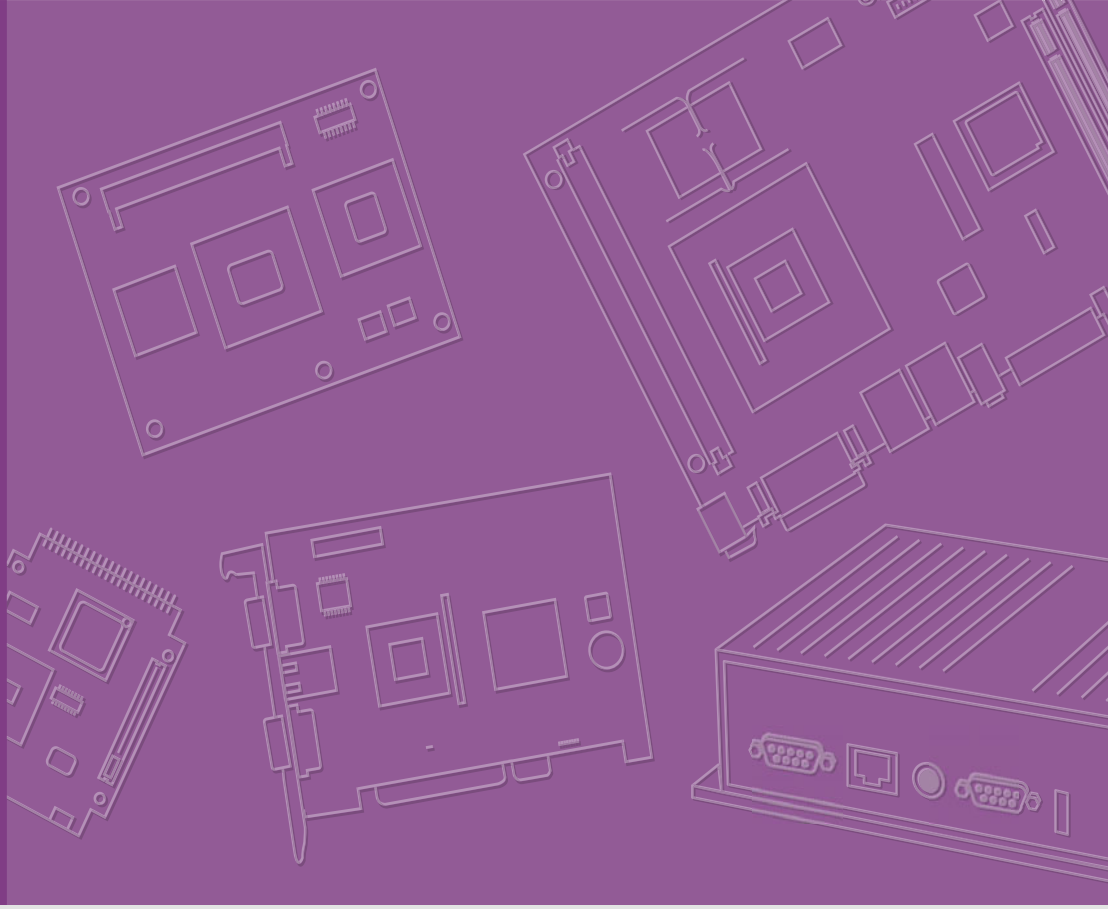


User Manual

AIMB-227

AMD Merlin Falcon Quad Core Mini-ITX with DP/DVI-D/HDMI, 6COM, and Dual LAN

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

Part No. 2006022710 Edition 1

February 2018

A Message to the Customer

Advantech Customer Services

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

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

Technical Support

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

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

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

Declaration of Conformity

FCC Class B

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 Test

Normal RAM test Data

Category	Speed	Capacity	Vendor	Module_PN	Chip_PN	ADVAN-TECH P/N	ECC	Result	Remark
DDR4	2133	4GB	ATP	A4G04QA8 BLPBME	40A77 D9RGQ	N/A	N	PASS	
DDR4	2133	8GB	Advan-tech	AQD-SD4U8GN21-SG	SEC 552 BCPB K4A4G085WD	AQD-SD4U8GN21-SG	N	PASS	
DDR4	2400	8GB	ADATA	ADS240038G17-BHYA	H5AN8G8NAFR	AQD-SD4U8GN24-HE	N	PASS	
DDR4	2400	8GB	Advan-tech	SQR-SD4N-8G2K4HBC	H5AN8G8NAFR UHC 643V	SQR-SD4N-8G2K4HBC	N	PASS	

ECC RAM test Data

Category	Speed	Capacity	Vendor	Module_PN	Chip_PN	ADVAN-TECH P/N	ECC	Result	Remark
DDR4	2133	4GB	ATP	A4F04QD8 BLPBME	40A77 D9RGQ	N/A	ECC	PASS	
DDR4	2133	8GB	ATP	A4F08QG8 BLPBME	40A77 D9RGQ	N/A	ECC	PASS	
DDR4	2400	8GB	ADATA	AD4B240038G17-BHYA	H5AN8G8NAFR UHC 634A	AQD-SD4U8GE24-HE	ECC	PASS	
DDR4	2400	8GB	Apacer	78.C2GF3.4000B	SEC 649 K4A8G08 SWB BCRC	N/A	ECC	PASS	

Ordering Information

Part Number	CPU	Display	TPM	PCIe	GbE	SATA	COM	Thermal Solution
AIMB-227MG2-00A1E	RX-421BD	DP/HDMI/DVI-D	(1)	x8	2	2	6	Active
AIMB-227MG2-01A1E	RX-216GD	DP/HDMI/DVI-D	(1)	x8	2	2	6	Passive
AIMB-227PG2-02A1E	GX-224IJ	DP/DVI-D	(1)	x4	2	2	6	Passive

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:

- AIMB-227 AMD R-series mini-ITX motherboard
- 1 x SATA HDD cable
- 1 x SATA Power cable
- 1 x Serial port cable(1 to 4)
- 2 x Serial port cable(1 to 1)
- 1 x I/O port bracket
- 1 x Startup manual
- 1 x Warranty card
- 1 x CPU cooler

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the AIMB-227 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-227, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Contents

Chapter 1

General Information

1.1 Introduction

AIMB-227 is a Mini-ITX motherboard based on Merlin Falcon" RX-421BD processor can deliver up to up to 22% more graphics performance than the previous enervation RX-427BB based on the 3DMark 11 (Performance) benchmark (good graphics performance), designed with rich I/O functions and dual display support, AIMB-227 is ideal for any rugged applications such as Digital Surveillance, Digital Signage, Thin Client, Electronic Gaming Machines, etc. With the pre-loaded remote management software - SUSIAccess, AIMB-227 not only saves development cost but also enhances system management efficiency.

1.2 Features

- **Rich I/O connectivity:** 6 serial ports, 4 USB 2.0, 4 USB3.0, 2 SATA III, Dual GbE LAN
- **Standard Mini-ITX form factor:** The AIMB-227 is a Mini-ITX motherboard
- **Wide selection of storage devices:** SATA HDD, SATA DOM, mSATA customers benefit from the flexibility of using the most suitable storage device for larger capacity
- **Optimized integrated graphic solution:** With AMD Radeon 3rd Generation GCN (Up to 8 CUs) Graphics, Support DirectX® 12 and UVD v6 Unified Video Decode Engine

1.3 Specifications

1.3.1 Processor System

- **CPU:** AMD R-series, supports Quad/Dual core CPU
- **Max. Speed:** Quad Core 2.1 GHz (RX-421BD, TDP 35 W)/ Dual Core 1.6 GHz (RX-216GD, TDP 15W) Dual Core 2.4GHz (GX-224IJ, TDP 15W)
- **L2 Cache:** 2 MB
- **BIOS:** AMI 16 Mbit SPI

1.3.2 Expansion Slot

- **Mini-PCIe:** One, full size
- **M.2 E Key:** 1, (2230)
- **PCIe x8:** 1

1.3.3 Memory

- **Technology:** Dual channel DDR4 2133 MHz
- **Max. Capacity:** 16 GB
- **Socket:** 2 x 260 pin SODIMM

1.3.4 Graphic Interface

- **Controller:** AMD Radeon 3rd Generation GCN (Up to 8 CUs)
- **HDMI:** 1, 4096 x 2160 @ 60Hz Max (60Hz requires re-timer)
- **LVDS:** 1, supports dual channel 48-bit up to 1920 x colay DP 1.2 port (Optional)
- **DP 1.2:** 1, supports DP++, resolution up to 4096 x 2160 @ 60Hz
- **DVI-D:** 1, supports up to SXGA 1920 x 1200
- **Multiple Display:** 3 independent display by DP/HDMI/DVI-D

1.3.5 Ethernet Interface

- **Interface:** 10/100/1000 Mbps
- **Controller:** GbE: Realtek RTL8111G
- **Connector:** RJ-45 x 2

1.3.6 SATA Interface

- **Max Data Transfer Rate:** 600 MB/s
- **Channel:** 2

1.3.7 Rear I/O

- **DVI-D:** 1
- **HDMI:** 1
- **DP:** 1
- **Ethernet:** 2
- **USB:** 4 (2USB2.0 & 2USB3.0)
- **Audio:** 1 (Line out)
- **DC jack:** 1

1.3.8 Internal Connector

- **LVDS & Inverter:** 1
- **USB:** 4 (2USB2.0 & 2USB3.0)
- **Serial:** 6 (5 x RS232,1 x RS232/422/485; COM 3 support RS232/422/485 auto flow control; COM6 support 5v/12V by jumper selection; 1 COM support CCtalk; 1 COM support TTL)
- **SATA:** 2
- **SATA Power Connector:** 2
- **GPIO:** 8-bit
- **Mini PCIE slot:** 1 miniPCIE slot, F/S support mSATA; F/S support SIM holder
- **M.2 E Key:** 1, (2230)

1.3.9 Watchdog Timer

- **Output:** System reset
- **Interval:** Programmable 1 ~ 255 sec/min

1.3.10 Power Requirement

- **Typical:**
  - Single Voltage 12V DC input by 1x 2.5φ connector or 1x internal 2x2-pin power
  - AT/ATX Supported by Jumper
  - Max power consumption: 60.83 W (16G DDR4 RAM)

1.3.11 Environment

- **Temperature:**
  - 0 ~ 60° C (32 ~ 140° F), Operating
  - -40 ~ 85° C (-40 ~ 185° F), Non-operating

1.3.12 Physical Characteristics

- **Dimensions:** 170 mm x 170 mm (6.69" x 6.69")

1.4 Jumpers and Connectors

Connectors on the AIMB-227 motherboard link it to external 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: Connector / Header List

	Description	Part Reference
1	DC input Jack	DCIN1
2	Digital Visual Interface connector	DVI1
3	Coin Battery wafer box	BAT1
4	COMS Mode selection	JCMOS1
5	Embed DisplayPort	EDP1
6	DisplayPort (Up) + High Definition Multimedia Interface (Down) stack connector	DP1+HDMI1
7	VDD select for LVDS1 & EDP1 Panel	JLVDS1
8	Low Voltage Differential Signaling	LVDS1
9	USB3.0 stack connector	USB12
10	Inverter power connector	INV1
11	USB2.0 stack connector	USB34
12	USB Power selection for USB12 & USB34	JUSBPWR1
13	USB Power selection for USB56 & USB78	JUSBPWR2
14	LVDS VESA, JEIDA format selection pin header	JLVDS_VCON1
15	Dual port USB2.0 header	USB78
16	LAN LED	LANLED1
17	Dual port RJ45 Connector	LAN12
18	MINIPCIE with mSATA connector	MINIPCIE1
19	HD Audio Interface (LINE-OUT)	AUDIO1
20	Front panel audio header	FPAUD1
21	Audio amplifier output pin header	AMP1
22	HD Audio interface (Digital)	SPDIF1
23	PCI Express x8 slot	PCIEX8_1
24	SATA DOM power selection pin header	JSATAPWR1
25	Next Generation Form Factor KEY-E	NGFF_E_1
26	Serial ATA interface connector #2	SATA2
27	Serial ATA interface connector #1	SATA1
28	Serial ATA Power connector #1	SATA_PWR1
29	Serial ATA Power connector #2	SATA_PWR2
30	SPI BIOS Flash Socket	SPI1
31	COM1 Box Header	COM1
32	COM2 Box Header	COM2
33	COM6 RI# selection pin header	JSETCOM6_V1
34	PS2 Keyboard & Mouse connector	KBMS1
35	8-bits General Purpose I/O Pin Header	GPIO1
36	CCTALK Voltage selection pin header	JCCT_VCON1
37	Case Open selection pin header	JCASEOP_SW1

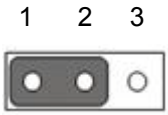
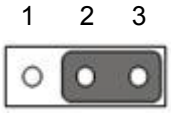
Table 1.1: Connector / Header List		
38	Case Open connector	JCASE1
39	COM3 ~ COM6 Box Header	COM3456
40	Low pin count interface connector	LPC1
41	AMD DB-FP4 Merlin Falcon SoC	CPU1
42	DDR4 SO-DIMM Socket CH-A	DIMMA1
43	DDR4 SO-DIMM Socket CH-B	DIMMB1
44	5VSB input connector	ATX_5VSB1
45	AT/ATX Mode selection	PSON1
46	Watch Dog timer output and OBS beep	JWDT1+JOBS1
47	Power LED and keyboard lock pin header	JFP2
48	PWRBTN#/ RESET#/HDD LED/ Serial bus from HW monitor IC/Internal Buzzer / External Speaker header	JFP1
49	System Fan #1 connector	SYSFAN1
50	CPU FAN #1 connector	CPUFAN1
51	Dual port USB3.0 header	USB56
52	ATX 12V power supply connector	ATX12V1
53	SIM Card holder	SIM1

Table 1.2: Jumper Setting List:		
	Description	**Part Reference**
1	USB VBUS Selection for USB12 & USB34	JUSBPWR1
2	USB VBUS Selection for USB56 & USB78	JUSBPWR2
3	VDD select for LVDS1 & EDP1 Panel	JLVDS1
4	SATA DOM power selection pin header	JSATAPWR1
5	CMOS clear	JCOMS1
6	COM6_RI# Pin Selection	JSETCOM6_V1
7	CCTALK selection pin header	JCCT_VCON1
8	Case open selection	JCASEOP_SW1
9	AT / ATX Mode selection	PSON1
10	PWRBTN# / RESET# / HDD LED / Serial bus / Internal Buzzer / External Speaker header	JFP1
11	Watch Dog Timer output and OBS Beep	JWDT1+JOBS1

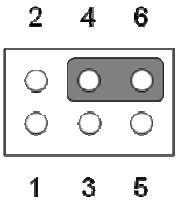
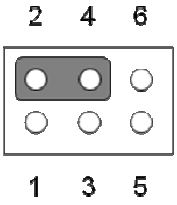
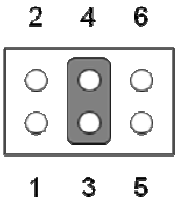
1. USB VBUS selection for USB12 & USB34 (JUSBPWR1)

Function	**Setting**
Set USB VBUS as +5VSB (Default)	1 2 3 
Set USB VBUS as +5V	1 2 3 

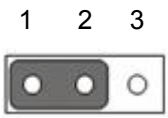
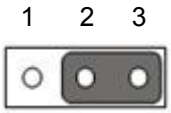
2. USB VBUS Selection for USB56 & USB78 (JUSBPWR2)

Function	Setting
Set USB VBUS as +5VSB (Default)	
Set USB VBUS as +5V	

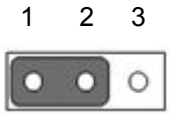
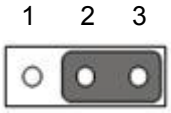
3. VDD select for LVDS1 & EDP1 Panel (JLVDS1)

Function	Setting
Jumper position for +3.3V (Default)	
Jumper position for +5V	
Jumper position for +12V	

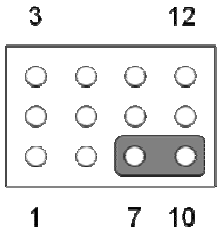
4. SATA DOM power selection pin header (JSATAPWR1)

Function	Setting
SATA1 Such as SATA CONN. (Default)	
SATA1 Support SATA DOM Power	

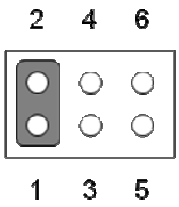
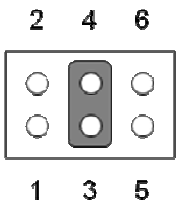
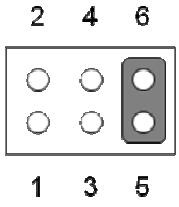
5. CMOS clear (JCOMS1)

Function	Setting
Normal (Default)	
Clear CMOS	

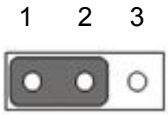
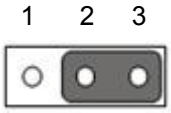
6. PWRBTN# / RESET# / HDD LED / Serial bus / Internal Buzzer / External Speaker header (JFP1)

Function	Setting
Internal Buzzer (Default)	

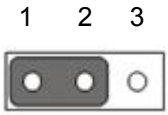
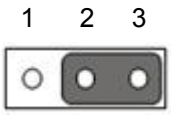
7. COM6_RI# Pin Selection (JSETCOM6_V1)

Function	Setting
Jumper position for RI# (Default)	
Jumper position for +5V	
Jumper position for +12V	

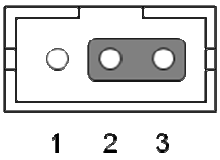
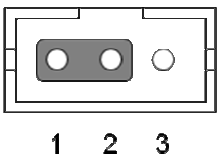
8. CCTALK selection pin header (JCCT_VCON1)

Function	Setting
CCTALK 12V (Default)	
CCTALK 5V	

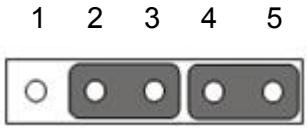
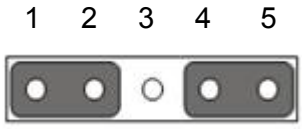
9. Case open selection (JCASEOP_SW1)

Function	Setting
Normal Close	
Normal Open (Default)	

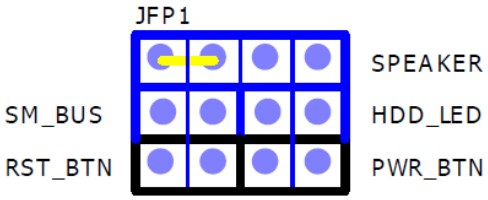
10. AT / ATX Mode selection (PSON1)

Function	Setting
Normal Close	
Normal Open (Default)	

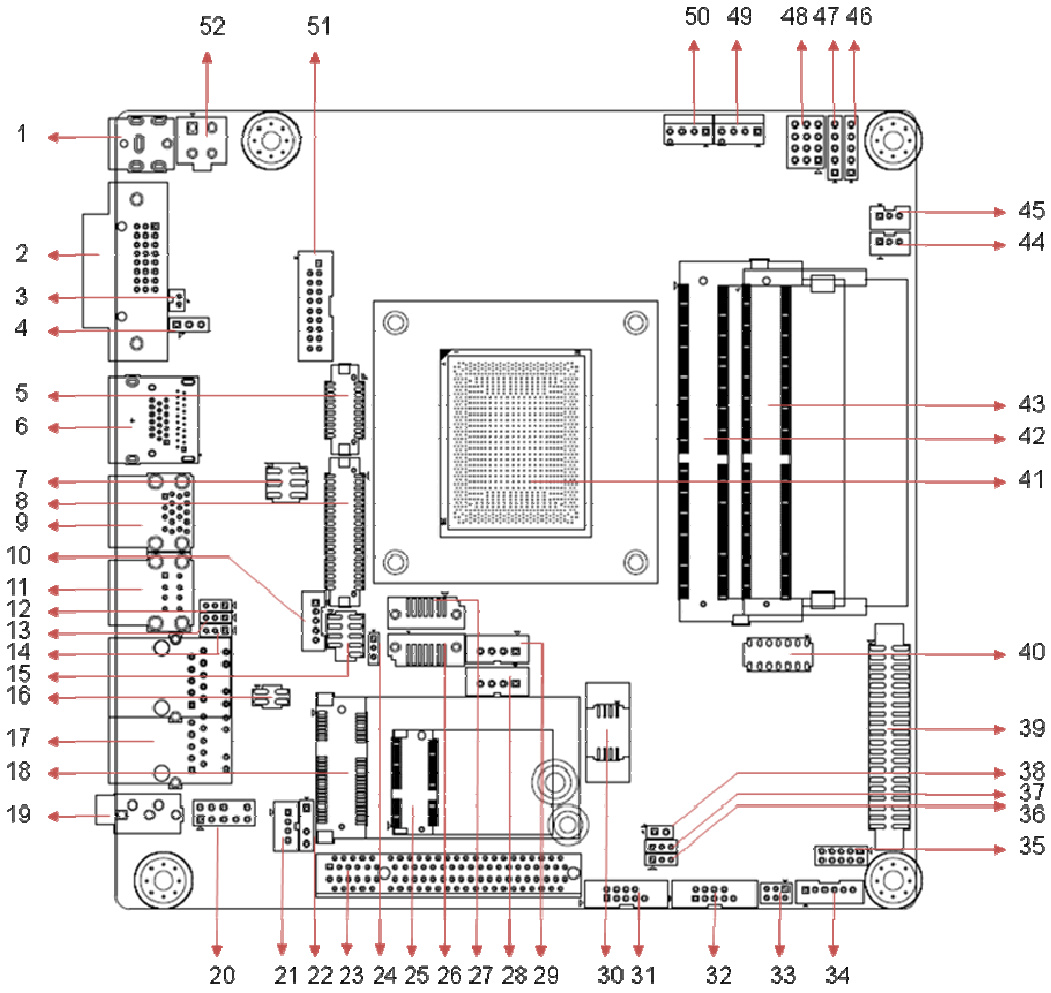
11. Watchdog timer output and OBS beep (JWDT1+JOBS1)

Function	Setting
Watch Dog Timer Enable (2-3) (Default) OBS BEEP(4-5) (Default)	
Watch Dog Timer Disable (1-2) OBS BEEP(4-5) (Default)	

12. Power switch/HDD LED/SMBus/Speaker pin header (JFP1)

Function	Setting
JFP1(7-10) (Default)	 

1.5 Board layout: Jumper and Connector Locations



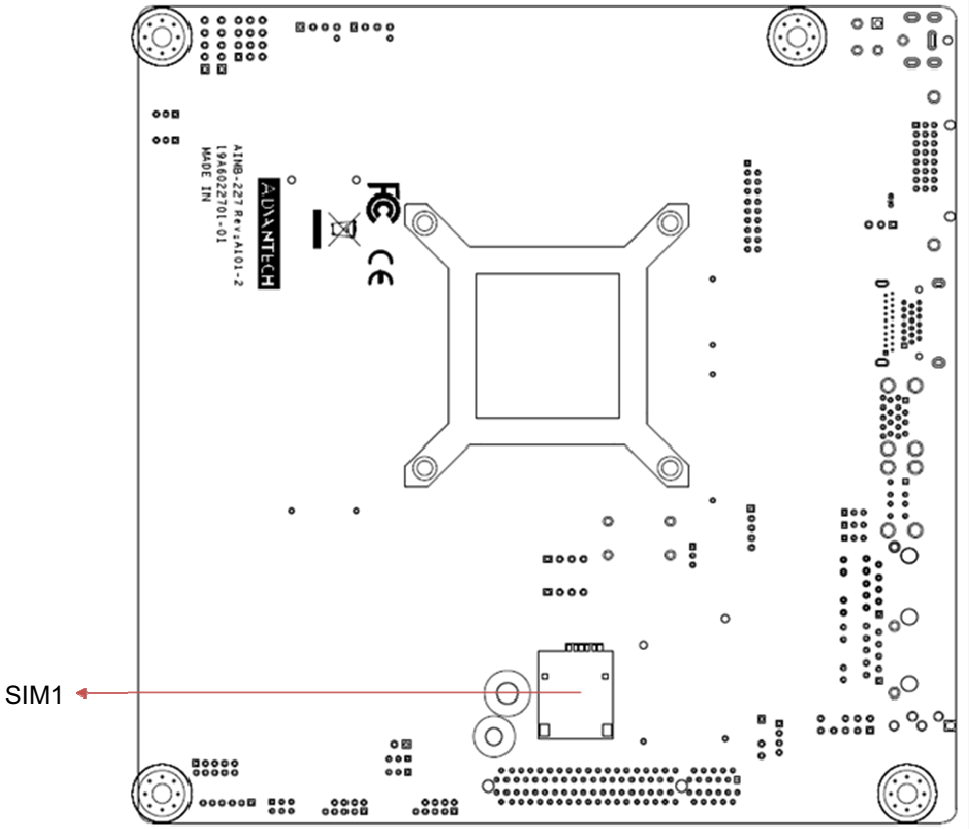


Figure 1.1 Jumper and Connector Location

1. DCIN1
2. DVI1
3. BAT1
4. JCMOS1
5. EDP1
6. DP1+HDMI1
7. JLVDS1
8. LVDS1
9. USB12
10. INV1
11. USB34
12. JUSBPWR1
13. JUSBPWR2
14. JLVDS_VON1
15. USB78
16. LANLED1
17. LAN12
18. MINIPCIE1
19. AUDIO1
20. FPAUD1
21. AMP1
22. SPDIF1
23. PCIEX8_1
24. JSATAPWR1
25. NGFF_E_1
26. SATA2
27. SATA1
28. SATA_PWR1
29. SATA_PWR2
30. SPI1
31. COM1
32. COM2
33. JSETCOM6_V1
34. KBMS1
35. GPIO1
36. JCCT_VCON1
37. JCASEOP_SW1
38. JCASE1
39. COM3456
40. LPC1
41. CPU1
42. DIMMA1
43. DIMMB1
44. ATX_5VSB1
45. PSON1
46. JWDT1+JOBS1
47. JFP2
48. JFP1
49. SYSFAN1
50. CPUFAN1
51. USB56
52. ATX12V1

1.6 AIMB-227 Board Diagram

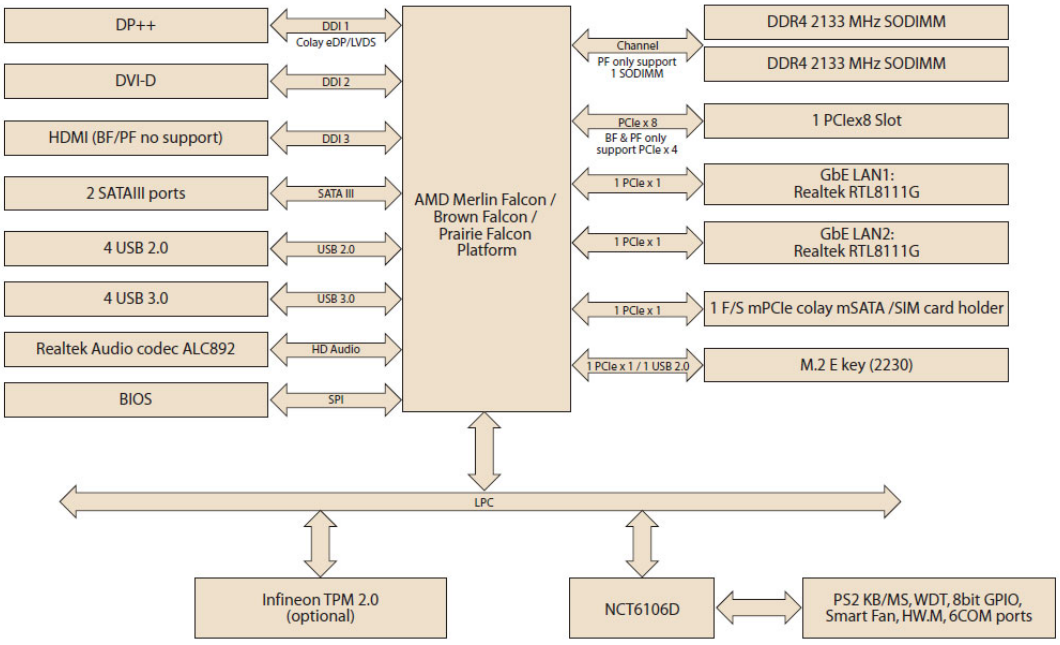


Figure 1.2 AIMB-227 Board Diagram

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 CMOS Clear (JCMOS1)

The AIMB-227 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 J1 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.

