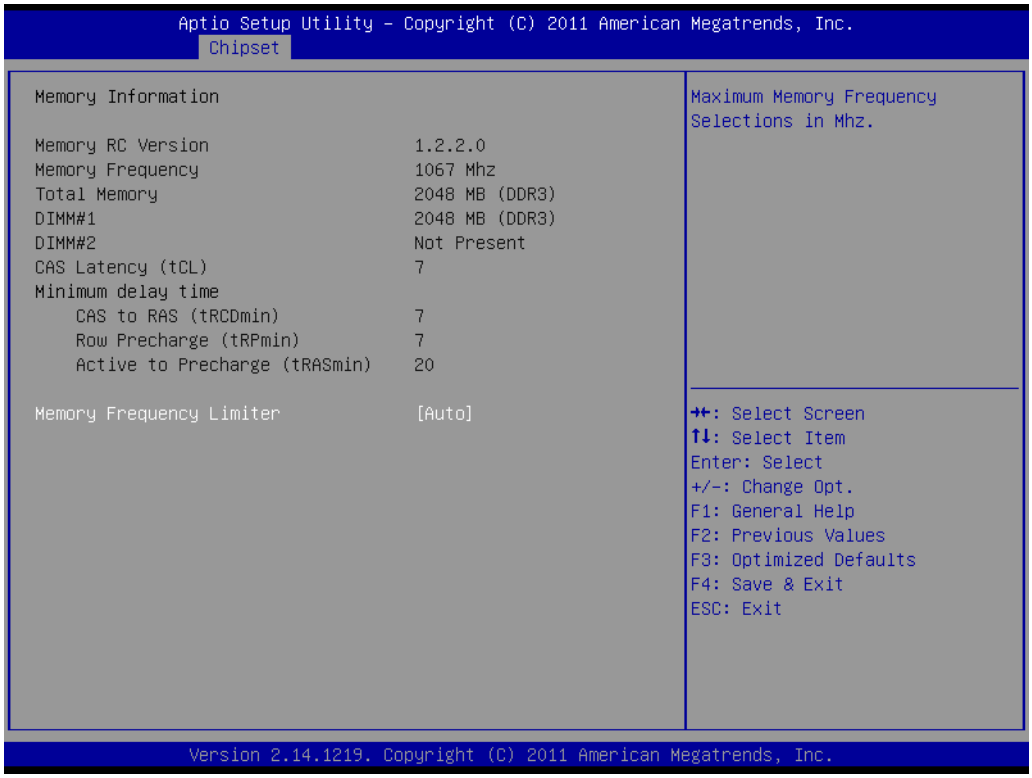
- **Enable PEG**

  This item allows users to enable or disable PEG always.

- **Detect Non-Compliance Device**

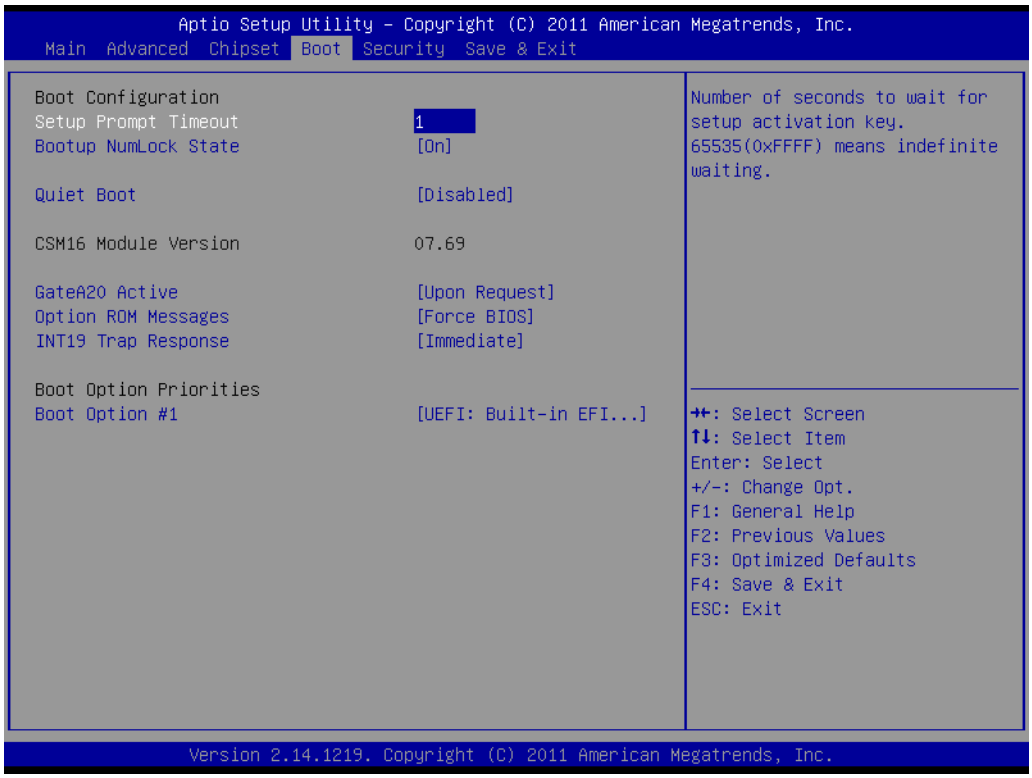
  This item allows users to enable or disable Detect Non-Compliance Device function.

3.4.6 Memory Information



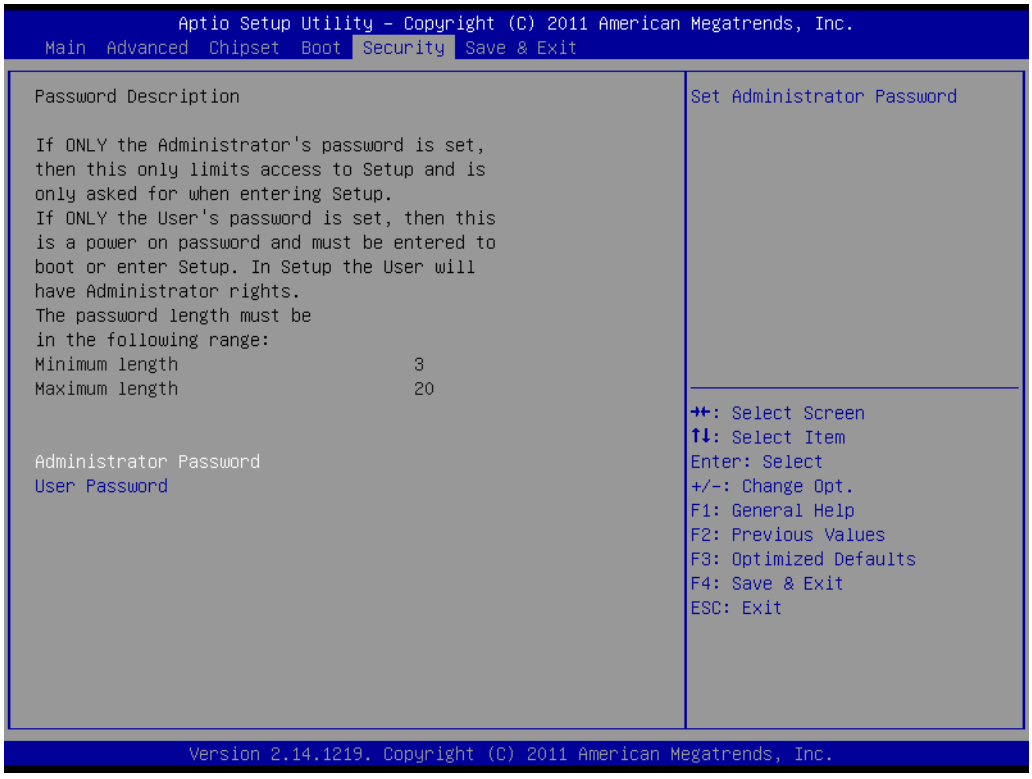
- **Memory Frequency Limiter**
  Select memory frequency limiter for auto, 1067, 1333, 1600.