Function	Setting
Normal (Default)	3 2 1 
Clear CMOS	3 2 1 

1.8.3 PSON1: ATX, AT Mode Selector

Function	Setting
AT Mode	1 2 3 
ATX Mode (Default)	1 2 3 

1.9 System Memory

The AIMB-227 has two sockets for a 260-pin SODIMM. This socket can use 1.2 V unbuffered double-data-rate three synchronous, low-voltage DRAM (DDR4 SDRAM). DRAM is available in capacities of 1 GB/2 GB/4 GB and 8 GB. The socket can be filled in any combination with DIMMs of any size, giving a total memory size between 2GB to 16GB. AIMB-227 only merlin Falcon supports ECC (error checking and correction) memory.

1.10 Memory Installation Procedures

To install SODIMMs, first make sure the handles of the SODIMM socket are in the “open” position, i.e., the handles lean outward. Slowly slide the SODIMM module along the plastic guides on both ends of the socket. Then press the SODIMM 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 SODIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected.

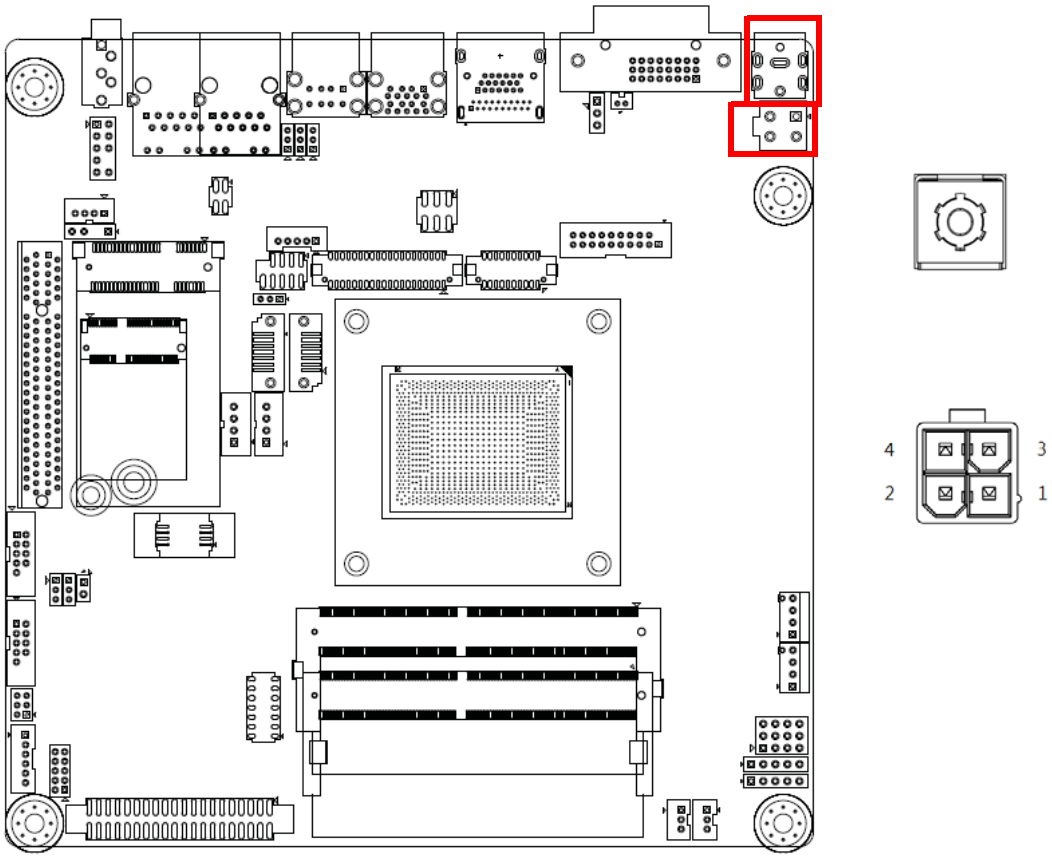
Chapter 2

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 ATX 12V/DCIN 12V Power Connector (ATX12V1/ DCIN1)

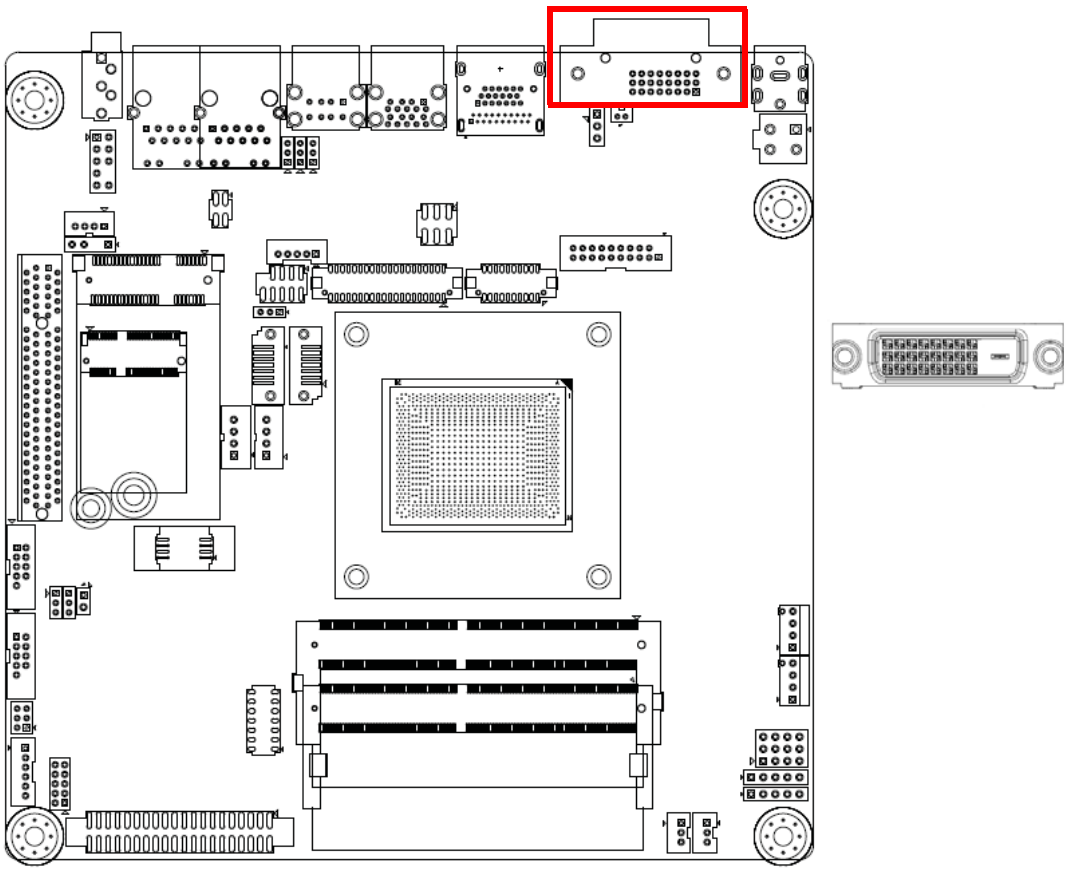


Pin	Signal
1	VCC (Center)
2	GND

Pin	Signal
1	GND
2	GND
3	+12V
4	+12V

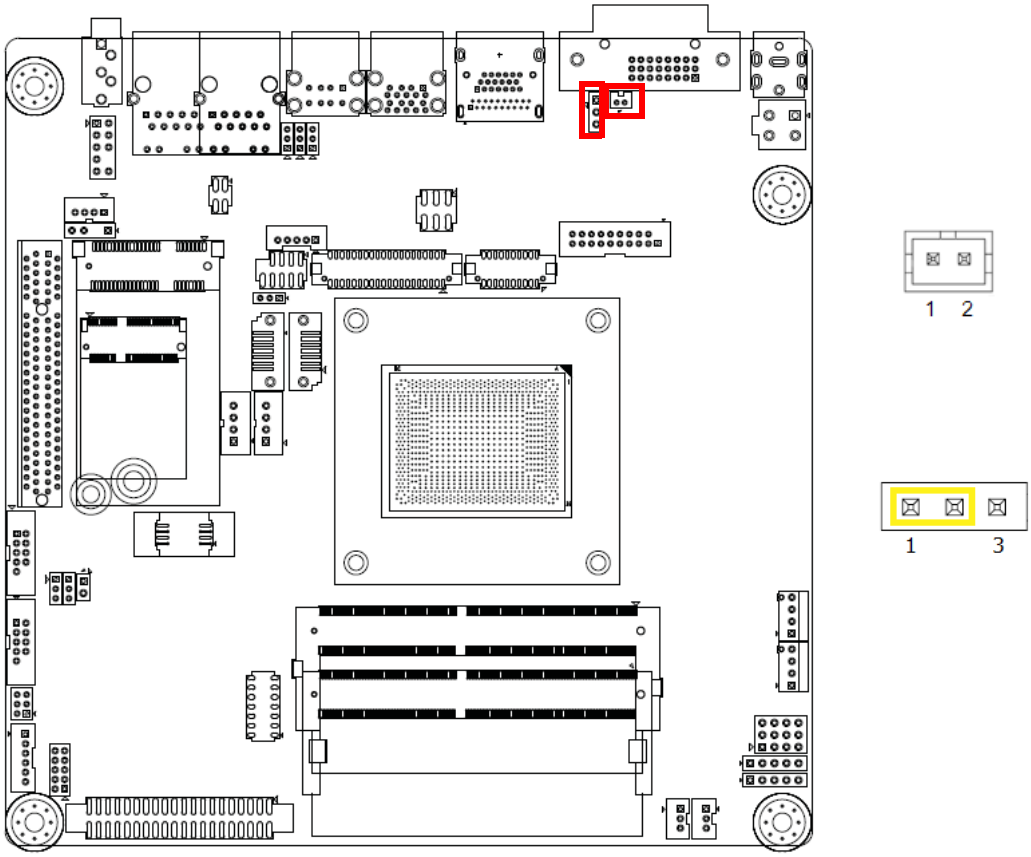
2.3 Digital Visual Interface connector (DVI1)

The AIMB-227 includes one DVI, which can support DVI-D outputs. Pin assignments for DVI-D is detailed in Appendix B.



2.4 CMOS battery wafer box (BAT1)

2.5 COMS Mode selection (JCMOS1)

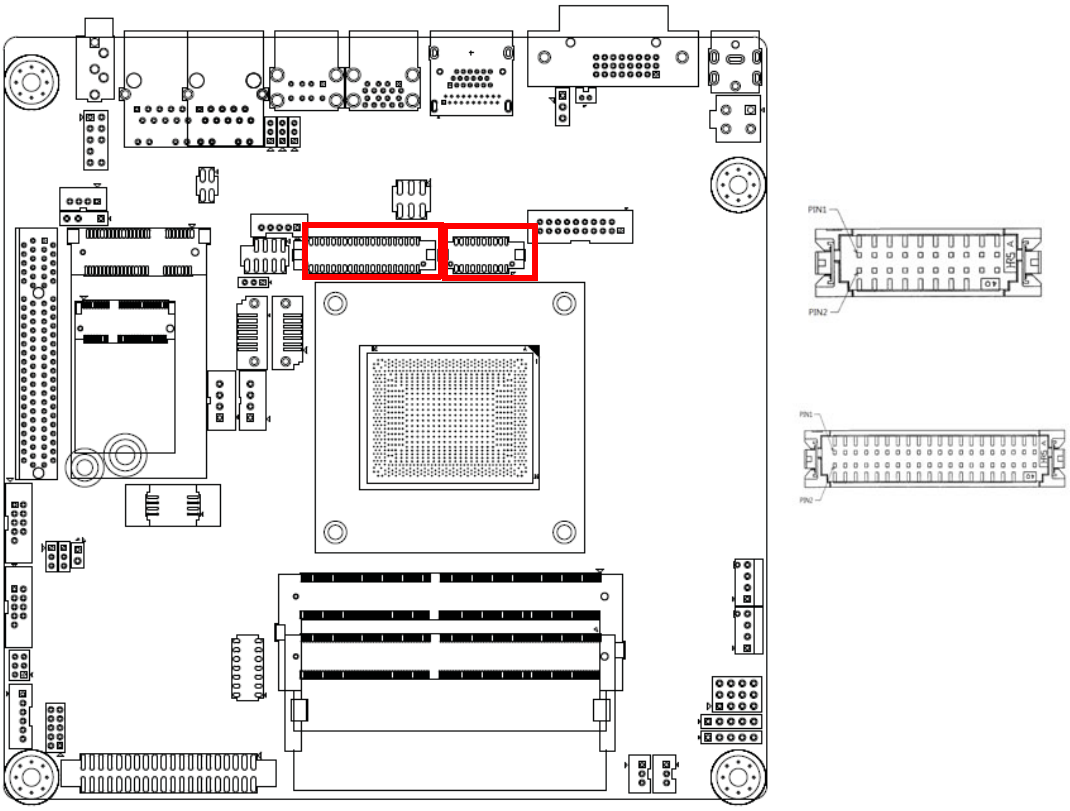


Pin	Signal
1	VCC
2	GND

Pin	Signal
1	VBAT
2	RTC
3	GND

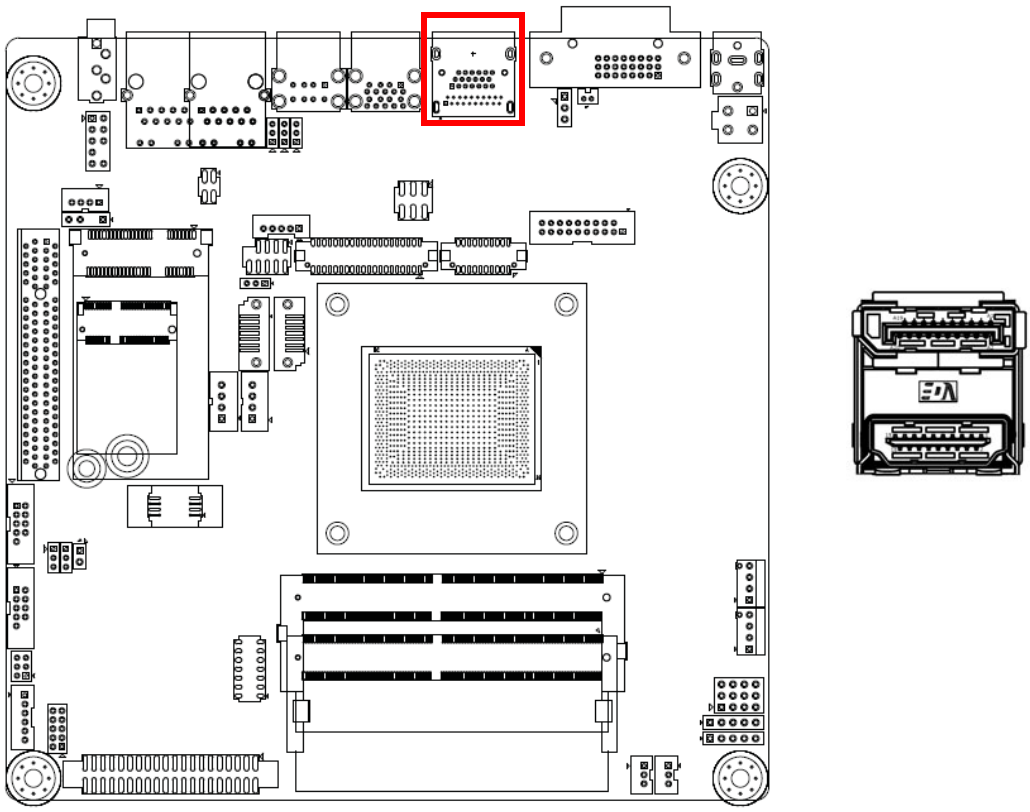
2.6 Embed DisplayPort (EDP1)

2.7 Low Voltage Differential Signaling (LVDS1)



Notice: LVDS is optional feature.

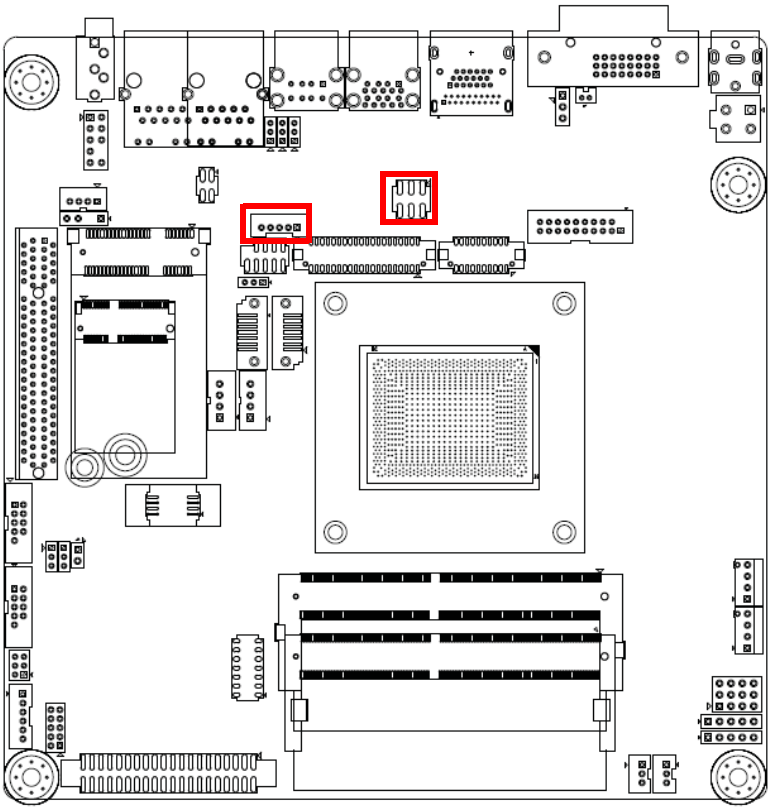
2.8 DisplayPort (Up) + High Definition Multimedia Interface (Down) stack connector (DP1+HDMI1)

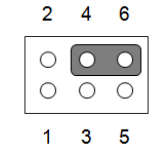


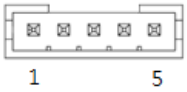
Notice: Prairie Falcon doesn't support HDMI (DDI3) output

2.9 VDD select for LVDS1 & EDP1 Panel (JLVDS1)

2.10 Inverter power connector (INV1)



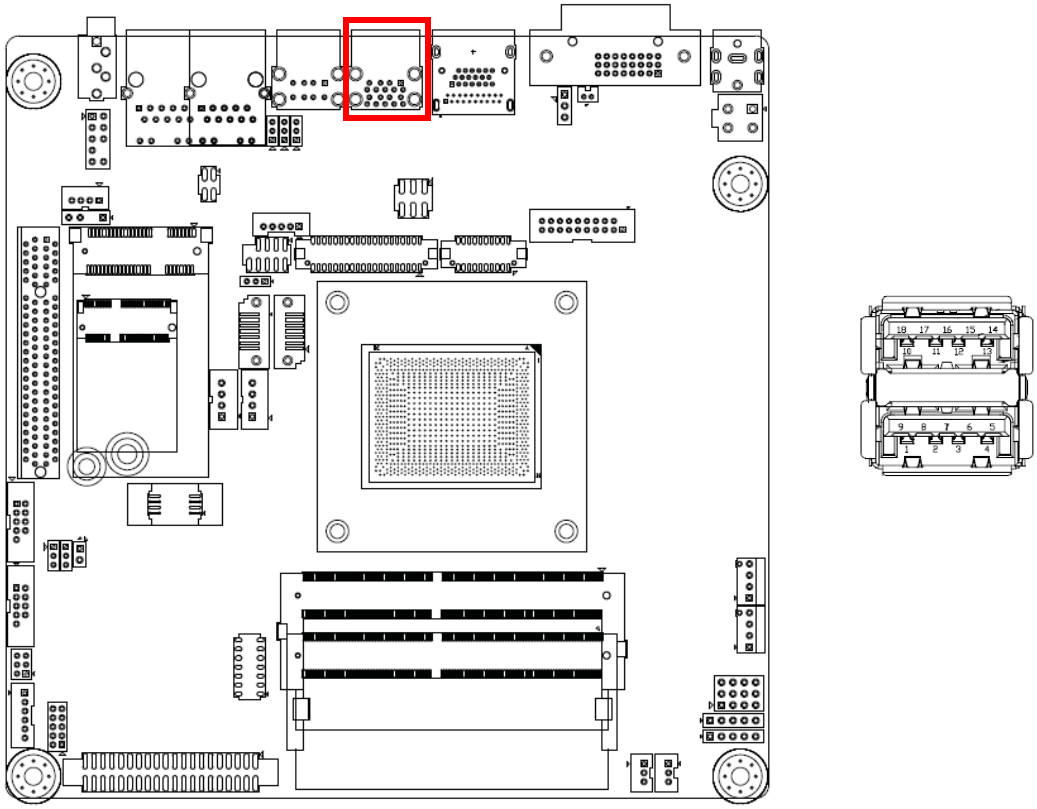




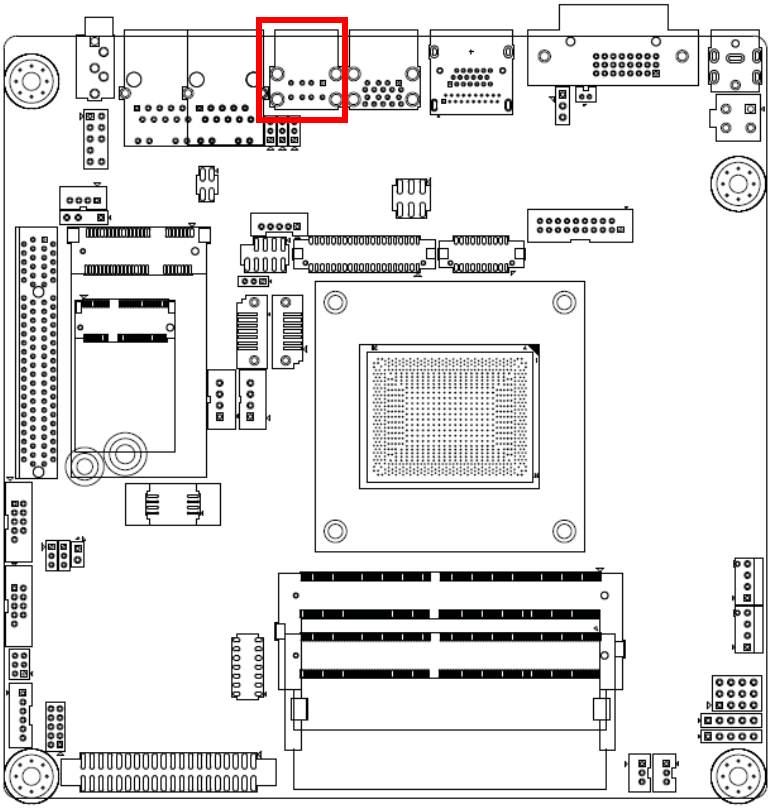
Pin	Signal	Pin	Signal
1	NC	2	+5V
3	+12V	4	VDD
5	NC	6	+3.3V

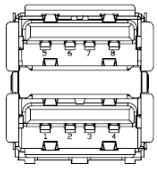
Pin	Signal
1	+12V
2	GND
3	BKL EN
4	BKL CTRL
5	+5V

2.11 USB3.0 stack connector (USB12)



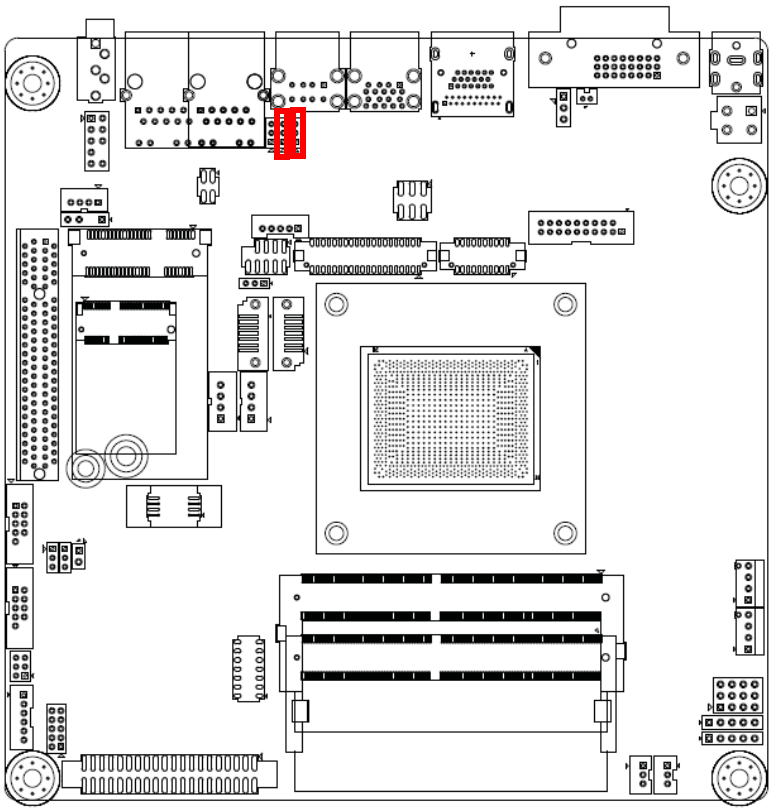
2.12 USB2.0 stack connector (USB34)