3.5 Boot Configuration



- **Setup Prompt Timeout**
  This item allows you to change number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  Select the Power-on state for Numlock.
- **Quiet Boot**
  If this option is set to Disabled, the BIOS display normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **GateA20 Active**
  This item allows you to select upon request or always.
- **Option ROM Messages**
  Sets display mode for option ROM.
- **INT19 Trap Response**
  This item allows option ROMs to trap interrupt 19.
- **Boot Option PrioritiesNT19 Trap Response**
  Set the system boot order.

3.6 Security Setting

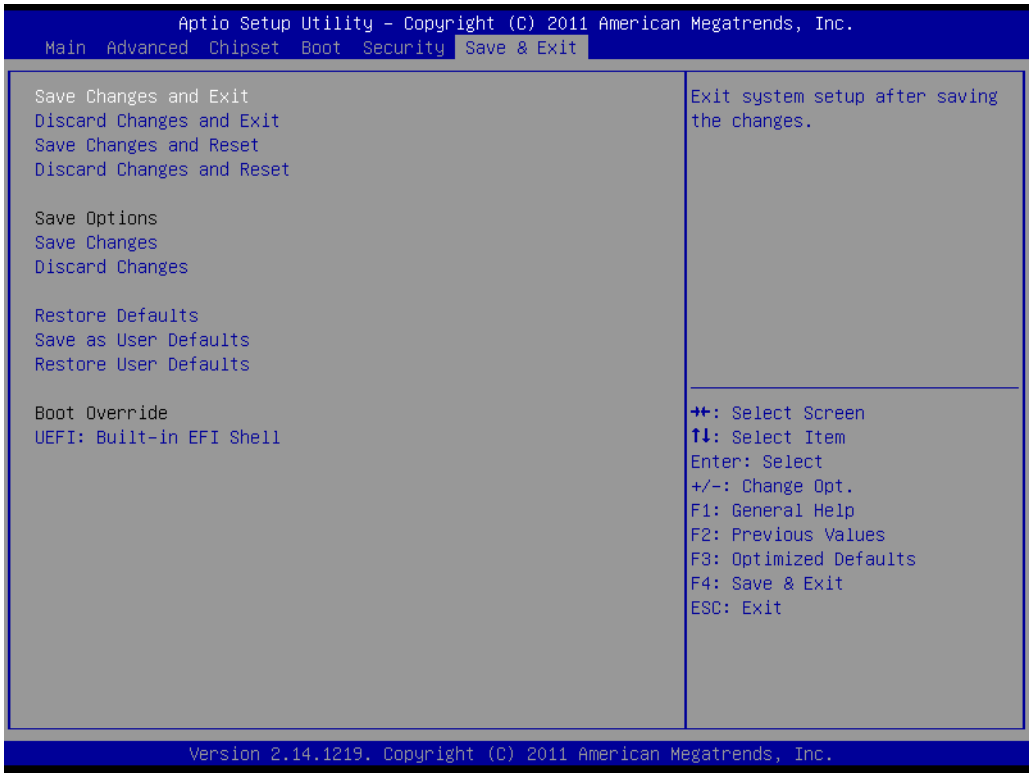


Select Security Setup from the AIMB-281 Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press<Enter>: Change Administrator / User Password.

- **Administrator Password**
  Select this option and press <ENTER> to access the sub menu, and then type in the password. Set the Administrator password.
- **User Password**

Select this option and press <ENTER> to access the sub menu, and then type in the password. Set the User Password.

3.7 Save & Exit Configuration



- **Save Changes and Exit**

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

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

- **Discard Changes and Exit**

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

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

- **Restore Default**

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

- **Save as User Default**

  Save the all current settings as a user default.

- **Restore User Default**

Restore all settings to user default values.

- **Boot Override**

  Shows the boot device types on the system.

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 AIMB-281 are located on the software installation CD. The driver in the folder of the driver CD will guide and link you to the utilities and drivers under a Windows system. Updates are provided via Service Packs from Microsoft*.

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:

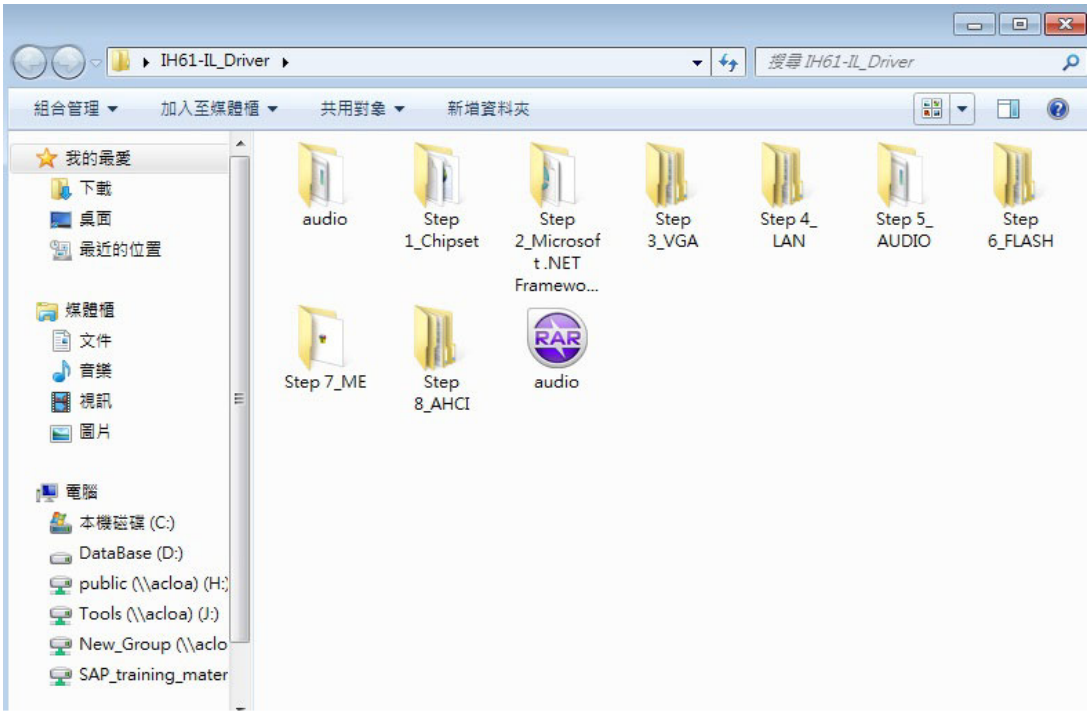
- Core PCI PnP services
- IDE Ultra ATA 100/66/33 and Serial ATA interface support
- USB 1.1/2.0 support (USB 2.0 driver needs to be installed separately for Win98)
- Identification of Intel chipset components in the Device Manager

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

- *Windows 7 (32-bit)*
- *Windows 7 (64-bit)*
- *Windows XP professional edition (32-bit)*
- *Windows XP professional edition (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 folder items. Navigate to the "Intel chip" folder and click "Setup.exe" to complete the installation of the driver.



Chapter 5

VGA Setup

5.1 Introduction

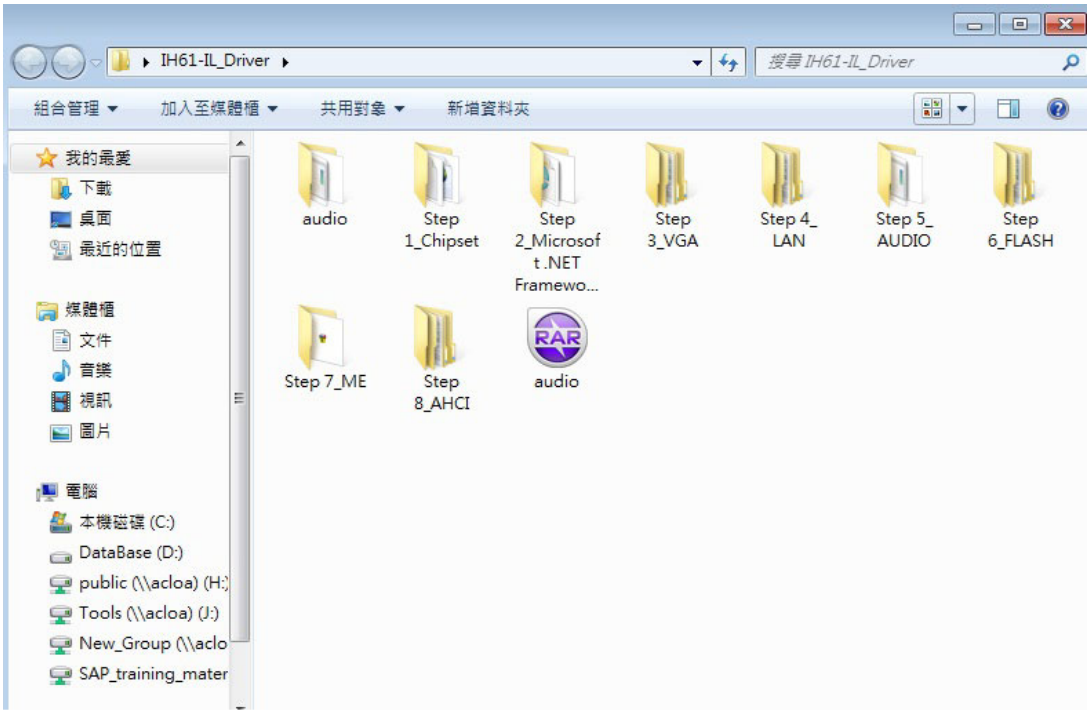
The Intel Core i7-3770, Core i5-3550S, Core i3-3220, Core i7-2600, Core i5-3570, Core i5-3450, Core i5-2500T, Core i3-2125, Core i3-3220, Xeon E3-1275, Xeon E3-1225, Pentium G620, Celeron G460, Core i3-2120, Pentium G850, Celeron G540 CPUs with dual cores are embedded with an integrated graphics controller. You need to install the VGA driver to enable this function.