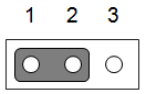


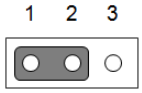


2.13 USB Power selection header #1 (JUSBPWR1)

2.14 USB Power selection header #2 (JUSBPWR2)



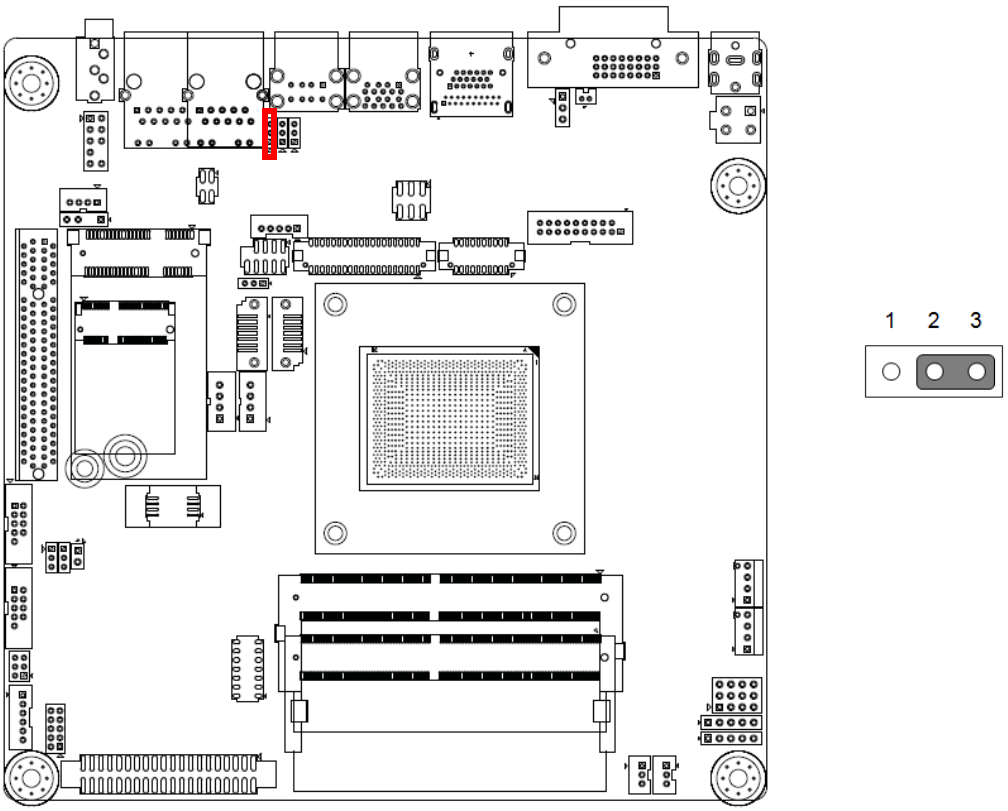




Pin	Signal
1	+5V AUX
2	Advantech define
3	+5V

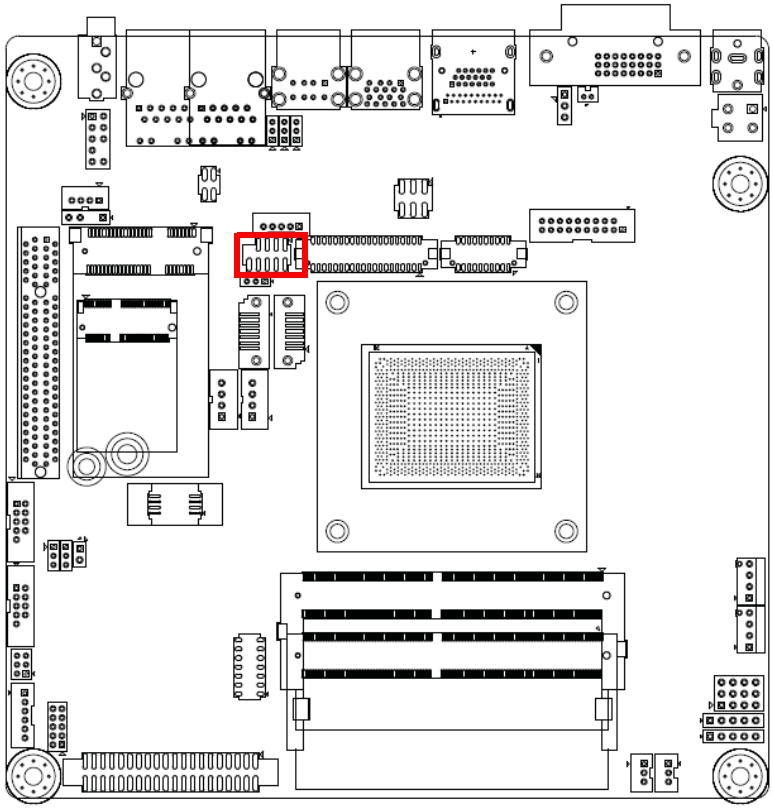
Pin	Signal
1	+5V AUX
2	Advantech define
3	+5V

2.15 LVDS VESA, JEIDA format selection pin header (JLVDS_VCON1)



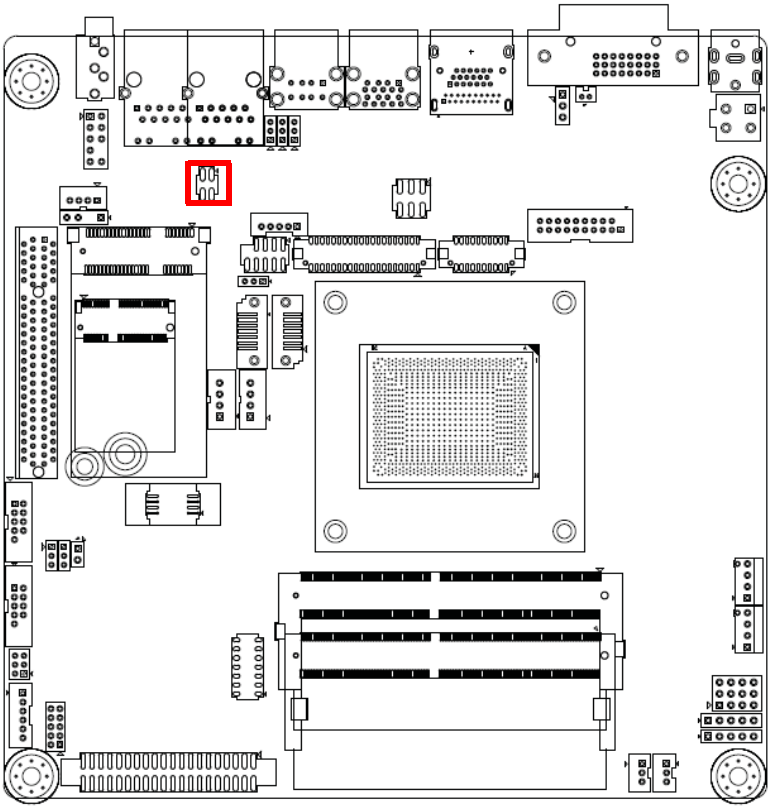
Pin	Signal
1	+5V AUX
2	Advantech define
3	+5V

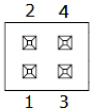
2.16 Dual port USB2.0 header (USB78)



Pin	Signal	Pin	Signal
1	VBUS	2	VBUS
3	D-	4	D-
5	D+	6	D+
7	GND	8	GND
		10	NC

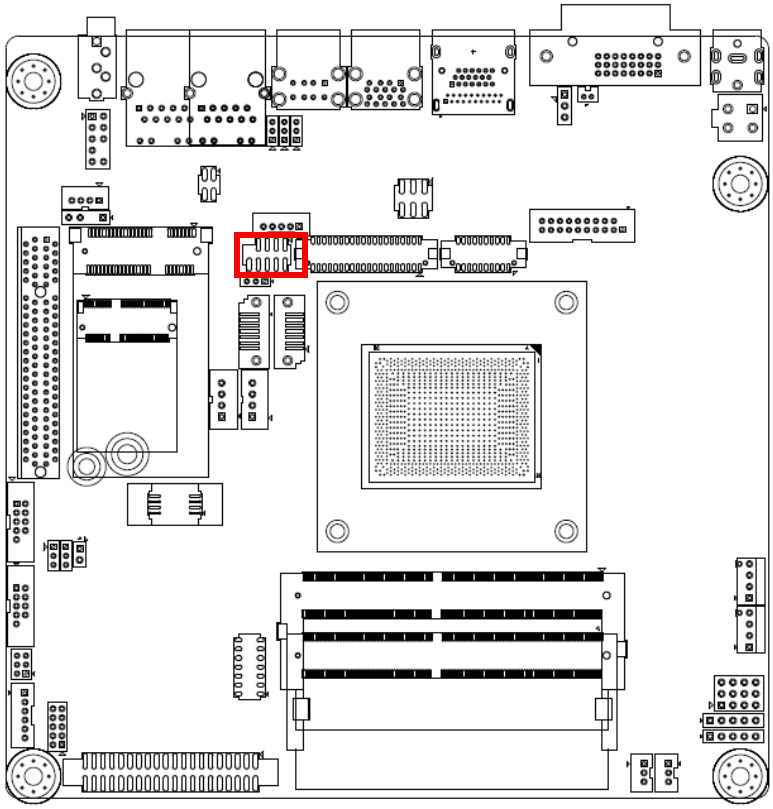
2.17 LAN LED (LANLED1)

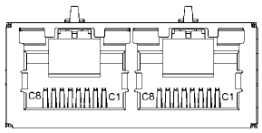




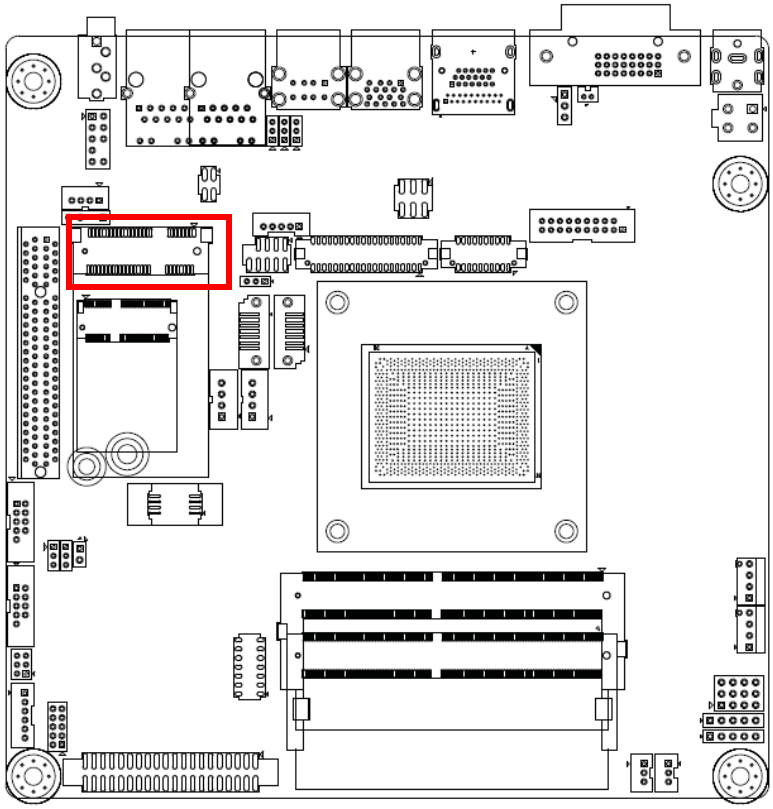
Pin	Signal
1	LAN1 ACT#
2	LAN2 ACT#
3	+3.3V AUX
4	+3.3V AUX

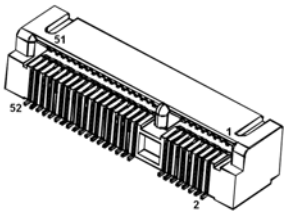
2.18 Dual port RJ45 Connector (LAN12)



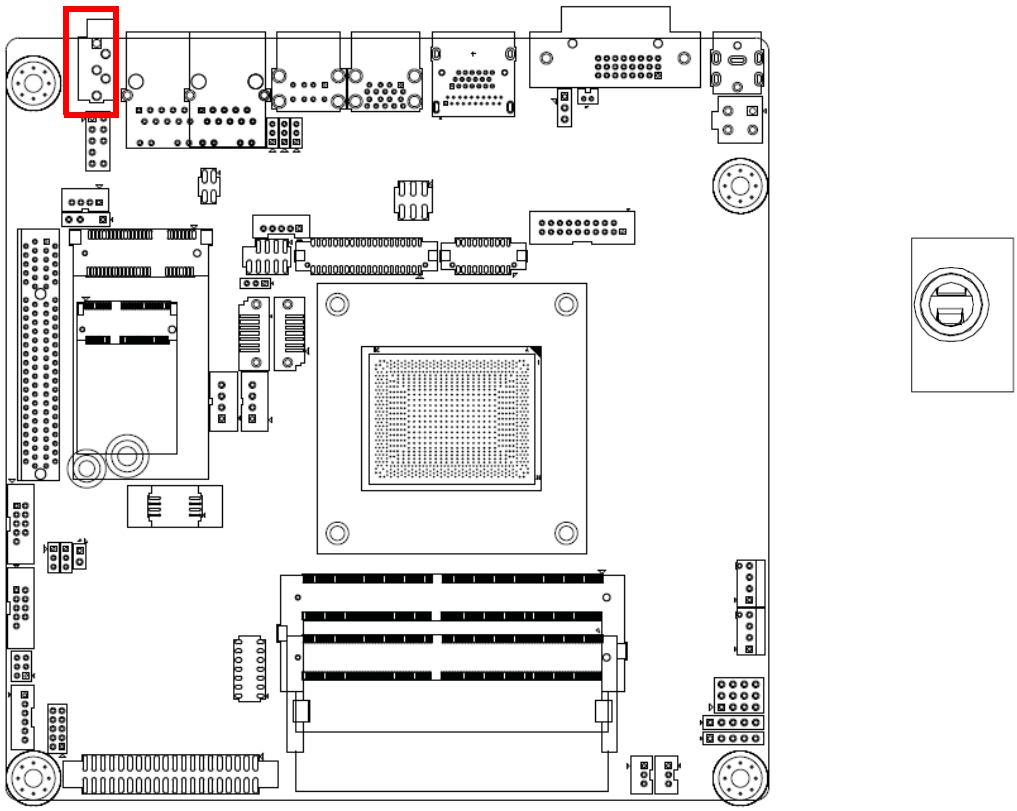


2.19 MINIPCIE with mSATA connector (MINIPCIE1)



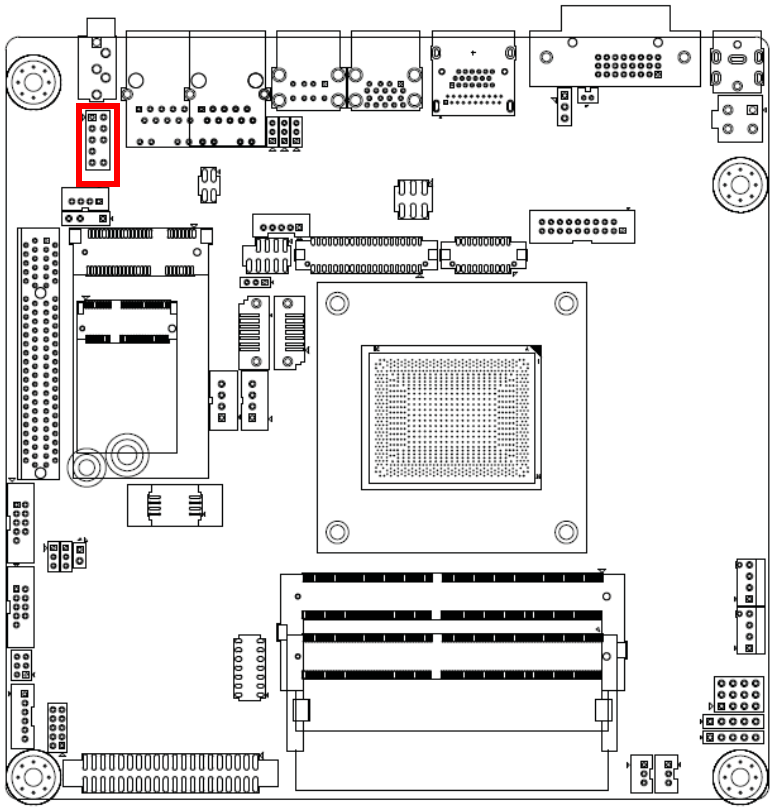


2.20 HD Audio Interfaces (LINE-OUT) (AUDIO1)



Pin	Signal
1	LINE OUT - L
2	LINE OUT - R

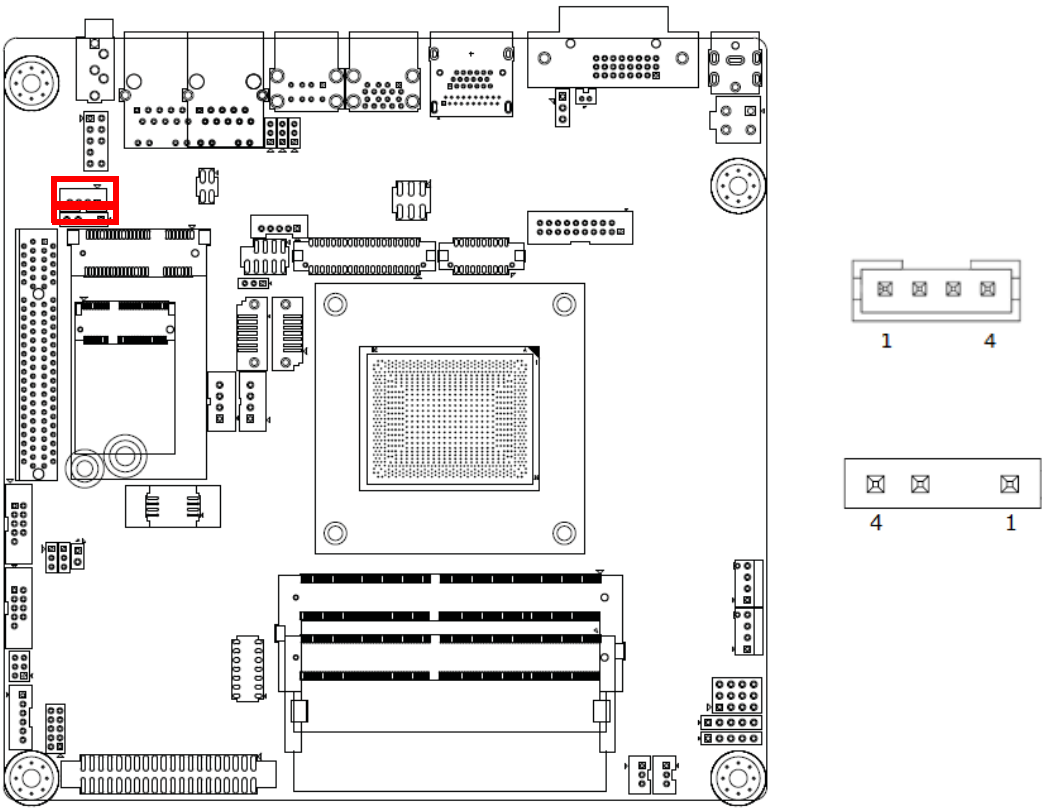
2.21 Front panel audio header (FPAUD1)



Pin	Signal	Pin	Signal
1	MIC IN - L	2	GND
3	MIC IN - R	4	FPAUD_DETECT#
5	LINE OUT - R	6	SENSE R1
7	SENSE	8	KEY
9	LINE OUT - L	10	SENSE R2

2.22 Audio amplifier output pin header (AMP1)

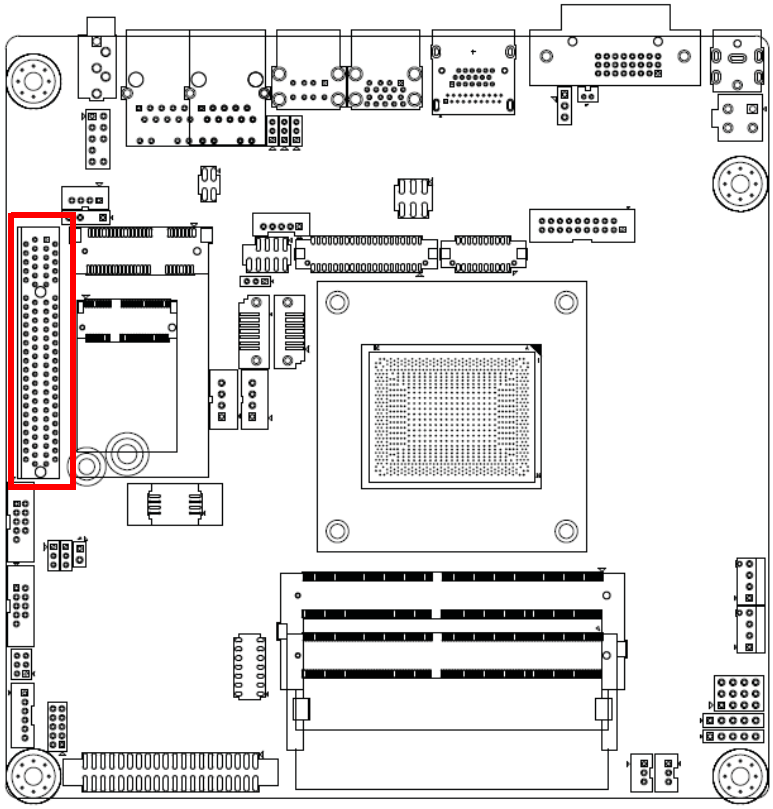
2.23 HD Audio interface (SPDIF1)



Pin	Signal
1	AMP OUT – R+
2	AMP OUT – R-
3	AMP OUT – L-
4	AMP OUT – L+

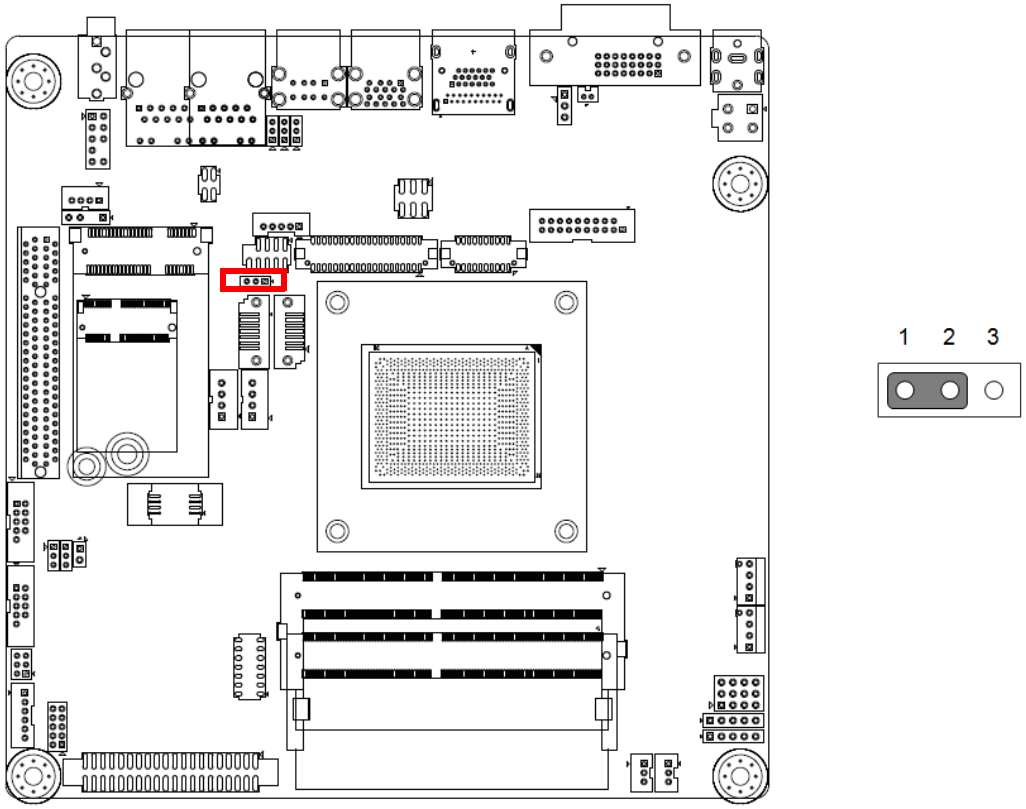
Pin	Signal
1	+5V
2	KEY
3	SPDIF OUT
4	GND

2.24 PCI-Express x8 slot (PCIEX8_1)



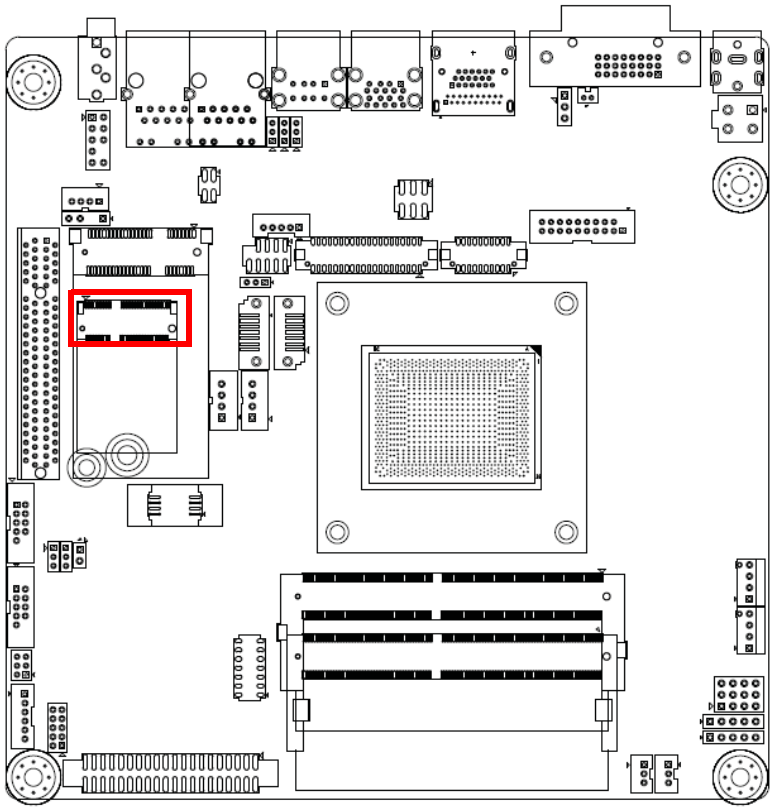
Note! *The internal graphic won't be disabling while External graphic card inserted. But after get into OS user can have external and internal graphic output.*

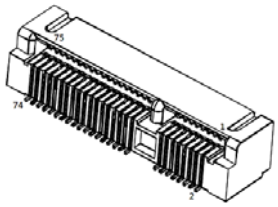
2.25 SATA DOM power selection pin header (JSATAPWR1)



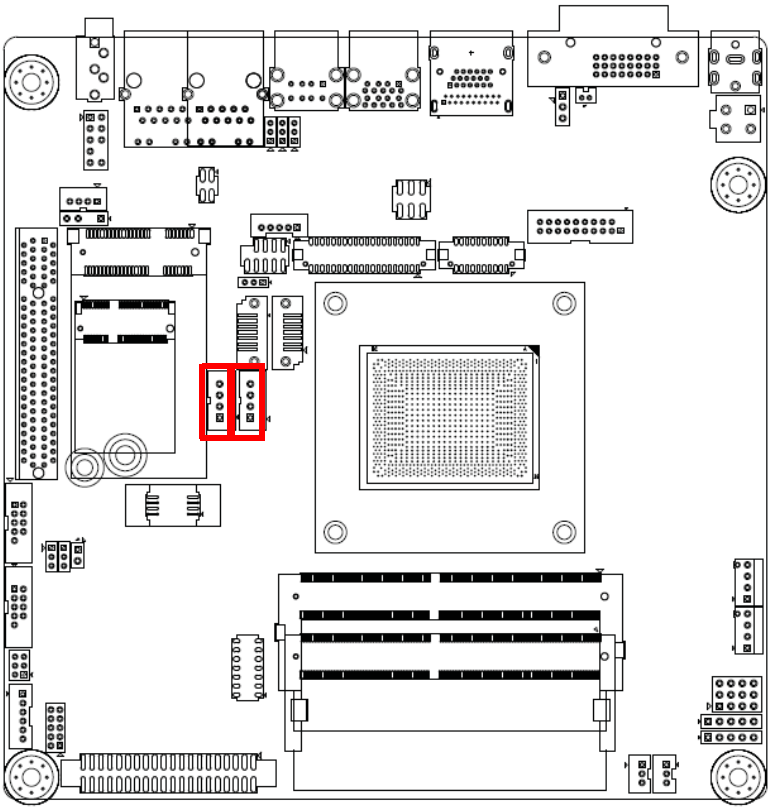
Pin	Signal
1	GND
2	DOM PWR
3	+5V

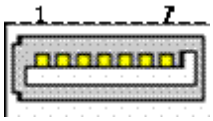
2.26 Next Generation Form Factor KEY-E (NGFF_E_1); M.2 conn





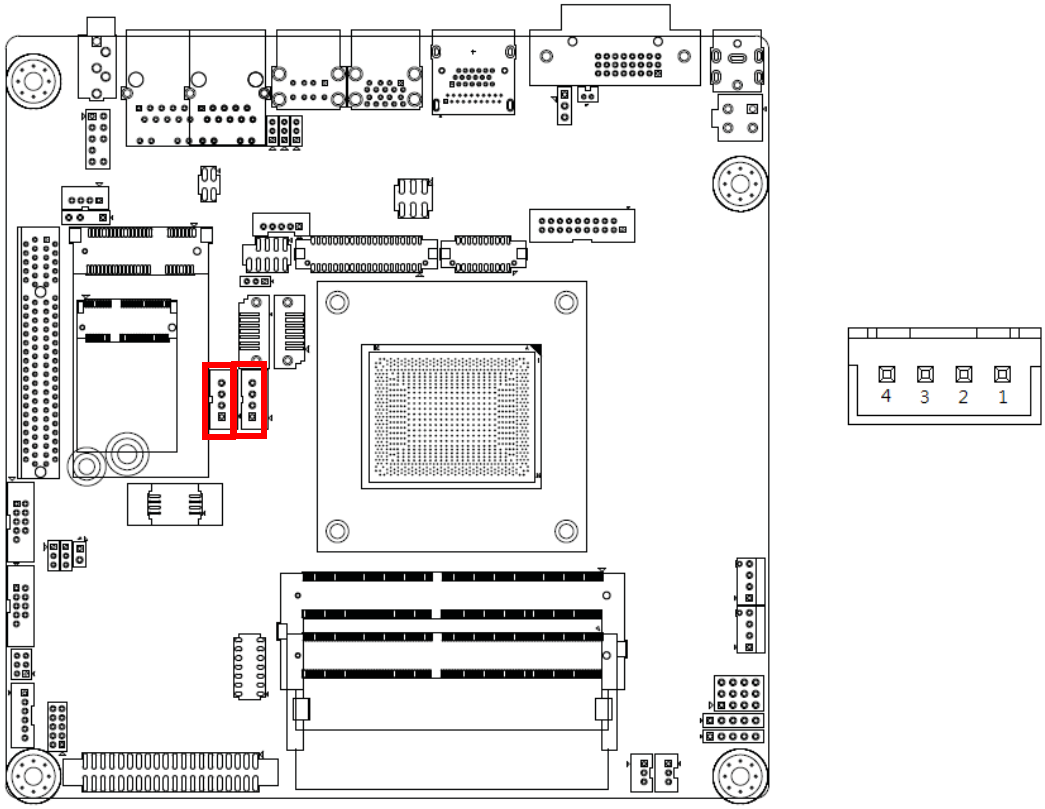
2.27 Serial ATA interface connector #2 and #1 (SATA2 and SATA1)





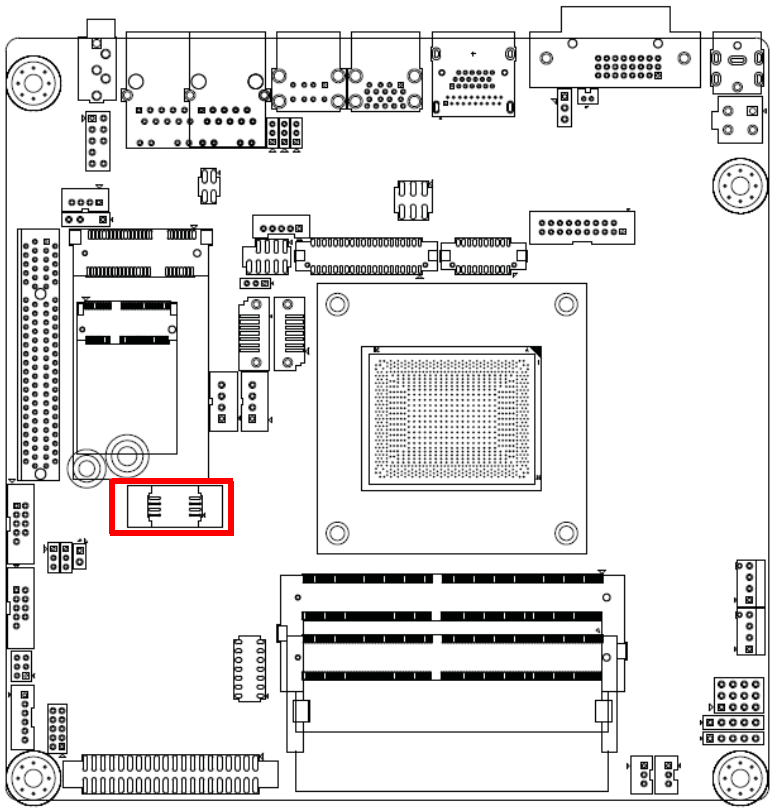
Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

2.28 Serial ATA Power connector #1 and #2 (SATA_PWR1 and SATA_PWR2)



Pin	Signal
1 +	5V
2	GND
3	GND
4	+12V

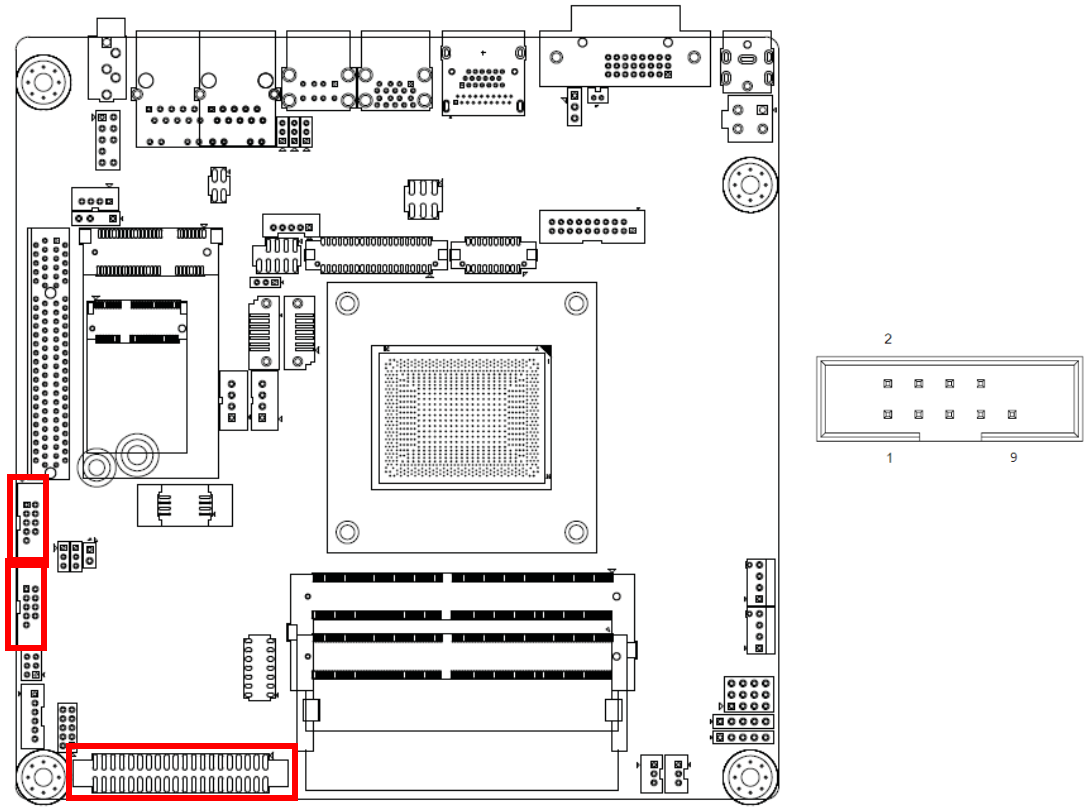
2.29 SPI BIOS flash socket (SPI1)



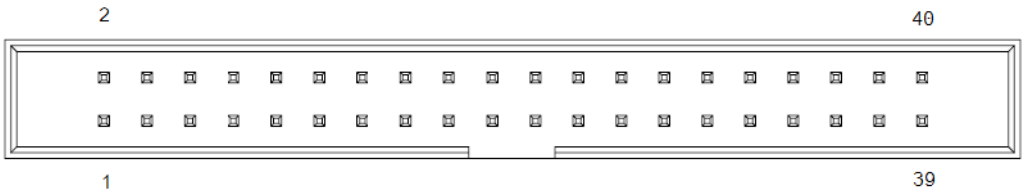
Pin	Signal	Pin	Signal
1	CS#	5	MOSI
2	MISO	6	SCLK
3	WP#	7	HOLD#
4	GND	8	+3.3V

2.30 COM1 and COM2 Box Header (COM1 and COM2)

2.31 COM3456 Box Header (COM3456)



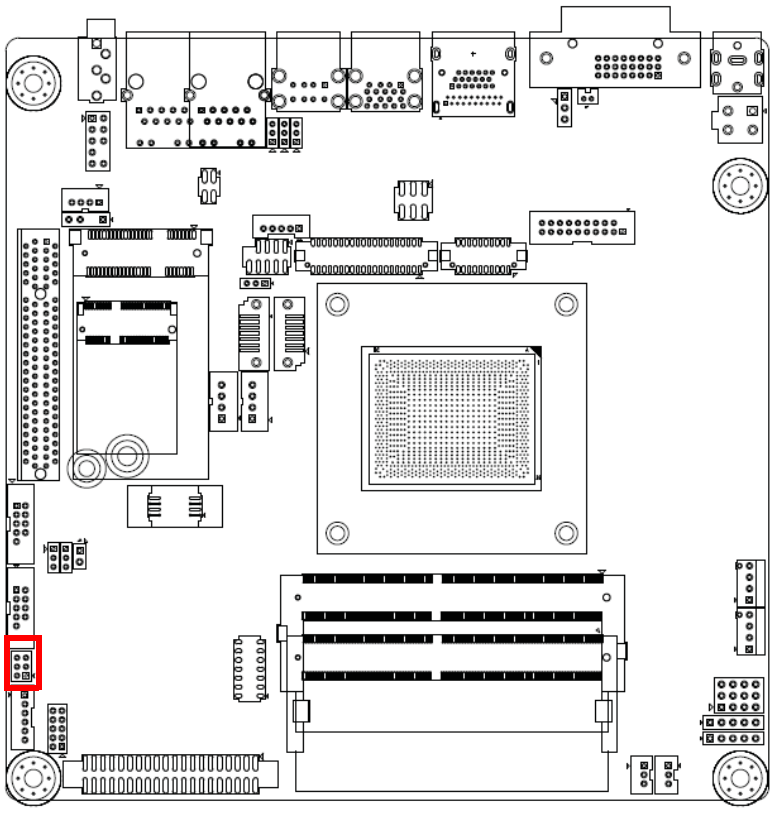
Pin	Signal	Pin	Signal
1	DCD# [1]	2	DSR# [1]
3	RXD [1]	4	RST# [1]
5	TXD [1]	6	CTS# [1]
7	DTR# [1]	8	RI# [1]
9	GND		

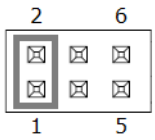


Pin	Signal	Pin	Signal
1	DCD# [3]	2	DSR# [3]
3	RXD [3]	4	RST# [3]
5	TXD [3]	6	CTS# [3]

7	DTR# [3]	8	RI# [3]
9	GND	10	GND
11	DCD# [4]	12	DSR# [4]
13	RXD [4]	14	RST# [4]
15	TXD [4]	16	CTS# [4]
17	DTR# [4]	18	RI# [4]
19	GND	20	GND
21	DCD# [5]	22	DSR# [5]
23	RXD [5]	24	RST# [5]
25	TXD [5]	26	CTS# [5]
27	DTR# [5]	28	RI# [5]
29	GND	30	GND
31	DCD# [6]	32	DSR# [6]
33	RXD [6]	34	RST# [6]
35	TXD [6]	36	CTS# [6]
37	DTR# [6]	38	RI# [6]
39	GND	40	GND

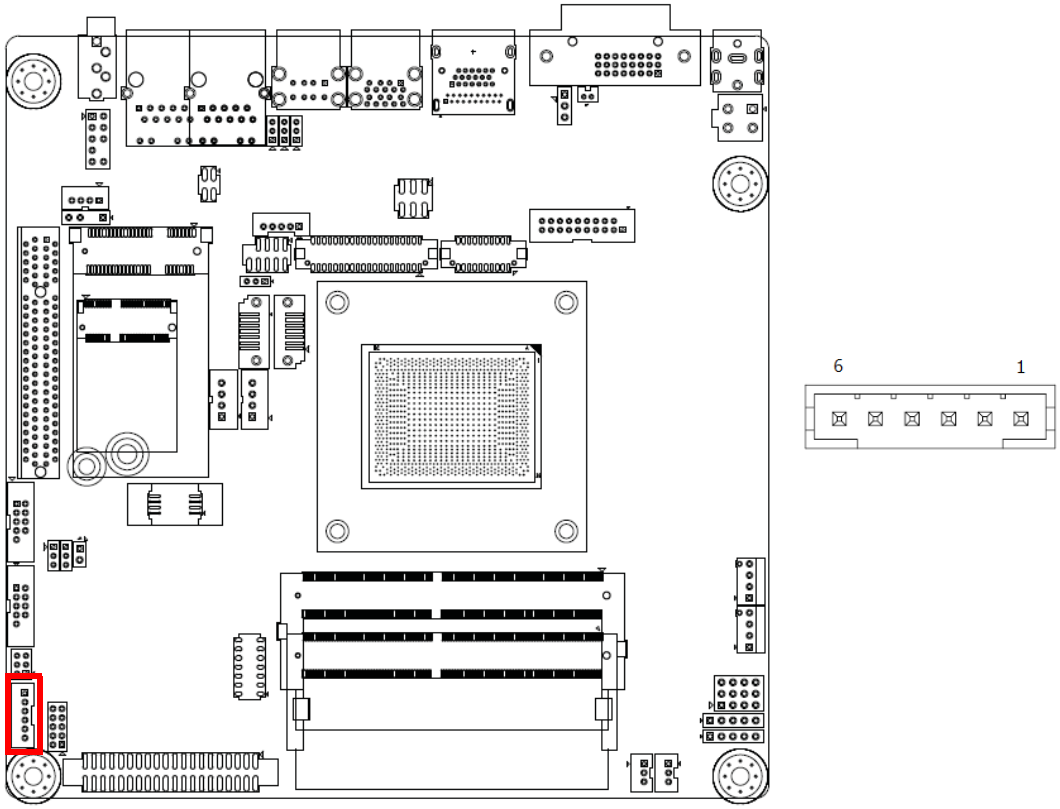
2.32 COM6 RI# selection pin header (JSETCOM6_V1)





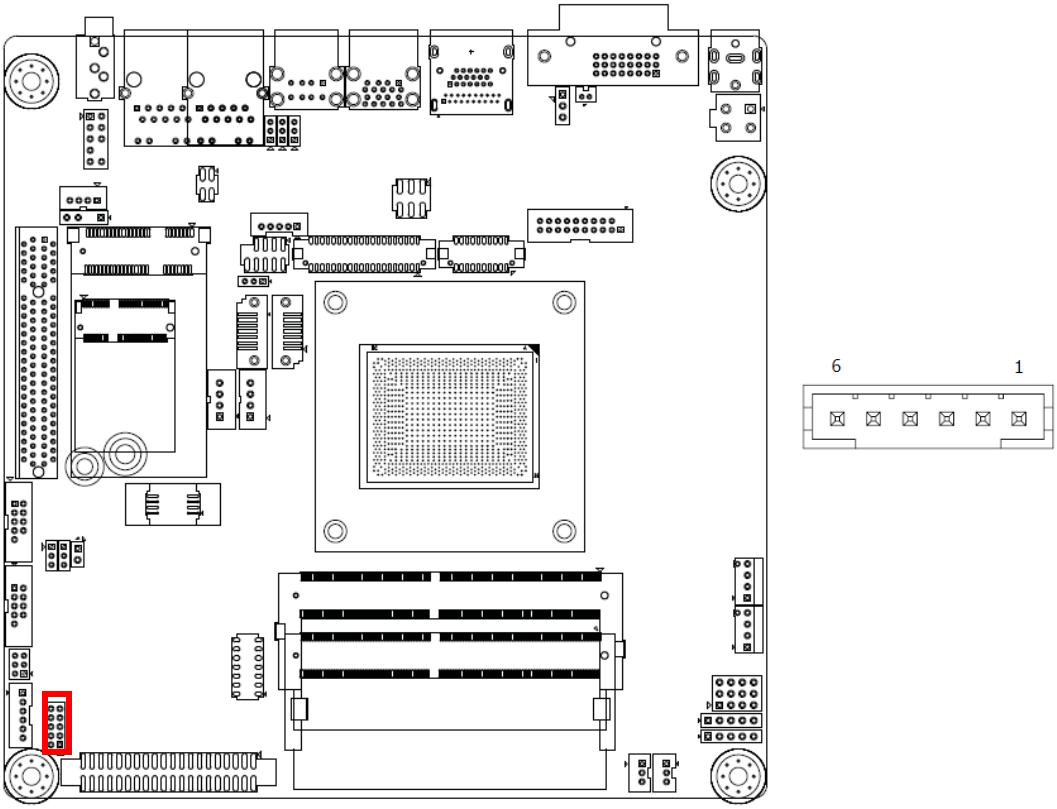
Pin	Signal	Pin	Signal
1	RI# [6]	2	Advantech define
3	Advantech define	4	+5V
5	+12V	6	Advantech define

2.33 Keyboard & Mouse connector (KBMS1)



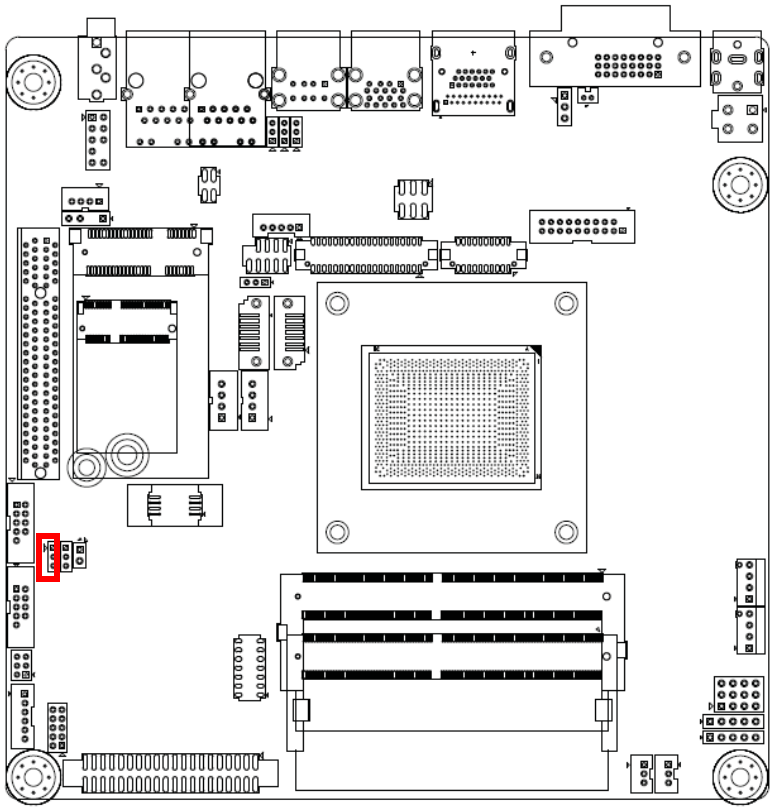
Pin	Signal
1	KB_CLK#
2	KB_DAT#
3	MS_CLK#
4	GND
5	+5V AUX
6	MS_DAT#

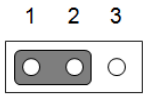
2.34 8-bits General Purpose I/O Pin Header (GPIO1)



Pin	Signal	Pin	Signal
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	+5V AUX	10	GND

2.35 CCTALK Voltage selection pin header (JCCT_VCON1)

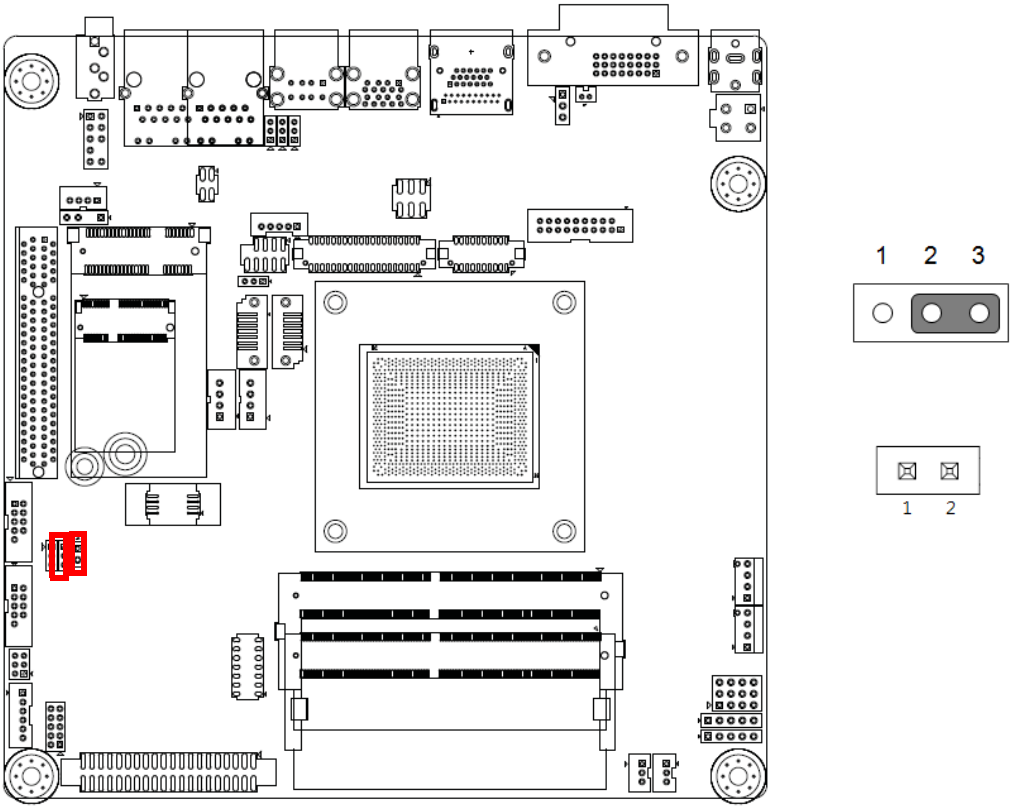




Pin	Signal
1	+12V
2	Advantech define
3	+5V

2.36 Case Open selection pin header (JCASEOP_SW1)

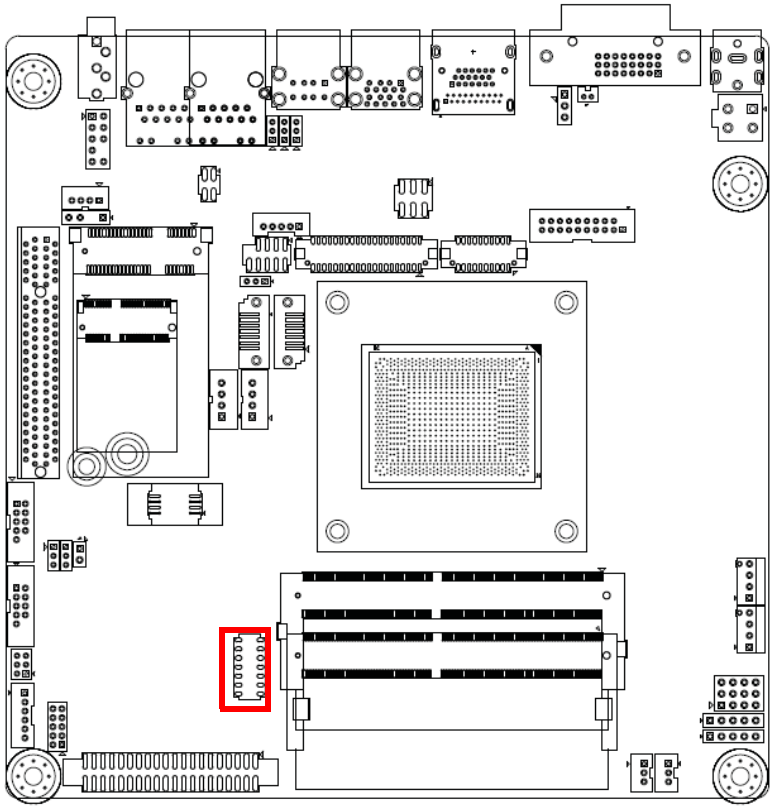
2.37 Case Open connector (JCASE1)

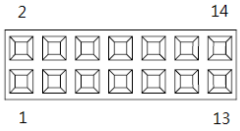


Pin	Signal
1	Normal Open
2	Advantech define
3	Normal Close

Pin	Signal
1	Case Open
2	GND

2.38 Low pin count interface connector (LPC1)





Pin	Signal	Pin	Signal
1	LPC CLK	2	LPC AD1
3	LPC RESET#	4	LPC AD0
5	LPC FRAME#	6	+3.3V
7	LPC AD3	8	GND
9	LPC AD2	10	SMB_CLK
11	LPC SERIRQ	12	SMB_DATA
13	+5V AUX	14	+5V

2.39 AMD DB-FP4 Merlin Falcon SoC (CPU1)

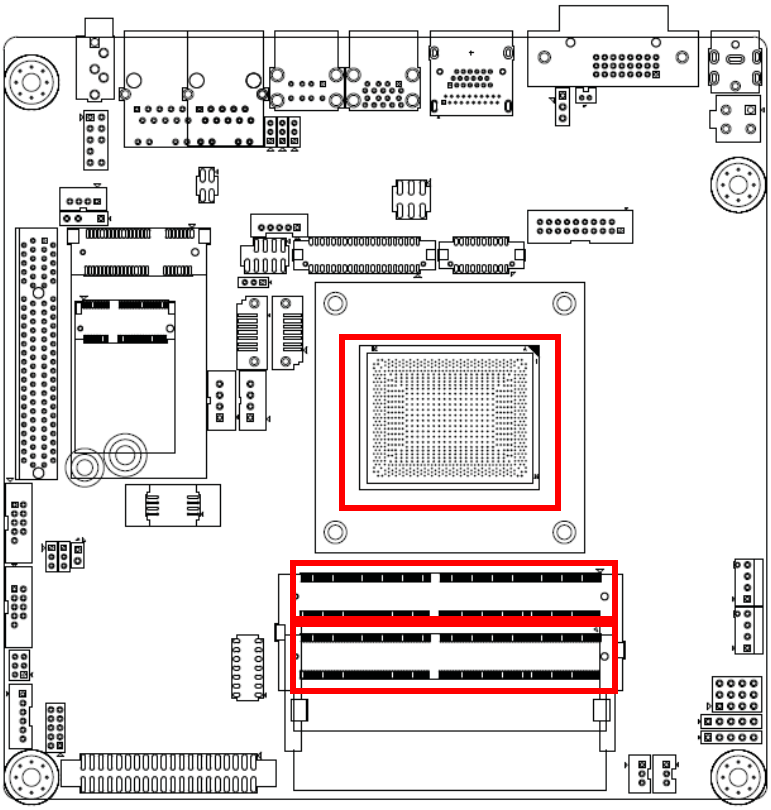
Please see AMD FP4 Processor Functional Data Sheet Family 15h Models 60h-6Fh.