Optimized integrated graphic solution: With Intel Graphics Flexible, versatile display options and 32-bit 3D graphics engine are supported. Dual independent displays and enhanced display modes for widescreen flat panels include extended, twin, and clone dual display modes, plus optimized 3D support delivers an intensive and realistic visual experience.

5.2 Windows 7/XP

Note! *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 5 for information on installing the CSI utility.*

Insert the driver CD into your system's CD-ROM drive. Navigate to the "Intel Graphics" folder and click "setup.exe" to complete the installation of the drivers for Windows 7 and Windows XP.



Chapter 6

LAN Configuration

6.1 Introduction

The AIMB-281 has dual Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (Realtek RTL8111E-VL (LAN1) and Realtek RTL8111E-VL (LAN2)) that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

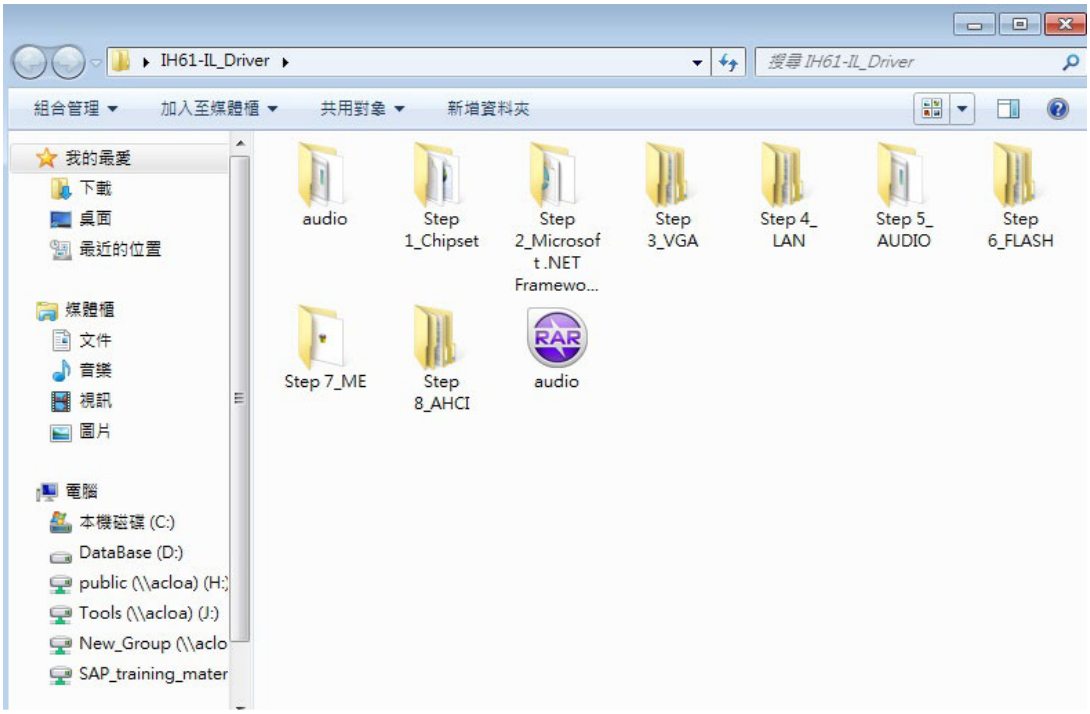
6.2 Installation

Note! *Before installing the LAN drivers, make sure the CSI utility has been installed on your system. See Chapter 5 for information on installing the CSI utility.*

The AIMB-281's Realtek RTL8111E-VL (LAN1) and Realtek RTL8111E-VL (LAN2) Gigabit integrated controllers support all major network operating systems. However, the installation procedure varies from system to system. Please find and use the section that provides the driver setup procedure for the operating system you are using.

6.3 Windows® 7/XP Driver Setup (Realtek RTL8111E-VL)

Insert the driver CD into your system's CD-ROM drive. Select the LAN folder then navigate to the directory for your OS.



Appendix A

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

AIMB-281'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.1.1 Watchdog Timer Overview

The watchdog timer is built into the super I/O controller Nuvoton NCT6776F. It provides the following user-programmable functions:

- Can be enabled and disabled by user 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.1.2 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 assign the address of register by writing an address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

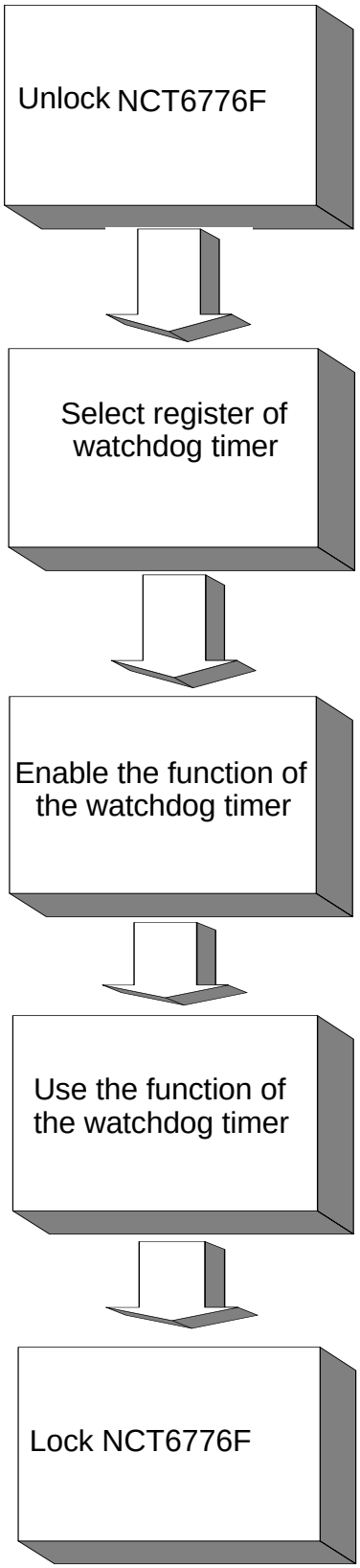

Unlock NCT6776F
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock NCT6776F

Table A.1: Watchdog Timer Registers

Address of Register (2E)	Attribute	
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 second as counting unit. [default] Write 1 to bit 3: set minutes as counting unit.
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 7:Write 1 to enable mouse to reset the timer, 0 to disable[default]. 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 the watchdog timer 2.

A.1.3 Example Program

1. Enable watchdog timer and set 10 sec. as 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
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 ; 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
Out dx,al
;----------------------------------------------------------
Dec dx ; Lock NCT6776F
Mov al,0aah
Out dx,al
```

2. Enable watchdog timer and set 5 minutes as 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
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 ; 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
Out dx,al
;------------------------------------------------------------
Dec dx ; Lock NCT6776F
Mov al,0aah
Out dx,al
```

3. 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
Mov 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
```

4. 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
```

5. 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
Mov 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
```

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