2.40 DDR4 SO-DIMM Socket CH-A (DIMMA1)

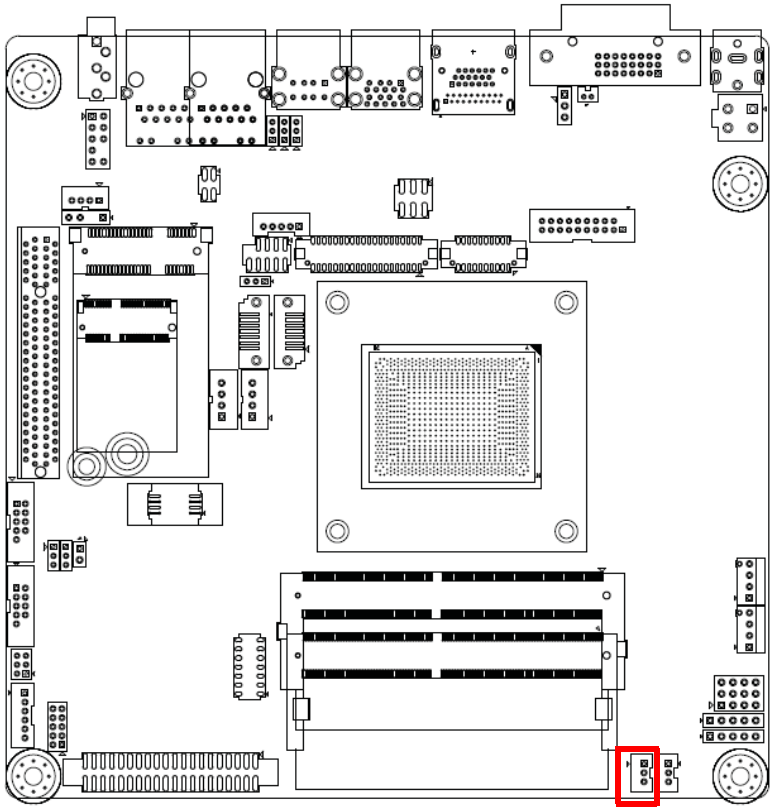
Please see JEDEC STANDARD

2.41 DDR4 SO-DIMM Socket CH-B (DIMMB1)

Please see JEDEC STANDARD

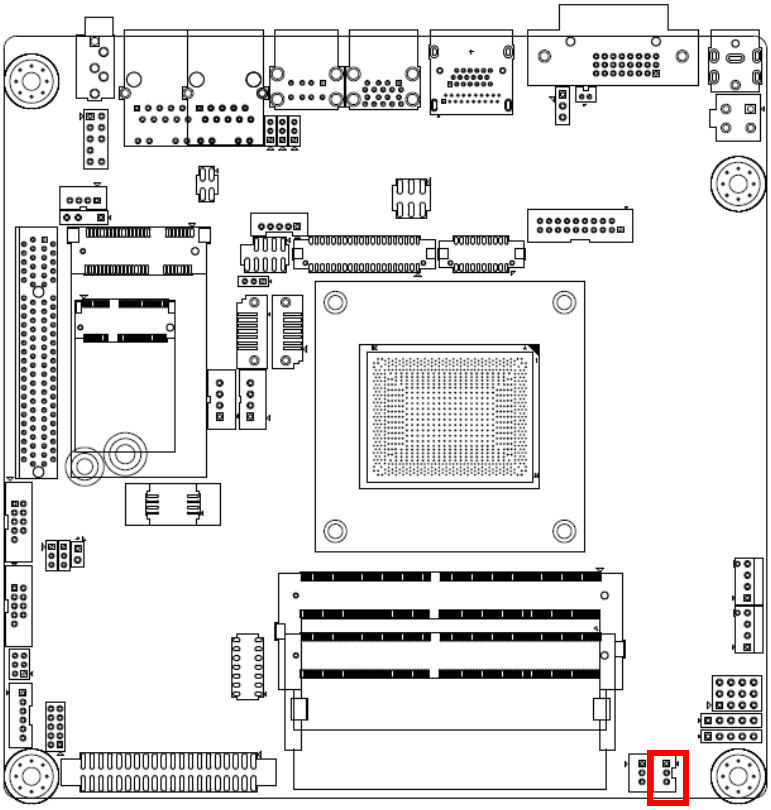


2.42 5VSB input connector (ATX_5VSB1)



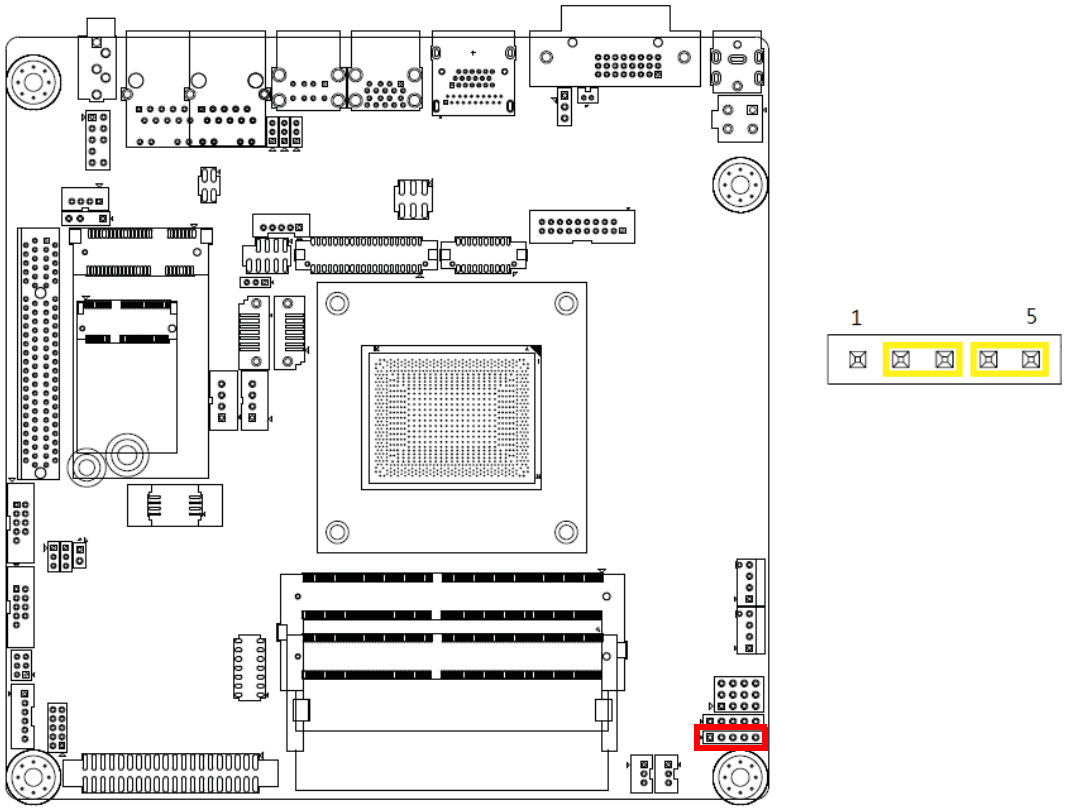
Pin	Signal
1	+5V AUX
2	GND
3	PS_ON#

2.43 AT/ATX Mode selection (PSON1)



Pin	Signal
1	AT
2	+3.3V
3	ATX

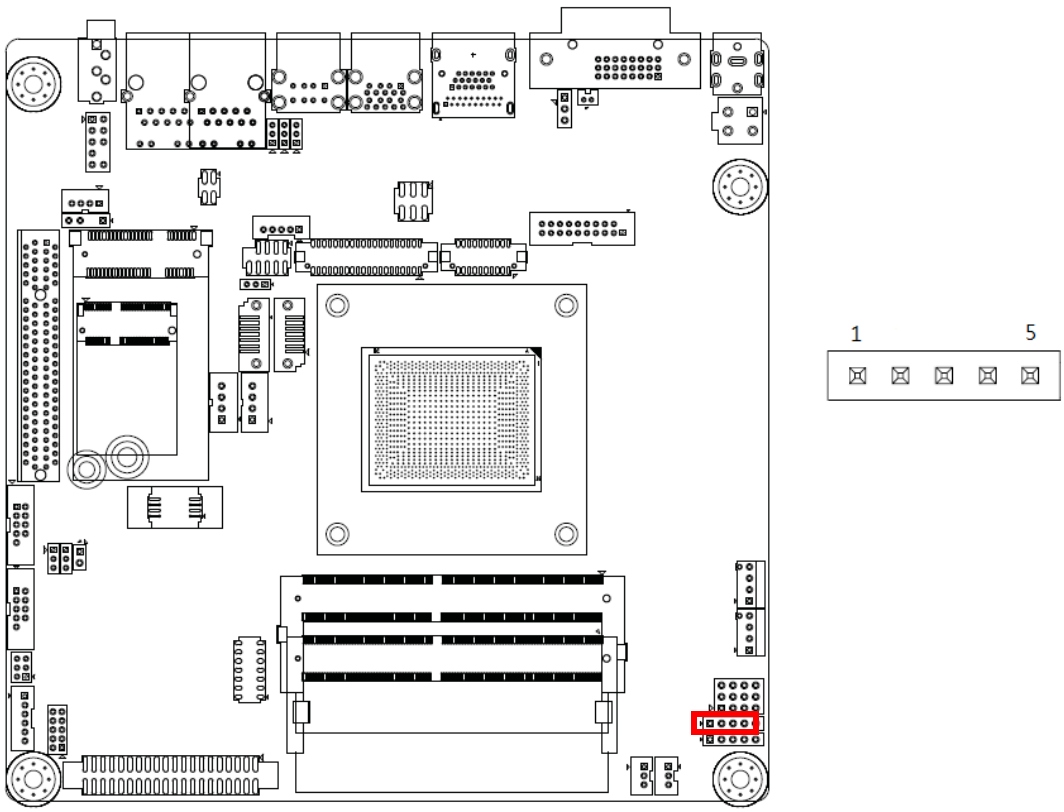
2.44 Watch Dog timer output and OBS beep (JWDT1+JOBS1)



Pin	Signal
1	NC
2	WDT
3	RESET#
4	SIO BEEP
5	FRP BEEP

2.45 Power LED and keyboard lock pin header (JFP2)

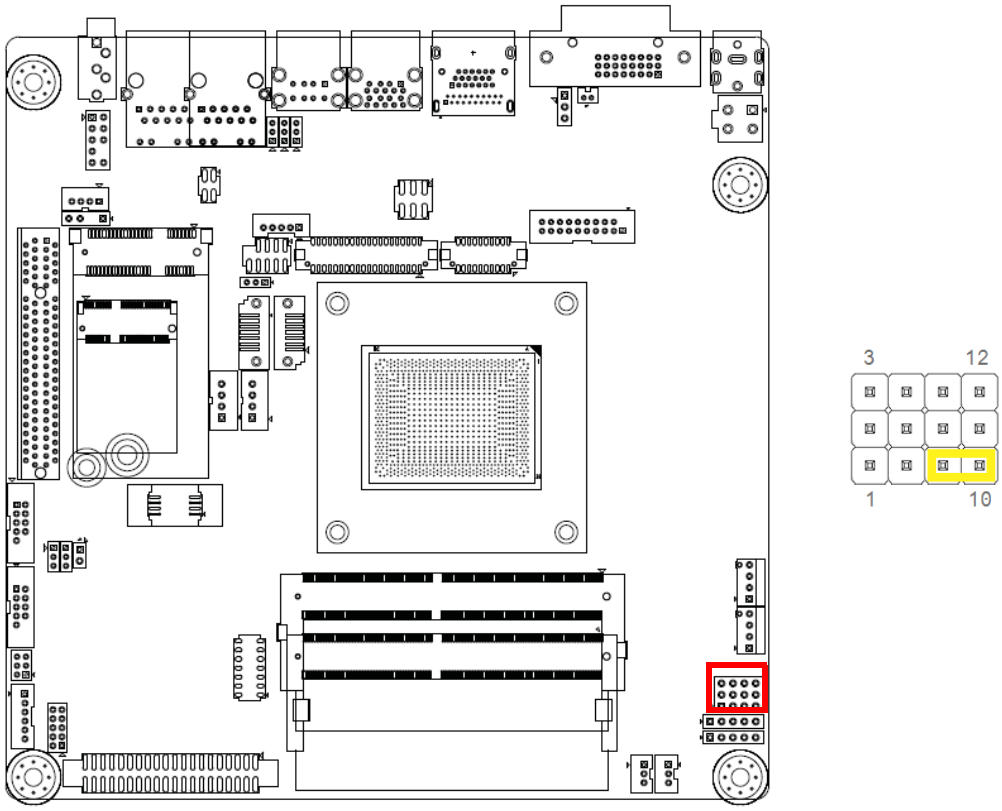
(JFP2 / PWR_LED & KEY LOCK) is a 5-pin connector for the power on LED and Key Lock function. Refer to Appendix B for detailed information on the pin assignments. The first is "ATX power mode"; the system turns on/off by a momentary power button. The second is "AT Power Mode"; the system turns on/off via the power supply switch. The third is another "AT Power Mode" which makes use of the front panel power switch. The power LED status is indicated in the following table:

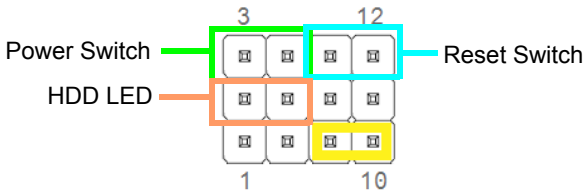


	ATX pwr supply LED status (No AT power support)		
Power Mode	LED (ATX Power Mode) (On/off by momentary button	LED (AT power Mode) (On/off by switching power supply)	LED (AT power Mode) (On/off by front panel switch
PSON1 (on back plane) jumper setting	pins 2-3 closed	pins 1-2 closed	Connect pins 1 & 2 to panel switch via cable
System On	On	On	On
System Suspend	Fast flashes	Fast flashes	Fast flashes
System Off	Slow flashes	Off	Off

Pin	Signal
1	Power LED
2	NC
3	GND
4	Keyboard Lock
5	GND

2.46 PWRBTN#/ RESET#/HDD LED/ Serial bus from HW monitor IC/Internal Buzzer /External Speaker header (JFP1)





Pin	Signal	Pin	Signal
1	+5V	2	HDD LED+
3	PWRBTN+	4	SPK_P2
5	HDD LED- 6	PWRBTN-	
7	SPK_P3	8	SMB_DATA
9	RESET+	10	SPK_P4
11	SMB_CLK	12	RESET

2.46.1 ATX soft power switch (JFP1/PWR_BTN)

If your computer case is equipped with an ATX power supply, you should connect the power on/off button on your computer case to (JFP1/ PWR_BTN), for convenient power on and off.

2.46.2 Reset (JFP1/RST_BTN)

Many computer cases offer the convenience of a reset button. Connect the wire for the reset button.

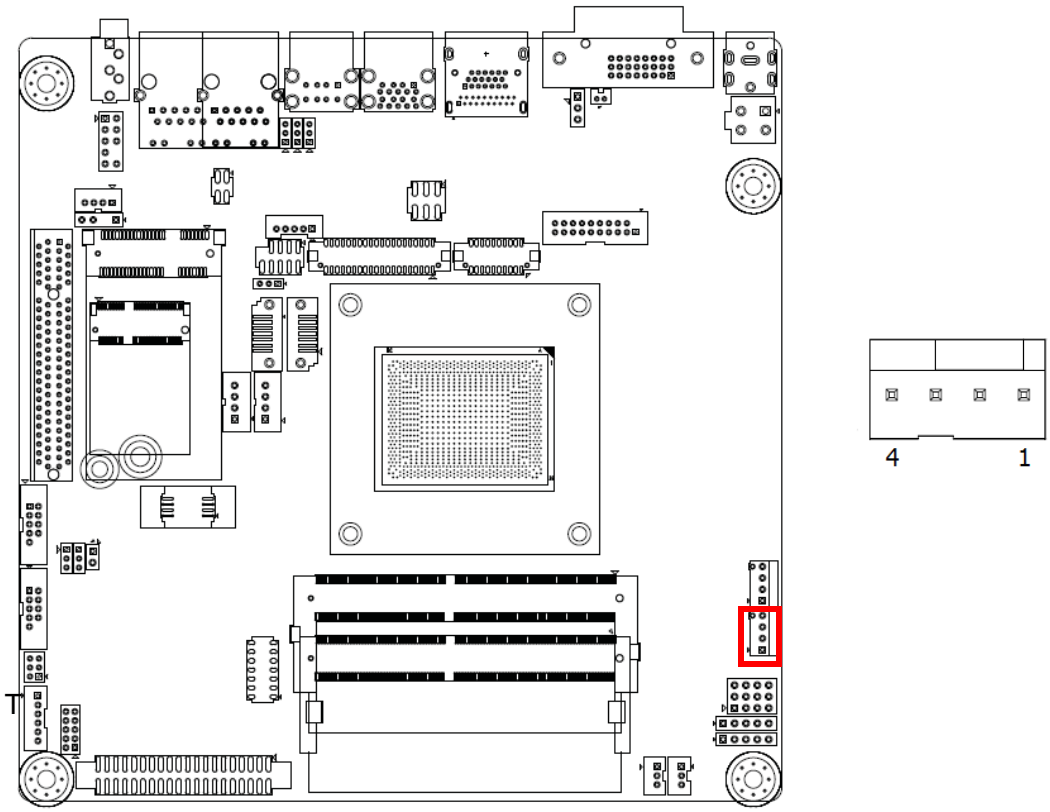
2.46.3 HDD LED (JFP1/HDD_LED)

You can connect an LED to connector (JFP1/HDD_LED) to indicate when the HDD is active.

2.46.4 External speaker (JFP1/SPEAKER)

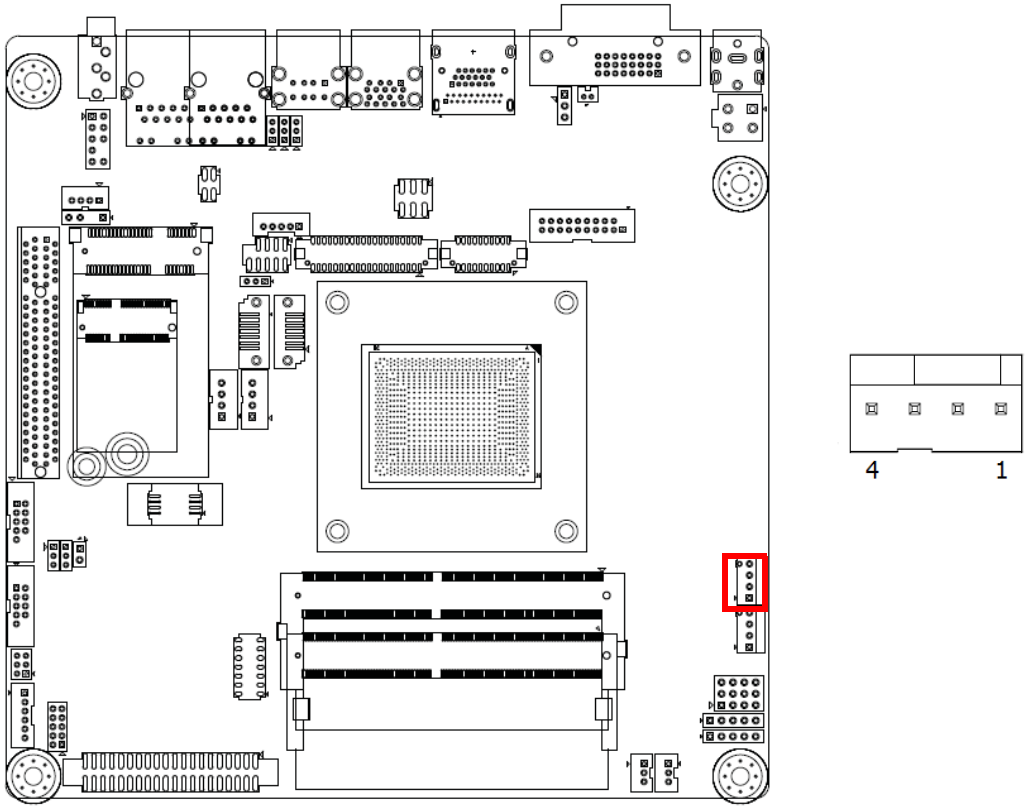
JFP1/SPEAKER is a 4-pin connector for an external speaker. If there is no external speaker, the AIMB-226 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 7 & 10 closed.

2.47 System Fan #1 connector (SYSFAN1)



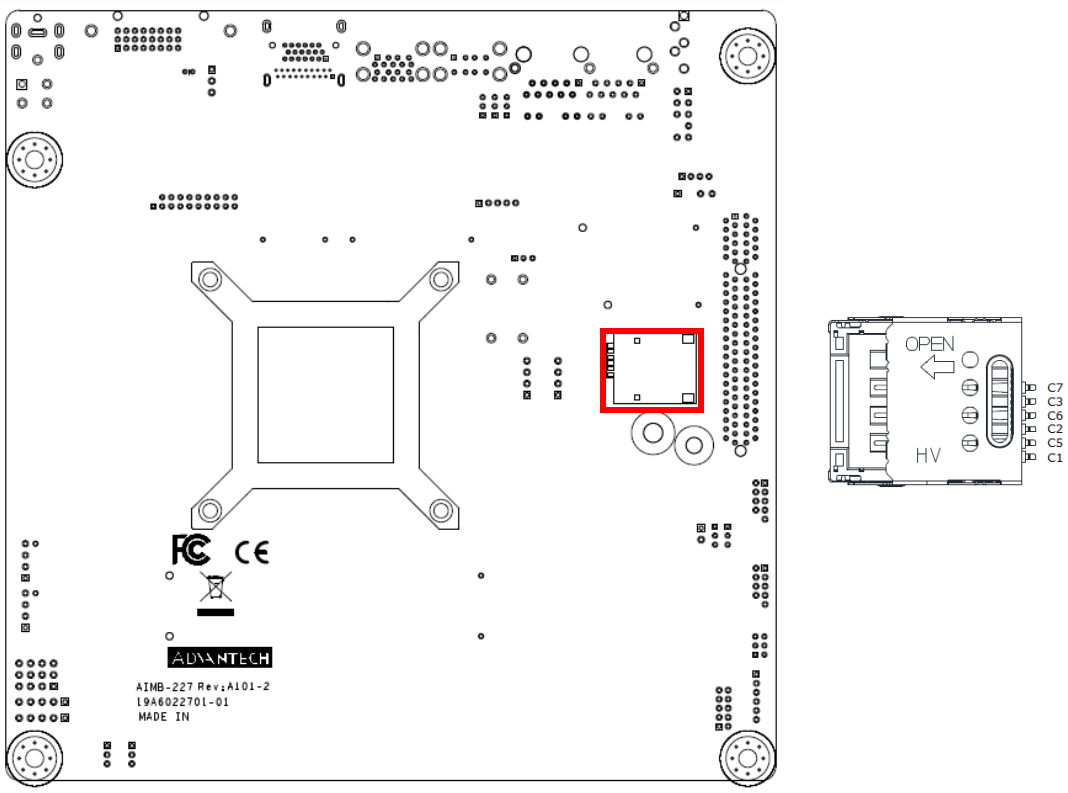
Pin	Signal
1	GND
2	SYSTEM FAN VCC
3	SYSTEM FAN SPEED
4	SYSTEM FAN PWM

2.48 CPU FAN #1 connector (CPUFAN1)



Pin	Signal
1	GND
2	CPU FAN VCC
3	CPU FAN SPEED
4	CPU FAN PWM

2.49 SIM Card holder (SIM1)



Pin	Signal
C1	SIM PWR
C2	SIM RESET
C3	SIM CLK
C5	GND
C6	SIM VPP
C7	SIM DATA

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 and control the special features of your computer. The Setup program uses a number of menus for making changes and turning special features on or off. This chapter describes the basic navigation of the AIMB-227 setup screens.

3.2 BIOS Setup

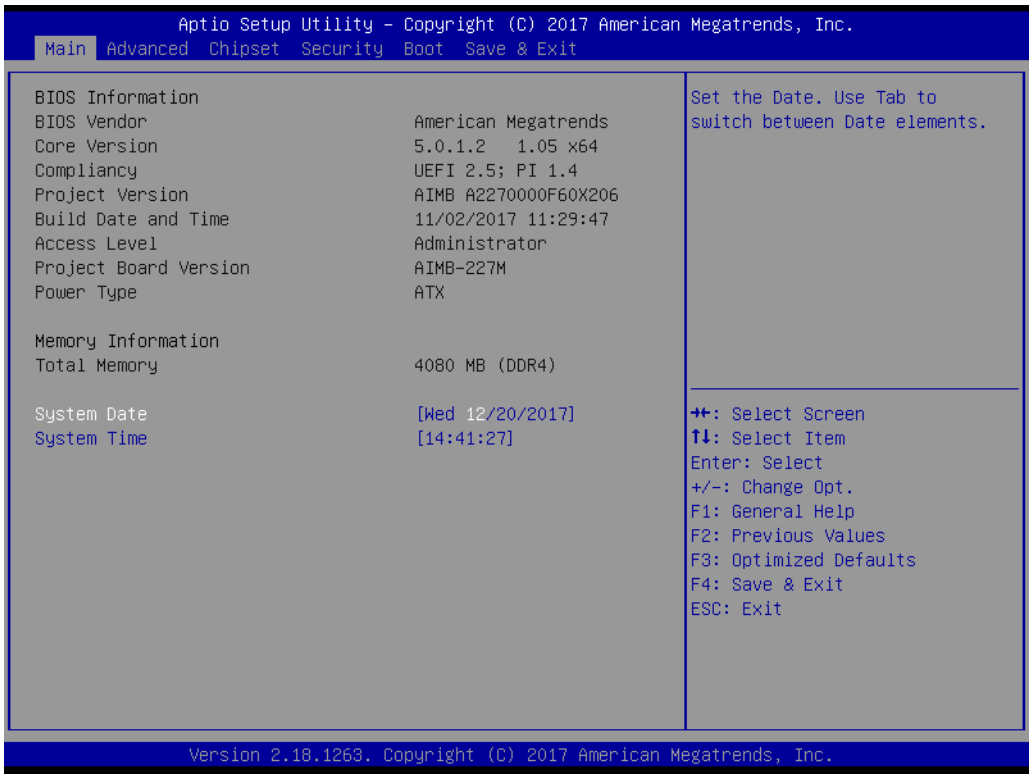
The AIMB-227 Series system has AMI BIOS built in, with a CMOS SETUP utility that allows users to configure required settings or to activate certain system features. The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies 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

3.2.1 Main Menu

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.



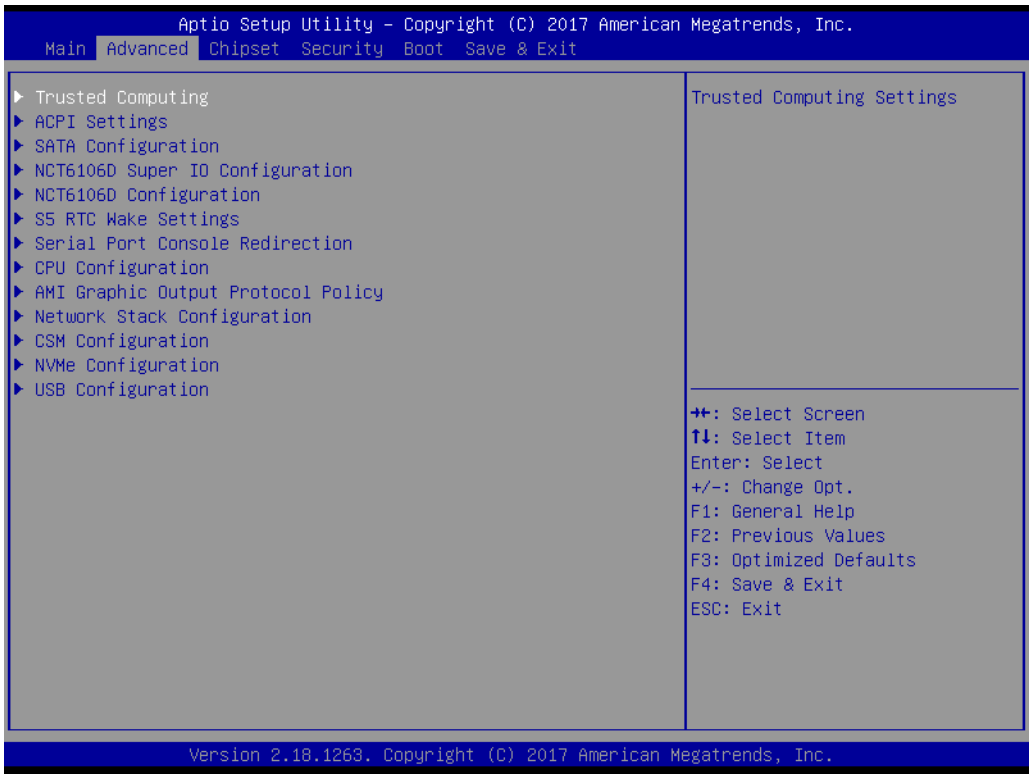
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

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.

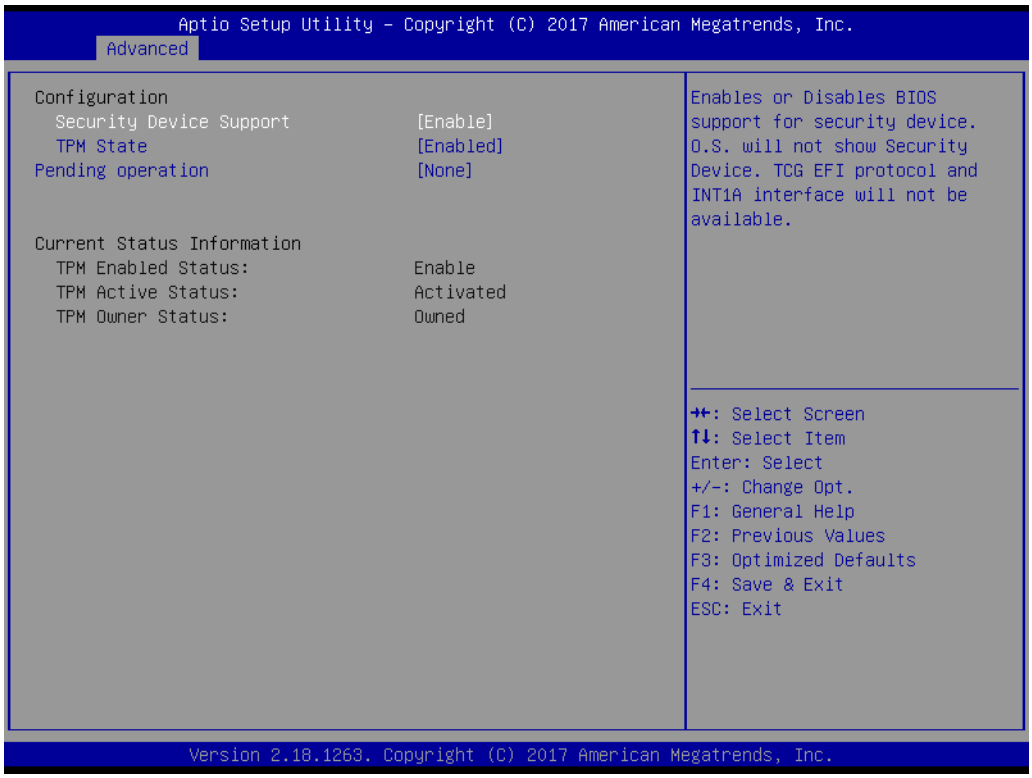
3.2.2 Advanced BIOS Features

Select the Advanced tab from the AIMB-227 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, 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.



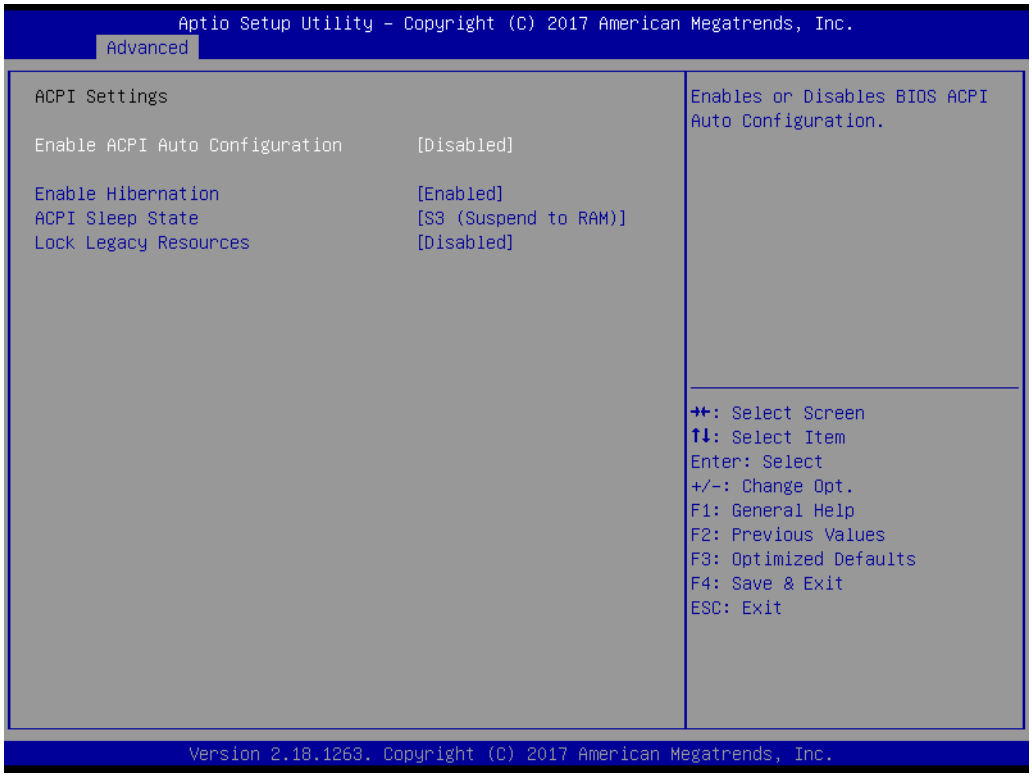
3.2.2.1 Trusted Computing

To enable/disable TPM (TPM 1.2) set up in BIOS. TPM (Trusted Platform Module) is a secure key generator and key cache management component, enables protected storage of encryption keys and authentication credentials for enhanced security capabilities.



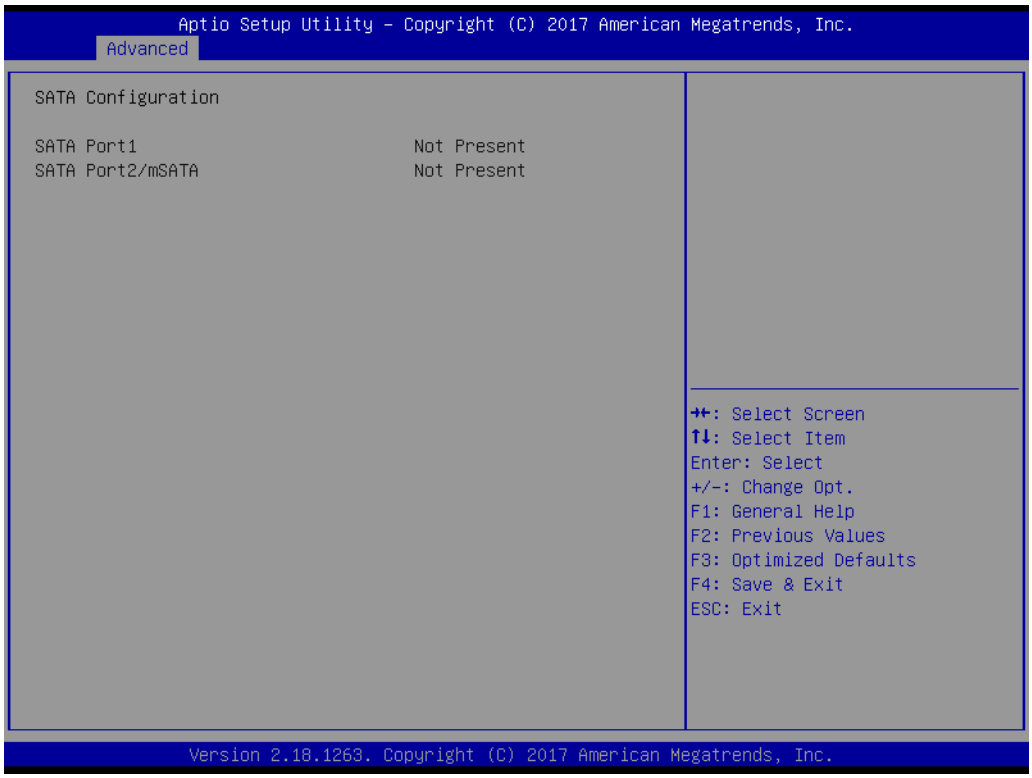
- **Security Device Support**
  Disable/Enable TPM function.
- **TPM State**
  Disable / Enable TPM function.
- **Pending Operation|**
  None / TPM Clear

3.2.2.2 ACPI Setting



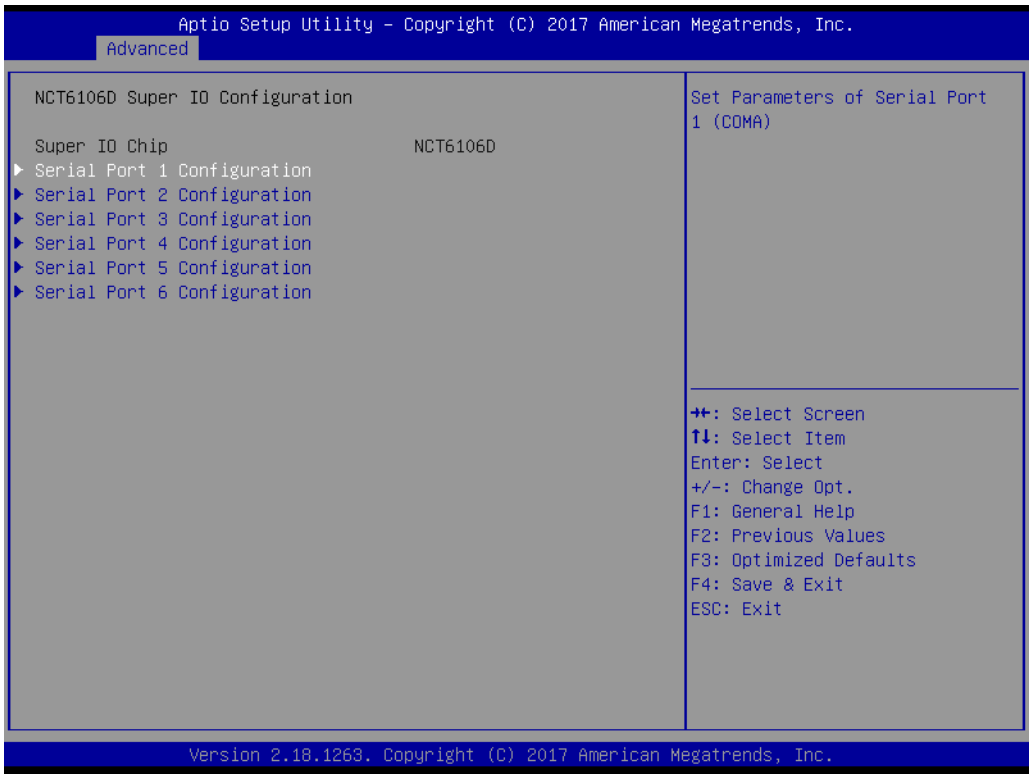
- **Enable ACPI Auto Configuration**
  Enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
  Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
- **ACPI Sleep State**
  Select ACPI sleep state the system will enter when the SUSPEND button is pressed.
- **Lock Legacy Resources**
  Enables or Disables Lock of Legacy Resources.

3.2.2.3 SATA Configuration



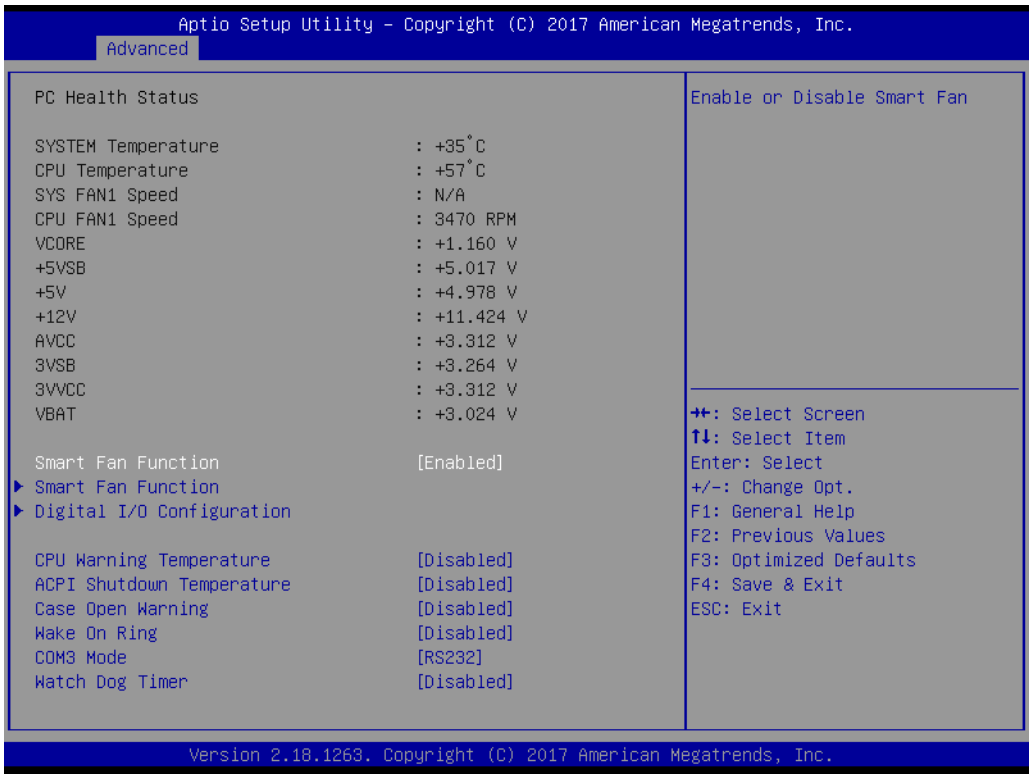
- **SATA Configuration**
  Options for SATA configuration.

3.2.2.4 NCT6106D Super IO Configuration



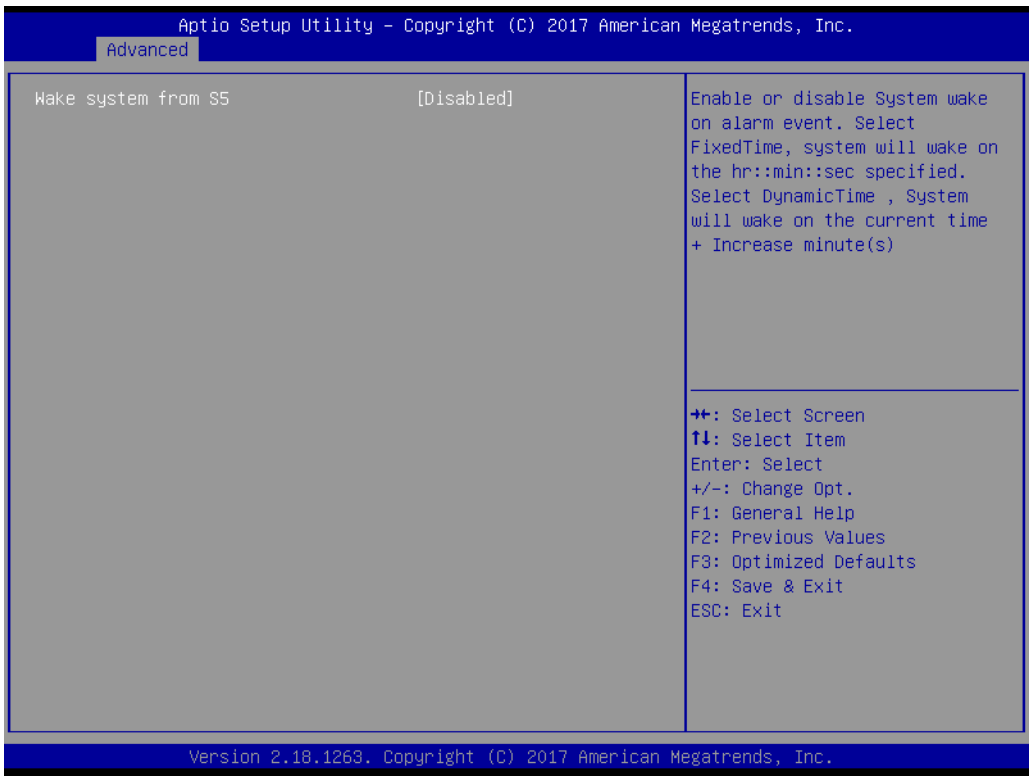
- **Serial Port 1 Configuration**
  Set the parameters Serial Port 1 (COMA).
- **Serial Port 2 Configuration**
  Set the parameters Serial Port 2 (COMB).
- **Serial Port 3 Configuration**
  Set the parameters Serial Port 3 (COMC).
- **Serial Port 4 Configuration**
  Set the parameters Serial Port 1 (COMD).
- **Serial Port 5 Configuration**
  Set the parameters Serial Port 1 (COME).
- **Serial Port 6 Configuration**
  Set the parameters Serial Port 1 (COMF).

3.2.2.5 NCT6106D Configuration (H/W monitor)



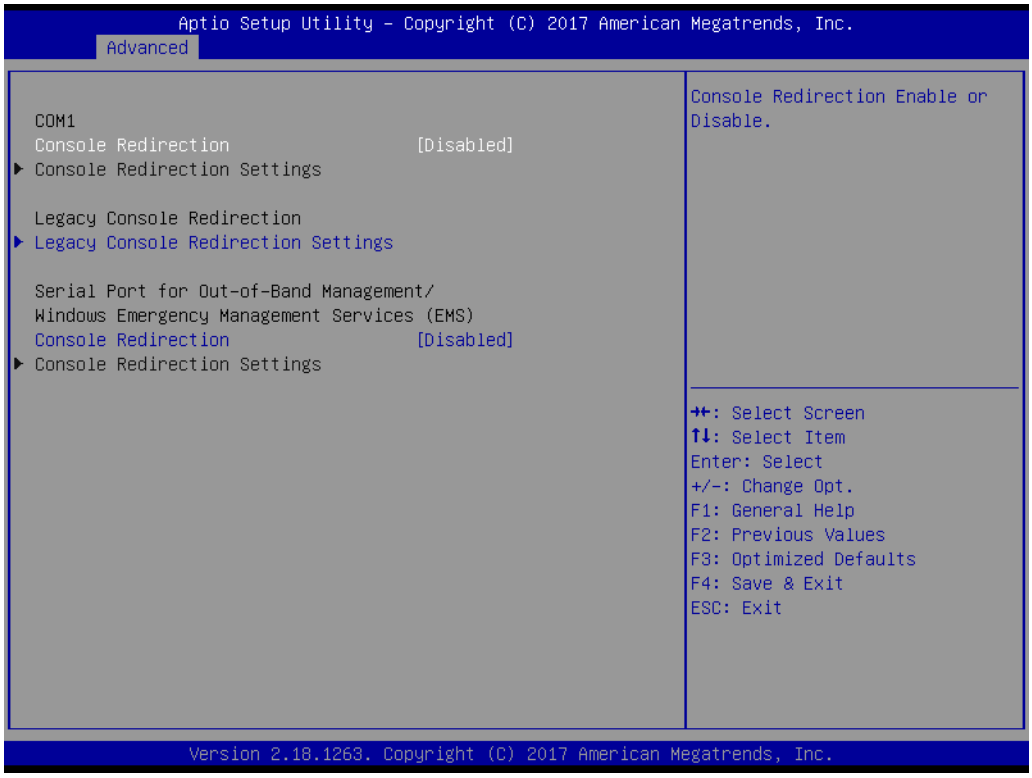
- **Smart Fan Function**
  This item allows you to enable/disable CPU cooler smart function.
- **CPU Warning Temperature**
  Use this to set the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.
- **ACPI Shutdown Temperature**
  Use this to set the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheating damage.
- **Case Open warning**
  This item allows you to enable/disable case open function.
- **Wake On Ring**
  This item allows you to enable/disable wake on ring function.
- **COM3 Mode**
  This item allows you to select COM3 as RS232 (default)/422/485.
- **Watch Dog timer**
  This item allows you to enable/disable Watch Dog Timer function.
- **Case Open warning**
  This item allows you to enable/disable case open function.

3.2.2.6 S5 RTC wake setting



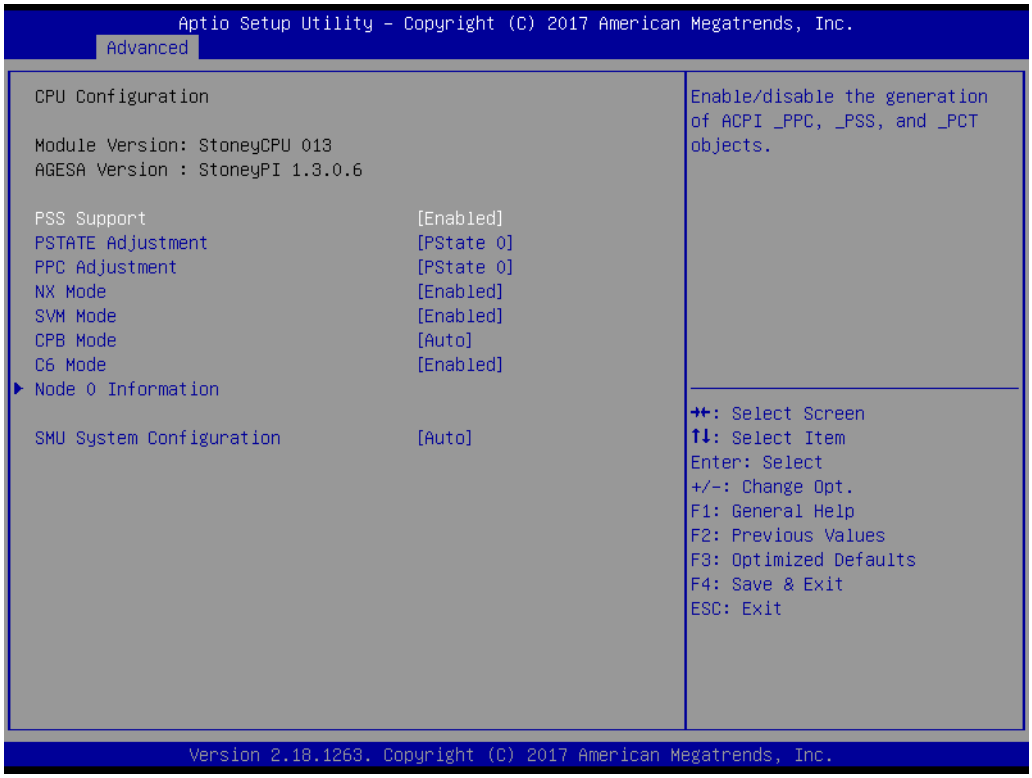
- **Wake system from S5**
  Enable or disable system wake on alarm event.

3.2.2.7 Serial Port Console Redirection



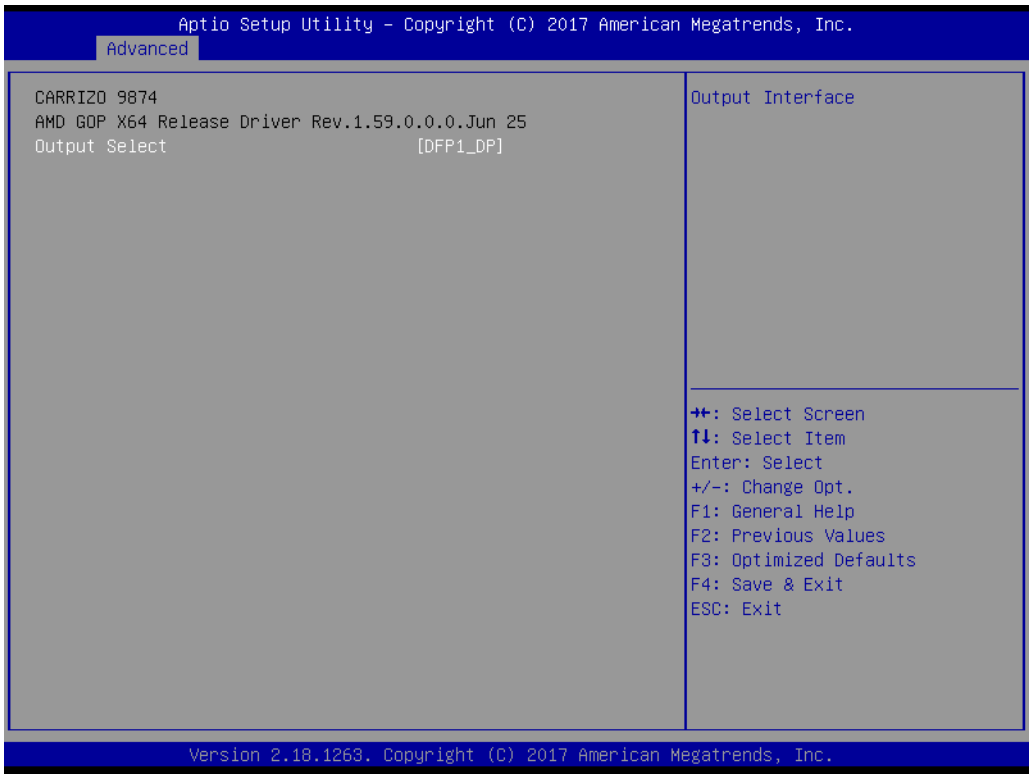
- **Console Redirection**
  This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

3.2.2.8 CPU Configuration



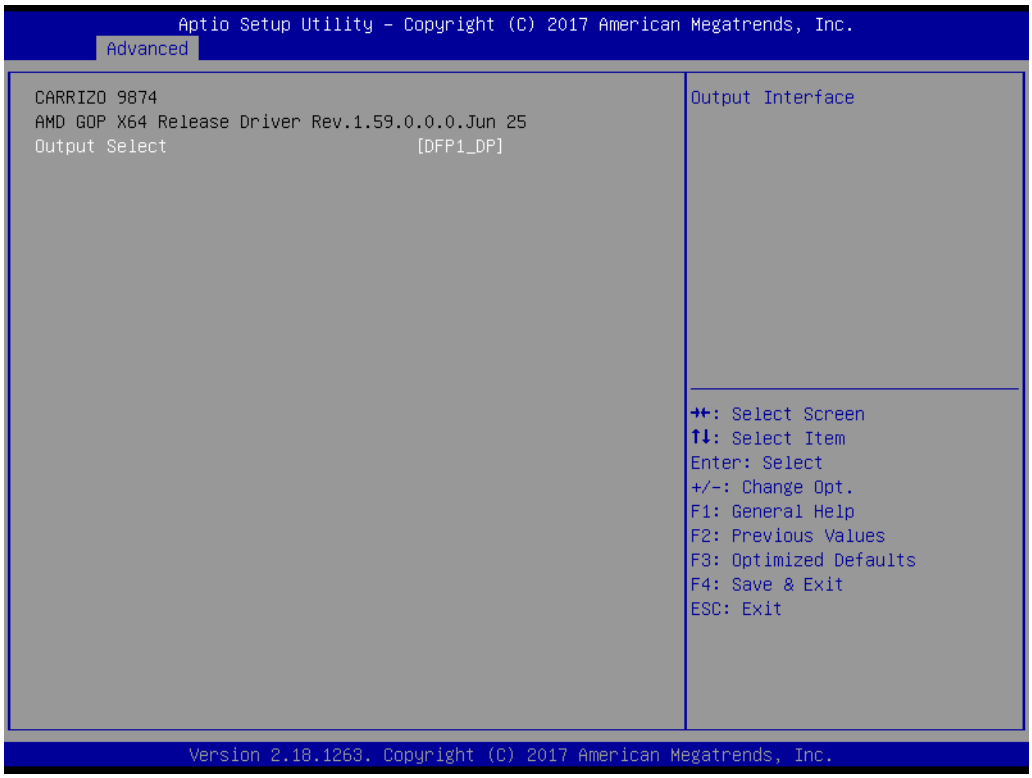
- **PSS Support**
  This item allows you to enable or disable the ACPI _PPC, _PSS, and _PCT objects.
- **NX mode**
  This item allows you to enable or disable the No-execute page protection function.
- **SVM mode**
  This item allows you to enable or disable the CPU virtualization.
- **C6 mode**
  This item allows you to auto or disable C6 function.
- **CPB mode**
  This item allows you to auto or disable CPB.

3.2.2.9 AMI Output Protocol Policy



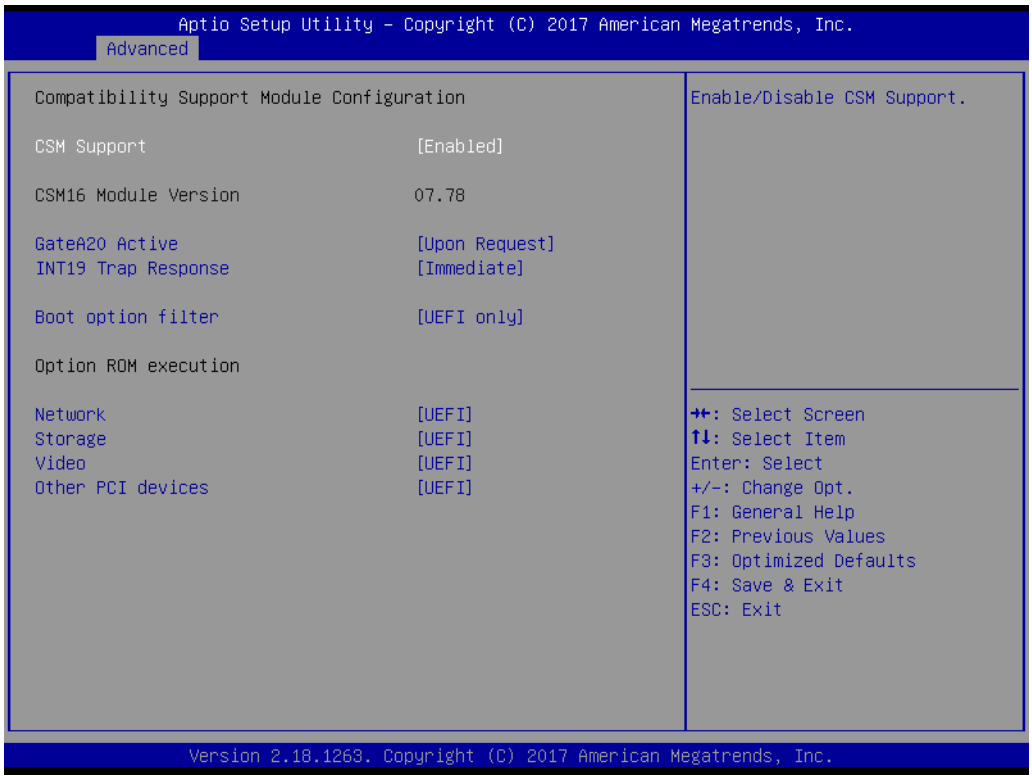
- **Output Select**
  Output interface.

3.2.2.10 Network Stack configuration



- **Network**
  Enable/Disable UEFI network stack.

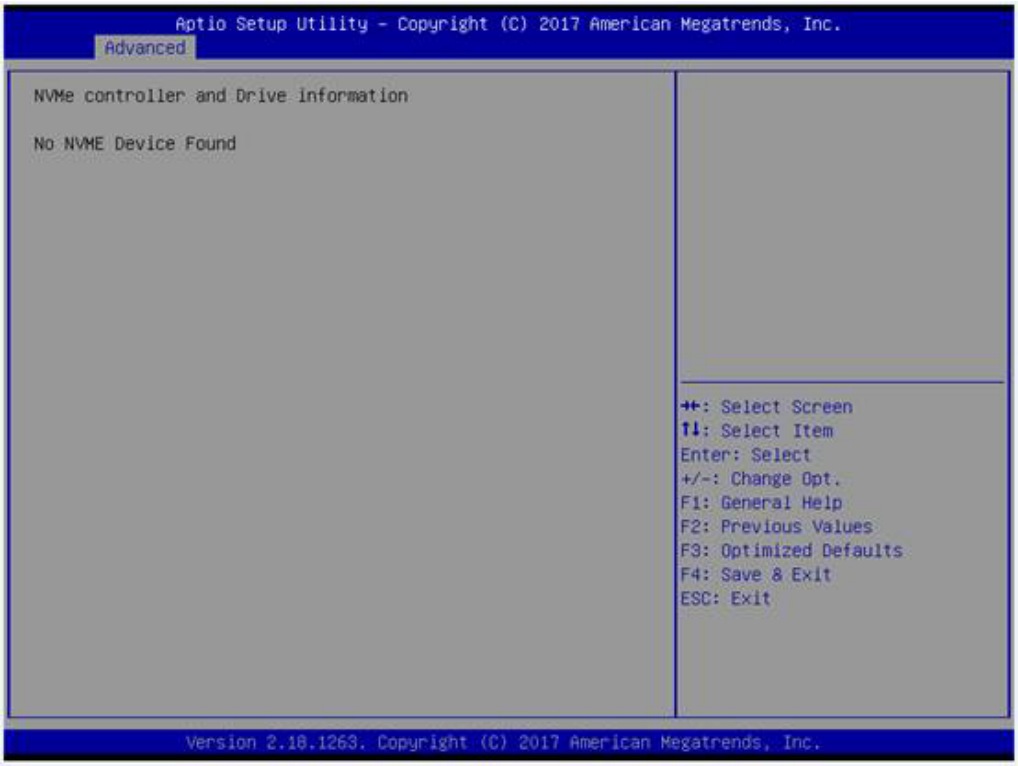
3.2.2.11 CSM configuration



- **CSM Support**
  Enable/Disable CSM support.
- **Boot option filter**
  Legacy/UEFI select.
- **Network**
  Legacy/UEFI select.
- **Storage**
  Legacy/UEFI select.
- **Video**
  Legacy/UEFI select.
- **Other PCI devices**
  Legacy/UEFI select.

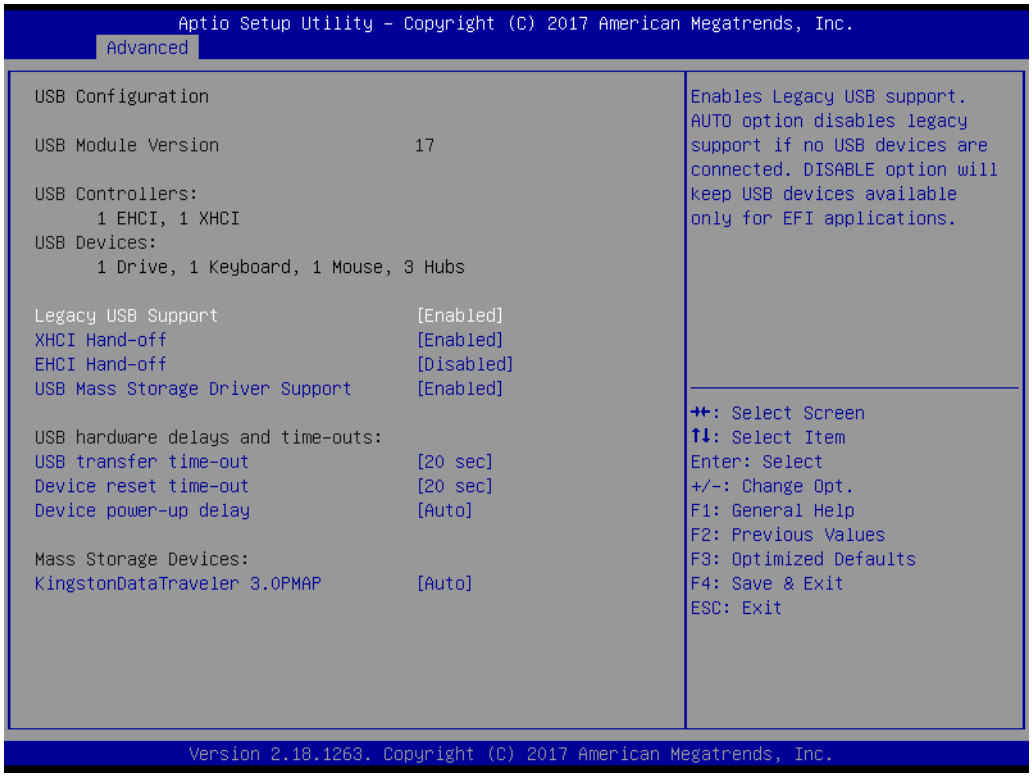
?

3.2.2.12 NVMe configuration



- **NVMe controller and Drive information**

3.2.2.13 USB Configuration

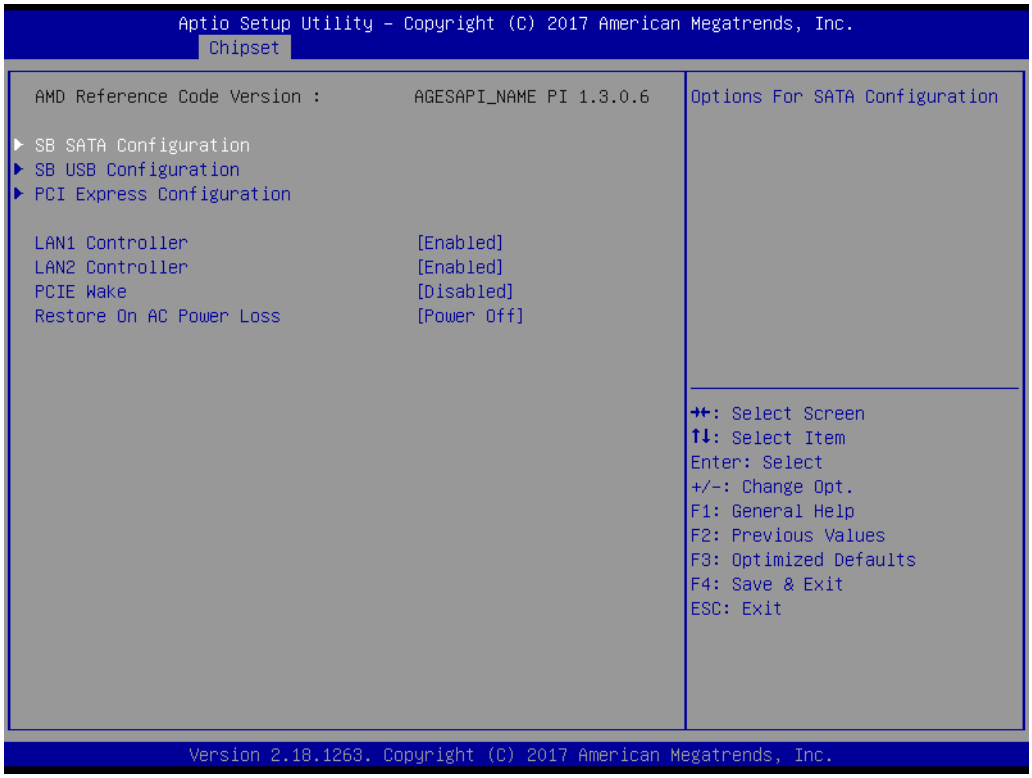


- **Legacy USB support**
  Enables support for legacy USB. Auto option disables legacy support if no USB devices are connected.
- **XHCI Hand-off**
  This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should claim by XHCI driver.
- **EHCI Hand-off**
  This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
- **USB Mass Storage Driver Support**
- **USB transfer time-out**
  Time-out value for control, bulk, and interrupt transfers.
- **Device reset time-out**
  USB mass storage device starts unit command time-out.
- **Device power-up delay**
  Maximum time the device will take before it properly report itself to the host controller.
- **Mass Storage Devices**
  Shows USB mass storage device information.

3.2.3 Chipset

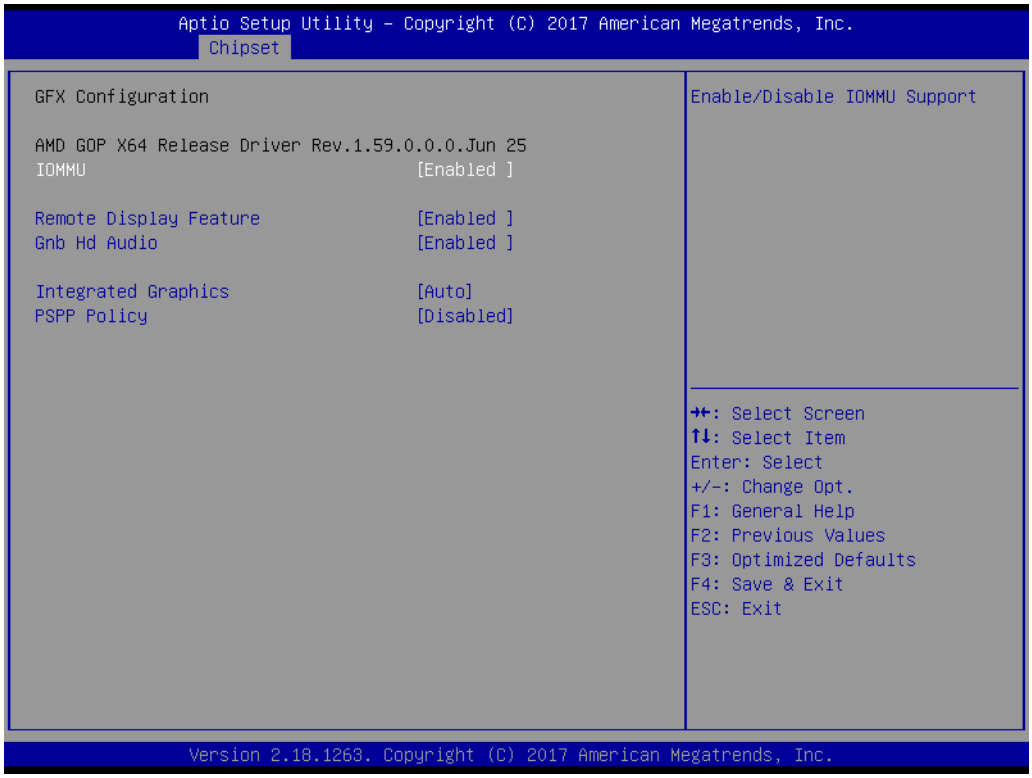
- **South Bridge Configuration**
  Details of South bridge items.
- **GFX Configuration**
  Details of display items.
- **North Bridge Configuration**
  Detail of North Bridge items.

3.2.3.1 South Bridge Configuration



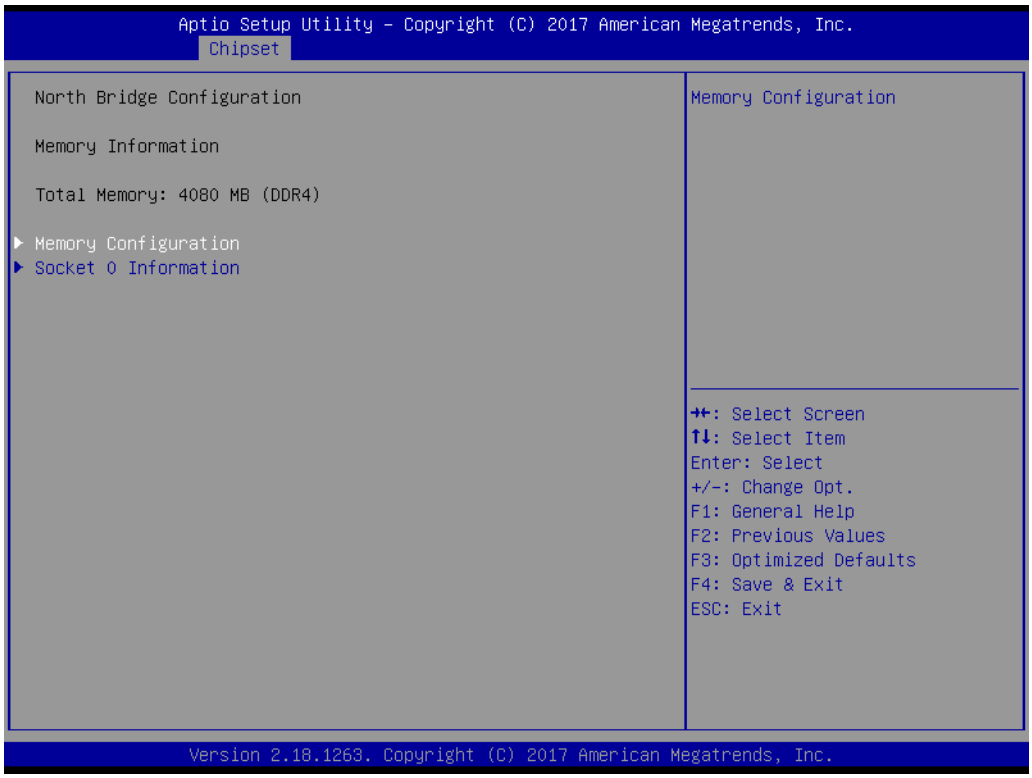
- **SB SATA Configuration**
  Options for SATA configuration.
- **SB USB Configuration**
  Options for USB configuration.
- **SB GPP Port Configuration**
  Options for GPP configuration
- **SB HD Azalia Configuration**
  Options for SB azalia.
- **PCI Express Configuration**
  Options for PCI express configuration

3.2.3.2 GFX Configuration



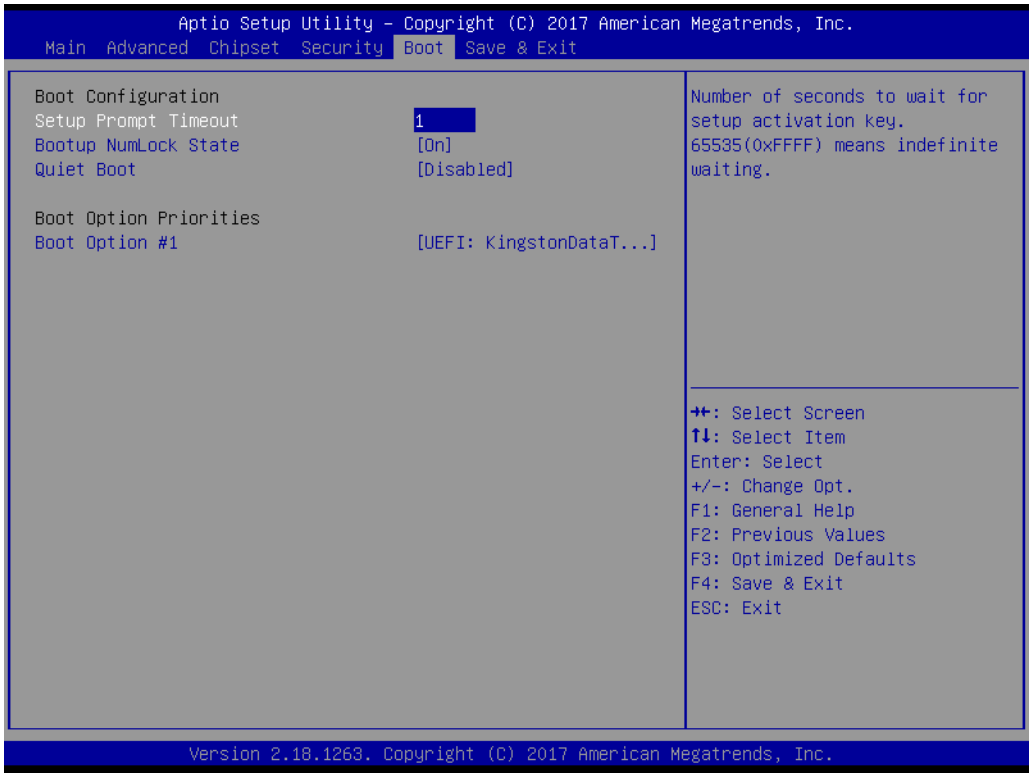
- **IOMMU**
  Enable / Disable IOMMU support.
- **Remote Display Feature**
  Enable / Disable Remote Display Feature support.
- **Gnb Hd Audio**
  Enable (default) / Disable Gnb Hd Audio support. Audio will be mute after Disable this function.
- **Integrated Graphics**
  Select SOC display outputs.
- **PSPP Policy**
  The processor supports dynamically changing the link frequency

3.2.3.3 North Bridge Configuration



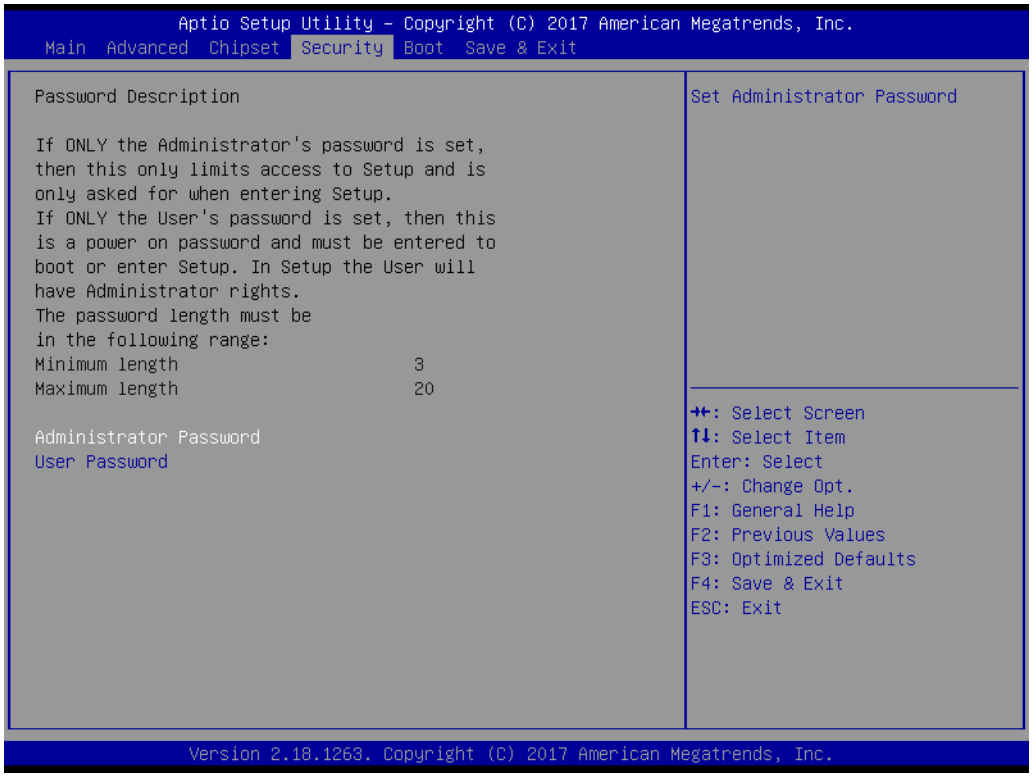
- **Memory Configuration**
  Enable / Disable (default) Memory ECC feature.
- **Socket 0 Information**
  Socket 0 Information.

3.2.4 Boot



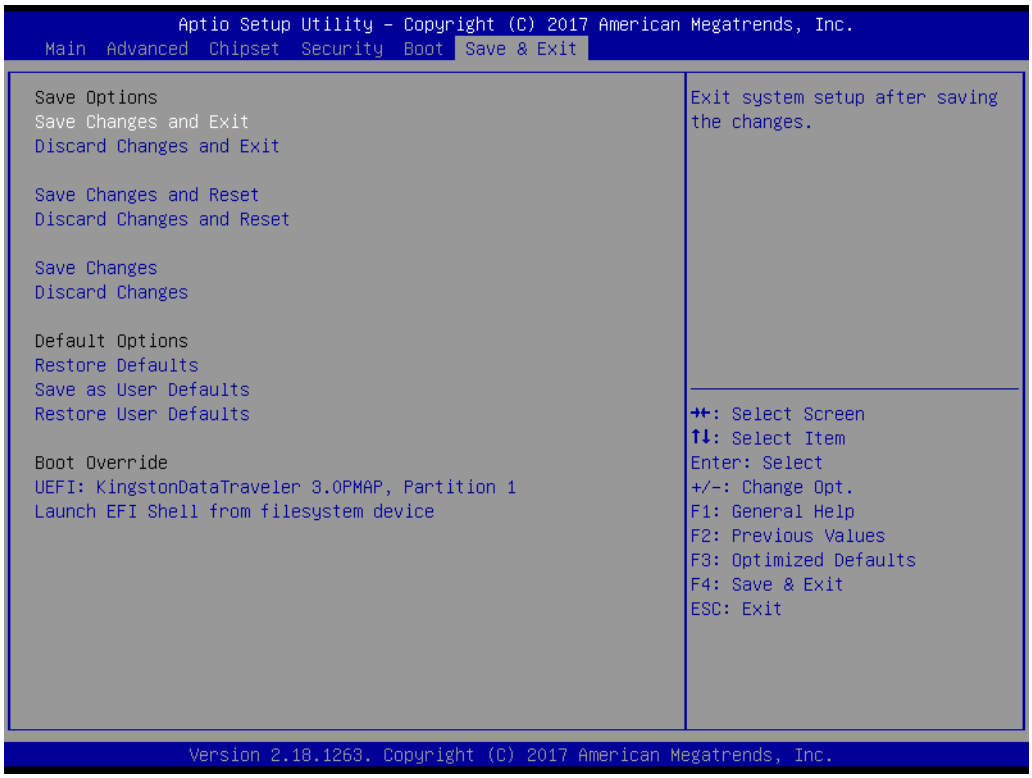
- **Setup Prompt Timeout**
  This item allows you to change number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  Select the Power-on state for Numlock.
- **Quiet Boot**
  If this option is set to Disabled, the BIOS display normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Boot Option Priorities**
  Set the system boot order.

3.2.5 Security



Select Security Setup from the AIMB-227 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.

3.2.6 Save & Exit



- **Save Changes and Exit**
  This item allows you to exit system setup after saving changes.
- **Discard Changes and Exit**
  This item allows you to exit system setup without saving any changes.
- **Save Changes and Reset**
  This item allows you to reset the system after saving the changes.
- **Discard Changes and Reset**
  This item allows you to rest system setup without saving any changes.
- **Save Changes**
  This item allows you to save changes done so far to any of the options.
- **Discard Changes**
  This item allows you to discard changes done so far to any of the options.
- **Restore Defaults**
  This item allows you to restore/load default values for all the options.
- **Save as User Defaults**
  This item allows you to save the changes done so far as user defaults.
- **Restore User Defaults**
  This item allows you to restore the user defaults to all the options.
- **Boot Override**
  Boot device select can override your boot priority.

Chapter 4

Software Introduction & Service

4.1 Introduction

The mission of Advantech Embedded Software Services is to "Enhance quality of life with Advantech platforms and Microsoft® Windows® embedded technology." We enable Windows® Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (hardware suppliers, system integrators, embedded OS distributors) for projects. Our goal is to make Windows® Embedded Software solutions easily and widely available to the embedded computing community.

4.2 Value-Added Software Services

Software API: An interface that defines the ways by which an application program may request services from libraries and/or operating systems. Provides not only the underlying drivers required but also a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. It plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

4.2.1 Software API

4.2.1.1 Control

GPIO

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. Allows users to monitor the level of signal input or set the output status to switch on/off the device. Our API also provide Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

SMBus

SMBus is the System Management Bus defined by Intel® Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface a embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

4.2.1.2 Display

Brightness Control

The Brightness Control API allows a developer to access embedded devices and easily control brightness.

Backlight

The Backlight API allows a developer to control the backlight (screen) on/off in embedded devices.

4.2.1.3 Monitor

Watchdog

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

Hardware Monitor

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.

4.2.1.4 Power Saving

CPU Speed

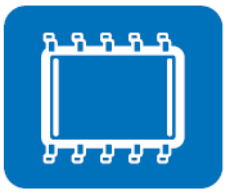
Makes use of Intel® SpeedStep technology to save power consumption. The system will automatically adjust the CPU speed depending on the system loading.

System Throttling

Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. This API allows the user to adjust the clock from 87.5% to 12.5%.

4.2.2 Software Utility

BIOS Flash



The BIOS Flash utility allows customers to update the flash ROM BIOS version, or use it to back up current BIOS by copying it from the flash chip to a file on customers' disk. The BIOS Flash utility also provides a command line version and an API for fast implementation into customized applications.

Embedded Security ID

The embedded application is the most important property of a system integrator. It contains valuable intellectual property, design knowledge and innovation, but it is easy to be copied! Embedded Security ID utility which provides reliable security functions for customers to secure their application data within embedded BIOS.

Monitoring

Monitoring is a utility that lets the customer monitor system health, like voltage, CPU and system temperature and fan speed. These items are important to a device, if the critical errors occur and are not solved quickly, permanent damage may be caused.

Flash Lock

Flash Lock is a mechanism to bind the Board and CF card (SQFlash) together. User can "Lock" SQFlash via Flash Lock function and "Unlock" by BIOS while booting. A locked SQFlash cannot be read by any card reader or boot from other platforms without a BIOS with "Unlock" feature.

eSOS

The eSOS is a small OS stored in BIOS ROM. It will boot up in case of a main OS crash. It will diagnose the hardware status, and then send an e-mail to the designated administrator. The eSOS also provide for remote connection via Telnet server and FTP server so the administrator can attempt to rescue the system. Note: This function requires BIOS customization.

Chapter 5

Chipset Software Installation Utility

5.1 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 AIMB-227 are located on Advantech website. Updates are provided via Service Packs from Microsoft®.

5.2 Introduction

The AMD 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:

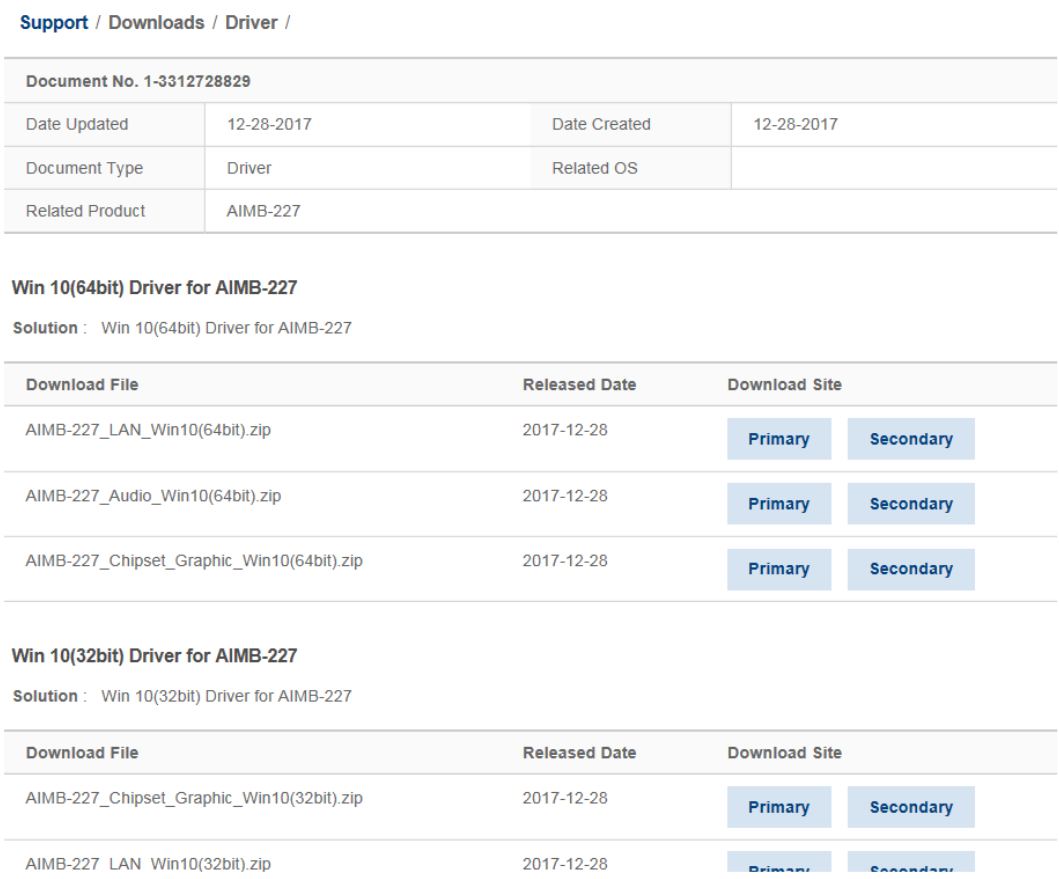
- Core PCI PnP services
- IDE Ultra ATA 100/66/33 and Serial ATA interface support
- USB 1.1/2.0 support (USB 2.0 driver needs to be installed separately for Win98)
- Identification of AMD chipset components in the Device Manager

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*

5.3 Windows 10/7 Driver Setup

1. Browse Advantech website and you can see the driver links.



Support / Downloads / Driver /

Document No. 1-3312728829			
Date Updated	12-28-2017	Date Created	12-28-2017
Document Type	Driver	Related OS	
Related Product	AIMB-227		

Win 10(64bit) Driver for AIMB-227

Solution : Win 10(64bit) Driver for AIMB-227

Download File	Released Date	Download Site	
AIMB-227_LAN_Win10(64bit).zip	2017-12-28	Primary	Secondary
AIMB-227_Audio_Win10(64bit).zip	2017-12-28	Primary	Secondary
AIMB-227_Chipset_Graphic_Win10(64bit).zip	2017-12-28	Primary	Secondary

Win 10(32bit) Driver for AIMB-227

Solution : Win 10(32bit) Driver for AIMB-227

Download File	Released Date	Download Site	
AIMB-227_Chipset_Graphic_Win10(32bit).zip	2017-12-28	Primary	Secondary
AIMB-227_LAN_Win10(32bit).zip	2017-12-28	Primary	Secondary

Chapter 6

Graphics Setup

6.1 Introduction

To benefit from the AMD R-series integrated graphics controller, you need to install the graphic driver.

6.2 Windows 10/7

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.*

Browse Advantech website and you can see the driver links.

Support / **Downloads** / **Driver** /

Document No. 1-3312728829			
Date Updated	12-28-2017	Date Created	12-28-2017
Document Type	Driver	Related OS	
Related Product	AIMB-227		

Win 10(64bit) Driver for AIMB-227

Solution : Win 10(64bit) Driver for AIMB-227

Download File	Released Date	Download Site	
AIMB-227_LAN_Win10(64bit).zip	2017-12-28	Primary	Secondary
AIMB-227_Audio_Win10(64bit).zip	2017-12-28	Primary	Secondary
AIMB-227_Chipset_Graphic_Win10(64bit).zip	2017-12-28	Primary	Secondary

Win 10(32bit) Driver for AIMB-227

Solution : Win 10(32bit) Driver for AIMB-227

Download File	Released Date	Download Site	
AIMB-227_Chipset_Graphic_Win10(32bit).zip	2017-12-28	Primary	Secondary
AIMB-227_LAN_Win10(32bit).zip	2017-12-28	Primary	Secondary

Chapter 7

LAN Configuration

7.1 Introduction

The AIMB-227 has dual Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (Realtek RTL8111G for LAN1&2) that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

7.2 Features

- Integrated 10/100/1000 Mbps transceiver
- 10/100/1000 Mbps triple-speed MAC
- High-speed RISC core with 24-KB cache
- On-chip voltage regulation
- Wake-on-LAN (WOL) support
- PCI Express x4 host interface

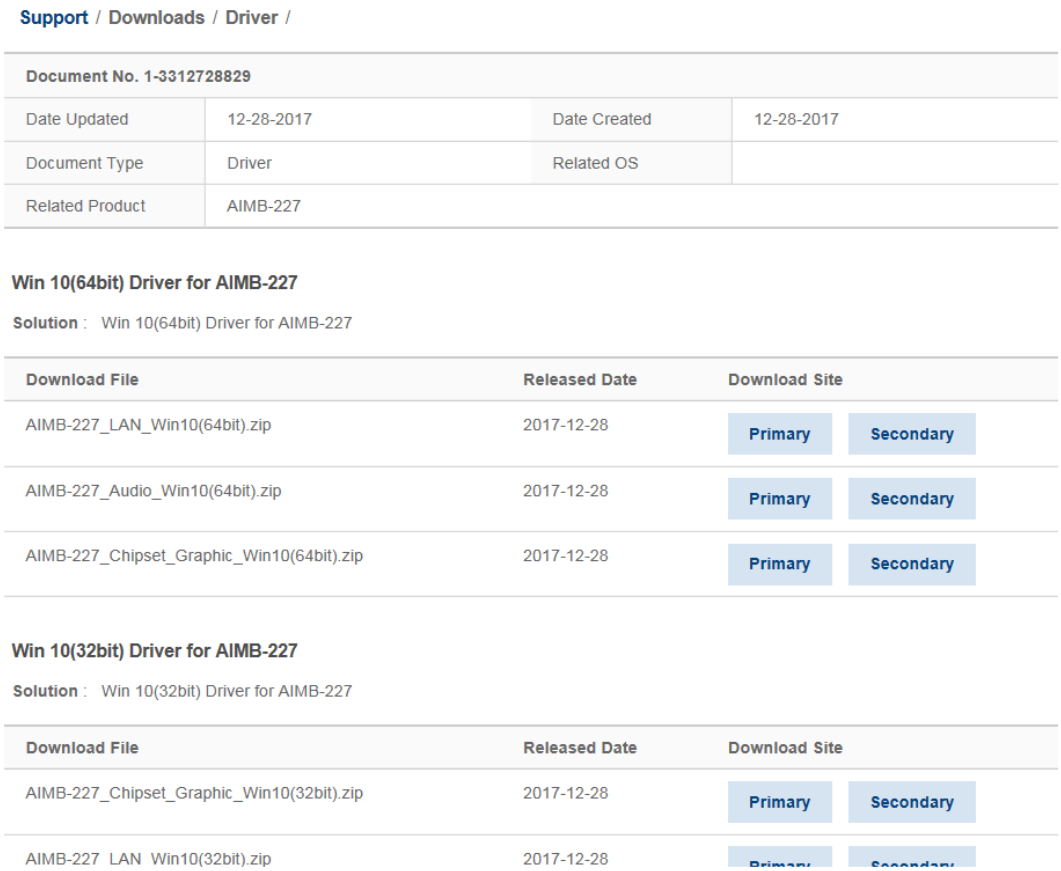
7.3 Installation

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-227's Realtek RTL8111G (LAN1&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.

7.4 Windows 10/7 Driver Setup

Browse Advantech website and find the needed drivers. Select the LAN folder then navigate to the directory for your OS.



Support / Downloads / Driver /

Document No. 1-3312728829			
Date Updated	12-28-2017	Date Created	12-28-2017
Document Type	Driver	Related OS	
Related Product	AIMB-227		

Win 10(64bit) Driver for AIMB-227

Solution : Win 10(64bit) Driver for AIMB-227

Download File	Released Date	Download Site
AIMB-227_LAN_Win10(64bit).zip	2017-12-28	Primary Secondary
AIMB-227_Audio_Win10(64bit).zip	2017-12-28	Primary Secondary
AIMB-227_Chipset_Graphic_Win10(64bit).zip	2017-12-28	Primary Secondary

Win 10(32bit) Driver for AIMB-227

Solution : Win 10(32bit) Driver for AIMB-227

Download File	Released Date	Download Site
AIMB-227_Chipset_Graphic_Win10(32bit).zip	2017-12-28	Primary Secondary
AIMB-227_LAN_Win10(32bit).zip	2017-12-28	Primary Secondary

Appendix A

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

The AIMB-227'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 NCT6776D. 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).

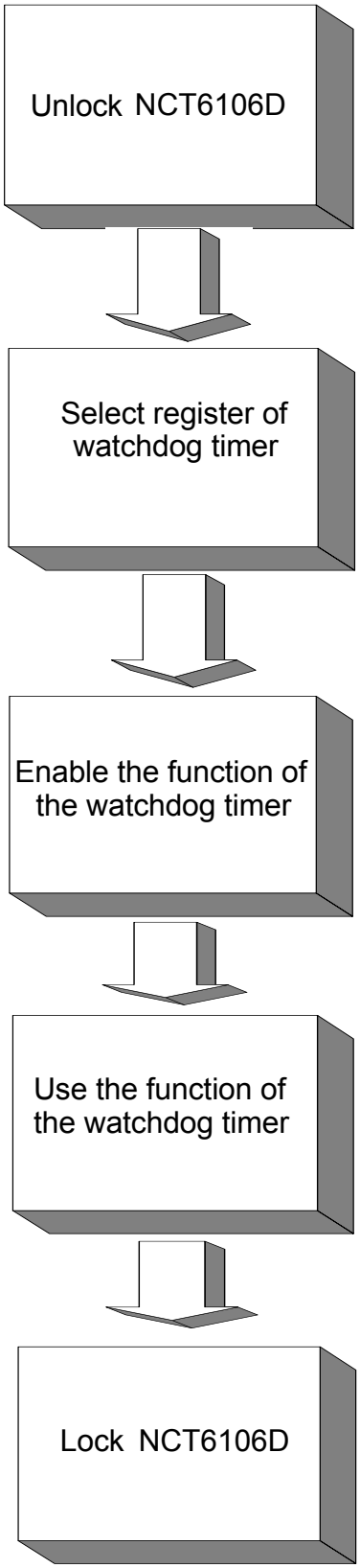

Unlock NCT6106D
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock NCT6106D

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 NCT6776D.
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 NCT6776D
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 NCT6776D
Mov al,0aah
Out dx,al
```

2. Enable watchdog timer and set 5 minutes as timeout interval

```
;----------------------------------------------------------
Mov dx,2eh ; Unlock NCT6776D
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 NCT6776D
Mov al,0aah
Out dx,al
```

3. Enable watchdog timer to be reset by mouse

```
;--------------------------------------------------------
Mov dx,2eh ; Unlock NCT6776D
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 NCT6776D
Mov al,0aah
Out dx,al
```

4. Enable watchdog timer to be reset by keyboard

```
;--------------------------------------------------------
Mov dx,2eh ; Unlock NCT6776D
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 NCT6776D
Mov al,0aah
Out dx,al
```

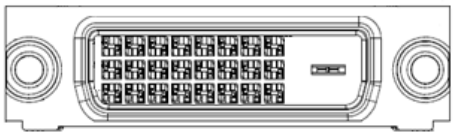
5. Generate a time-out signal without timer counting

```
;--------------------------------------------------------
Mov dx,2eh ; Unlock NCT6776D
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 NCT6776D
Mov al,0aah
Out dx,al
```

Appendix B

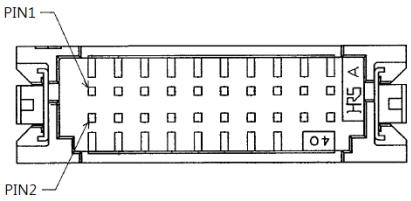
I/O Pin Assignments

B.1 Digital Visual Interface connector (DVI1)



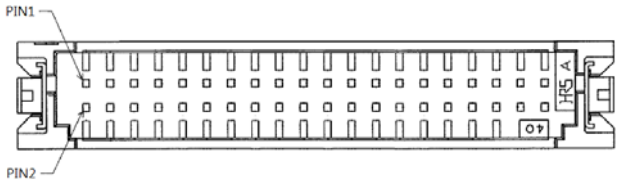
Pin	Signal	Pin	Signal
1	TMDS D2-	13	GND
2	TMDS D2+	14	VCC (+5V)
3	GND	15	GND
4	GND	16	Hot plug detect
5	GND	17	TMDS D0-
6	DDC CLK	18	TMDS D0+
7	DDC DAT	19	GND
8	NC	20	GND
9	TMDS D1-	21	GND
10	TMDS D1-	22	GND
11	GND	23	TMDS CLK+
12	GND	24	TMDS CLK-

B.2 Embed DisplayPort (EDP1)



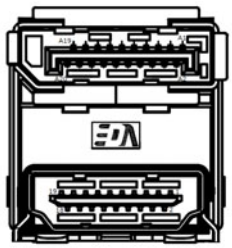
Pin	Signal	Pin	Signal
1	GND	2	GND
3	ML_0-	4	ML_3-
5	ML_0+	6	ML_3+
7	GND	8	NC
9	ML_1-	10	GND
11	ML_1+	12	AUX-
13	GND	14	AUX+
15	ML_2-	16	GND
17	ML_2+	18	Hot plug detect
19	VDD	20	VDD

B.3 Low Voltage Differential Signaling (LVDS1)



Pin	Signal	Pin	Signal
1	VDD	2	VDD
3	LVDS DETECT#	4	GND
5	VDD	6	VDD
7	OD0-	8	ED0-
9	OD0+	10	ED0+
11	GND	12	GND
13	OD1-	14	ED1-
15	OD1+	16	ED1+
17	GND	18	GND
19	OD2-	20	ED2-
21	OD2+	22	ED2+
23	GND	24	GND
25	OCK-	26	ECK-
27	OCK+	28	ECK+
29	GND	30	GND
31	DDC CLK	32	DDC DAT
33	GND	34	GND
35	OD3-	36	ED3-
37	OD3+	38	ED3+
39	LVDS ENBKL	40	LVDS VCON

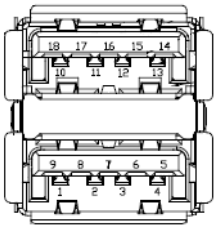
B.4 DisplayPort (Up) + High Definition Multimedia Interface (Down) stack connector (DP1+HDMI1)



Pin	Signal	Pin	Signal
A1	ML0+	A11	GND
A2	GND	A12	ML3-
A3	ML0-	A13	CONFIG1
A4	ML1+	A14	GND
A5	GND	A15	AUX+
A6	ML1-	A16	GND
A7	ML2+	A17	AUX-
A8	GND	A18	HPD
A9	ML2-	A19	GND
A10	ML3+	A20	DP_PWR (+3.3V)

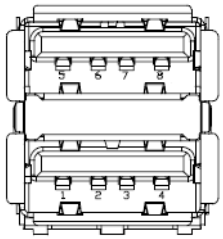
Pin	Signal	Pin	Signal
1	TMDS D2+	11	GND
2	GND	12	TMDS CLK-
3	TMDS D2-	13	NC
4	TMDS D1+	14	NC
5	GND	15	SCL
6	TMDS D1-	16	SDA
7	TMDS D0+	17	GND
8	GND	18	VCC (+5V)
9	TMDS D0-	19	HPD
10	TMDS CLK+		

B.5 USB3.0 stack connector (USB12)



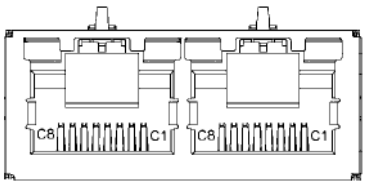
Pin	Signal	Pin	Signal
1	VBUS	2	D-
3	D+	4	GND
5	RX-	6	RX+
7	GND	8	TX-
9	TX+	10	VBUS
11	D-	12	D+
13	GND	14	RX-
15	RX+	16	GND
17	TX-	18	TX+

B.6 USB2.0 stack connector (USB34)



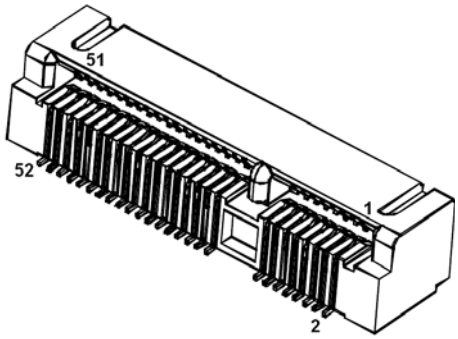
Pin	Signal	Pin	Signal
1	VBUS	5	VBUS
2	D-	6	D-
3	D+	7	D+
4	GND	8	GND

B.7 Dual port RJ45 Connector (LAN12)



Pin	Signal
C1	MDI0+
C2	MDI0-
C3	MDI1+
C4	MDI1-
C5	MDI2+
C6	MDI2-
C7	MDI3+
C8	MDI3-

B.8 MINIPCIE with mSATA connector (MINIPCIE1)



MINIPCIE:

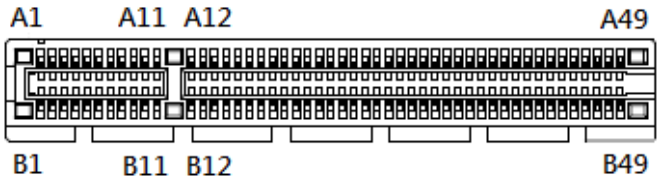
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3V AUX
3	Reserved	4	GND
5	Reserved	6	+1.5V
7	CLKREQ#	8	Reserved
9	GND	10	Reserved
11	REFCLK-	12	Reserved
13	REFCLK+	14	Reserved
15	GND	16	Reserved
17	Reserved	18	GND
19	Reserved	20	DISABLE#
21	DETECT#	22	RESET#
23	PCIE_RX+	24	+3.3V AUX
25	PCIE_RX-	26	GND

27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIE_TX-	32	SMB_DATA
33	PCIE_TX+	34	GND
35	GND	36	USB_D
37	GND	38	USB_D+
39	+3.3V AUX	40	GND
41	+3.3V AUX	42	Reserved
43	V1.2_DETECT#	44	LED_WLAN#
45	Reserved	46	Reserved
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	MSATA_DETECT#	52	+3.3V AUX

mSATA

Pin	Signal	Pin	Signal
1	Reserved	2	+3.3V
3	Reserved	4	GND
5	Reserved	6	+1.5V
7	Reserved	8	Reserved
9	GND	10	Reserved
11	Reserved	12	Reserved
13	Reserved	14	Reserved
15	GND	16	Reserved
17	Reserved	18	GND
19	Reserved	20	Reserved
21	DETECT#	22	Reserved
23	RX+	24	+3.3V
25	RX-	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	TX-	32	SMB_DATA
33	TX+	34	GND
35	GND	36	Reserved
37	GND	38	Reserved
39	+3.3V	40	GND
41	+3.3V	42	Reserved
43	Reserved	44	Reserved
45	Reserved	46	Reserved
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	MSATA_DETECT#	52	+3.3V

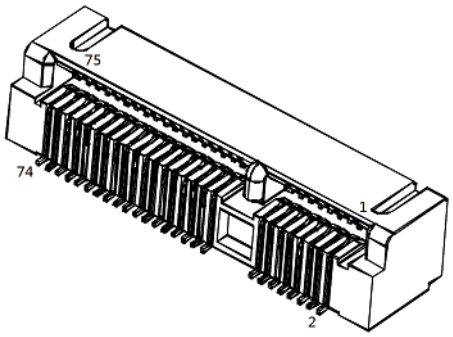
B.9 PCI-Express x8 slot (PCIEX8_1)



Pin	Signal	Pin	Signal
B1	+12V	A1	PRSNT1#
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	GND
B5	SMB_CLK	A5	Reserved
B6	SMB_DATA	A6	Reserved
B7	GND	A7	Reserved
B8	+3.3V	A8	Reserved
B9	Reserved	A9	+3.3V
B10	+3.3VAUX	A10	+3.3V
B11	WAKE#	A11	PWRGD
B12	Reserved	A12	GND
B13	GND	A13	REFCLK+
B14	TX0+	A14	REFCLK-
B15	TX0-	A15	GND
B16	GND	A16	RX0+
B17	Advantech define	A17	RX0-
B18	Advantech define	A18	GND
B19	TX1+	A19	Reserved
B20	TX1-	A20	GND
B21	GND	A21	RX1+
B22	GND	A22	RX1-
B23	TX2+	A23	GND
B24	TX2-	A24	GND
B25	GND	A25	RX2+
B26	GND	A26	RX2-
B27	TX3+	A27	GND
B28	TX3-	A28	GND
B29	GND	A29	RX3+
B30	Reserved	A30	RX3-
B31	Reserved	A31	GND
B32	GND	A32	Reserved
B33	TX4+	A33	Reserved
B34	TX4-	A34	GND
B35	GND	A35	RX4+
B36	GND	A36	RX4-
B37	TX5+	A37	GND
B38	TX5-	A38	GND
B39	GND	A39	RX5+

B40	GND	A40	RX5-
B41	TX6+	A41	GND
B42	TX6-	A42	GND
B43	GND	A43	RX6+
B44	GND	A44	RX6-
B45	TX7+	A45	GND
B46	TX7-	A46	GND
B47	GND	A47	RX7+
B48	Reserved	A48	RX7-
B49	GND	A49	GND

B.10 Next Generation Form Factor KEY-E (NGFF_E_1) ; M.2 conn

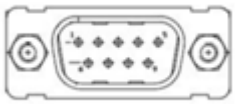


Pin	Signal	Pin	Signal
1	GND	2	+3.3V AUX
3	USB_D+	4	+3.3V AUX
5	USB_D-	6	NC
7	GND	8	I2S SCK
9	NC	10	I2S WS
11	NC	12	I2S SD_IN
13	NC	14	I2S SD_OUT
15	NC	16	NC
17	NC	18	GND
19	NC	20	UART WAKE#
21	NC	22	UART RXD
23	NC	24	KEY
25	KEY	26	KEY
27	KEY	28	KEY
29	KEY	30	KEY
31	KEY	32	UART TXD
33	GND	34	UART CTS
35	PETp0	36	UART RTS
37	PETn0	38	NC
39	GND	40	NC
41	PERp0	42	NC
43	PERn0	44	NC

45	GND	46	NC
47	REFCLKp0	48	NC
49	REFCLKn0	50	SUSCLK
51	Advantech define	52	PERST0#
53	CLKREQ0#	54	W_DISABLE2#
55	PEWAKE0#	56	W_DISABLE1#
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+3.3V AUX
73	NC	74	+3.3V AUX
75	GND		

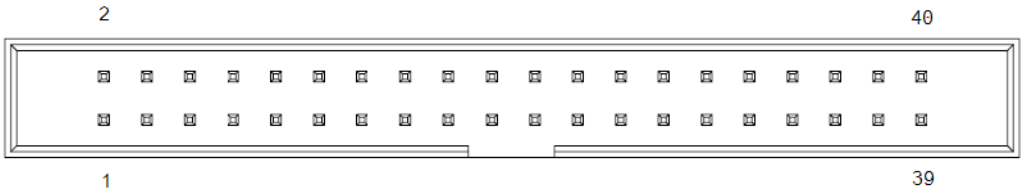
B.11 COM2 Box Header (Colay CCTalk)

COM2



	RS-232		RS-422/485
Pin	**Signal**	**Pin**	**Signal**
1	COM2_DCD#	1	-
2	COM2_RXD	2	-
3	COM2_TXD	3	CC_Talk
4	COM2_DTR#	4	-
5	COM2_GND	5	GND
6	COM2_DSR#	6	-
7	COM2_RTS#	7	-
8	COM2_CTS#	8	-
9	COM2_RI#	9	-

B.12 COM3456 Box Header (COM3456) COM3 (BIOS selectable RS232/422/485, Default RS-232)

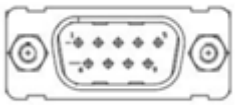


Pin	Signal	Pin	Signal
1	DCD# [3]	2	DSR# [3]
3	RXD [3]	4	RST# [3]
5	TXD [3]	6	CTS# [3]
7	DTR# [3]	8	RI# [3]
9	GND	10	GND
11	DCD# [4]	12	DSR# [4]
13	RXD [4]	14	RST# [4]
15	TXD [4]	16	CTS# [4]
17	DTR# [4]	18	RI# [4]
19	GND	20	GND
21	DCD# [5]	22	DSR# [5]
23	RXD [5]	24	RST# [5]
25	TXD [5]	26	CTS# [5]
27	DTR# [5]	28	RI# [5]
29	GND	30	GND
31	DCD# [6]	32	DSR# [6]
33	RXD [6]	34	RST# [6]
35	TXD [6]	36	CTS# [6]
37	DTR# [6]	38	RI# [6]
39	GND	40	GND

RS-232		RS-422/485	
Pin	Signal	Pin	Signal
1	COM3_DCD#	1	TXD-
2	COM3_RXD	2	TXD+
3	COM3_TXD	3	RTS-
4	COM3_DTR#	4	RTS+
5	COM3_GND	5	GND

6	COM3_DSR#	6	RXD-
7	COM3_RTS#	7	RXD+
8	COM3_CTS#	8	CTS
9	COM3_RI#	9	CTS+

COM6 (RS-232/TTL)



	RS-232		RS-422/485
Pin	**Signal**	**Pin**	**Signal**
1	COM6_DCD#	1	-
2	COM6_RXD	2	TTL_RX
3	COM6_TXD	3	TTL_TX
4	COM6_DTR#	4	-
5	COM6_GND	5	GND
6	COM6_DSR#	6	-
7	COM6_RTS#	7	-
8	COM6_CTS#	8	-
9	COM6_RI#	9	-

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