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User Manual

AIMB-280

Intel® Core™ i7/i5/i3/Pentium® Socket LGA1156 Mini-ITX with DVI/VGA, DDR3, 2 COM, Dual LAN, PCIe x16

Trusted ePlatform Services

ADVANTECH

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

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- This device must accept any interference received, including interference that may cause undesired operation.

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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

CPU Family	SPEED	Core Stepping	sSpec.	Power	Vcore	FSB
Lynfield i7 860 MP CPU (NO Integrated Graphic Controller)	2.8G	B0 (MP)	SLBLC	94W	1.2V	1333
Lynfield i5 750 MP CPU (NO Integrated Graphic Controller)	2.66G	B1 (MP)	SLBJJ	95W	1.2V	1333
Clarkdale i3 540 ES sample (Integrated Graphic Controller)	3.066G	C2 (ES)	Q3GQ	79W/ 65W		1333
Clarkdale i5 660 ES sample (Integrated Graphic Controller)	3.330G	C2 (ES)	Q3GP	79W/ 65W	1.24V	1333

Memory Compatibility

Brand	Size	Speed	Type	ECC	Vendor PN	Advantech PN	Memory
Transcend	1GB	DDR3 1066	DDR3	N	TS128MLK64V1U/ TS2KNU28100-1S	96D3-1G1066NN-TR	SEC K4B1G0846D-HCF8(128x8)
	2GB	DDR3 1066	DDR3	N	TS256MLK64V1U/ TS5KNU28300-1S	96D3-2G1066NN-TR	SEC K4B1G0846D-HCF9(128x8)
Apacer	1GB	DDR3 1066	DDR3	N	78.01GC3.420	96D3-1G1066NN-AP	ELPIDA J1108BABG-AE-E
	2GB	DDR3 1066	DDR3	N	78.A1GC3.421	96D3-2G1066NN-AP	ELPIDA J1108BABG-AE-E
Transcend	1GB	DDR3 1333	DDR3	N	TS128MLK64V3U		SEC 907 HCH9 K4B1G08460(128x8)
	2GB	DDR3 1333	DDR3	N	TS256MLK64V3U		SEC 907 HCH9 K4B1G08460(128x8)
Apacer	1GB	DDR3 1333	DDR3	N	78.A 1GC6.421		ELPIDA J1108BABG-DJ-E(128x8)
	2GB	DDR3 1333	DDR3	N	78.01GC6.420		ELPIDA J1108BABG-DJ-E (128x8)
DSL	1GB	DDR3 1333	DDR3	N			ELPIDA J1108BABG-DJ-E (128x8)
	2GB	DDR3 1333	DDR3	N			ELPIDA J1108BABG-DJ-E (128x8)

Ordering Information

Part Number	Chipset	VGA	DVI	SW RAID	USB	COM	GbE LAN
AIMB-280QG2-00A1E	Q57	Yes	Yes	Yes	8	2	2

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-280 Intel® Core™ i7/i5/i3/Pentium® socket LGA1156 Mini-ITX motherboard
- 2 x SATA HDD cable
- 2 x SATA Power cable
- 1 x I/O port bracket
- 1 x Startup manual
- 1 x Driver CD
- 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-280 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-280, 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

The AIMB-280 is designed with the Intel® Q57 for industrial applications that require both performance computing and enhanced power management capabilities. The motherboard supports Intel® Core™ i7 up to 2.93 GHz / Core™ i5 700 up to 2.66GHz / Core™ i5 600 up to 3.3GHz/Core™ i3 up to 3.06 GHz/Pentium® up to 2.8 GHz processor up to 8 MB L2 cache and DDR3 800/1066/1333 up to 4 GB. A rich I/O connectivity of 2 serial ports, 8 USB 2.0, dual GbE LAN and 4 SATA ports.

1.2 Features

- **Performance Q57/3450 Chipset:** Two-chip solution supports data transfer through DMI (Direct Media Interface) and FDI (Flexible Design Interface).
- **Rich I/O connectivity:** 2 serial ports, 8 USB 2.0, Dual GbE LAN.
- **Standard Mini-ITX form factor with industrial feature:** The AIMB-280 is a full-featured Mini-ITX 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® Graphics Flexible, it supports versatile display options and a 32-bit 3D graphics engine.

1.3 Specifications

1.3.1 System

- **CPU:** LGA1156 Intel® Core™ i7 up to 2.93 Ghz / Core™ i5 700 up to 2.66GHz/ Core™ i5 600 up to 3.3GHz / Core™ i3 up to 3.06 Ghz/Pentium® up to 2.8 Ghz
- **BIOS:** AMI 64 Mbit SPI BIOS
- **System chipset:** Intel® Q57
- **SATA hard disk drive interface:** Four on-board SATA connectors with data transmission rate up to 300 MB

1.3.2 Memory

- **RAM:** Up to 4 GB in 1 slot 240-pin DIMM socket. Supports single channel DDRIII 800/1066/1333 SDRAM

Note! *Intel® desktop 5 Series Chipset platforms only support non-ECC unbuffered DIMMs.*

1.3.3 Input/Output

- **PCI bus:** 1 PCIe x16 slot
- **Serial ports:** Two serial ports, both COM1 and COM2 only support RS-232
- **Keyboard and PS/2 mouse connector:** Supports one standard PS/2 keyboard, one standard PS/2 mouse (On board 6pin wafer box)
- **USB port:** Supports up to eight USB 2.0 ports with transmission rate up to 480 Mbps, 4 on board pin headers and 4 external ports)

1.3.4 Graphics

- **Controller:** Intel® HD Graphics, only Core™ i5-600, Core™ i3-500 and Pentium® CPUs with Clarkdale core are embedded with integrated graphics; Core™ i7, Core™ i5-700 with Lynnfield core are not embedded with integrated graphics
- **Display memory:** 1 GB maximum shared memory when 2GB and above system memory installed
- **DVI:** Supports DVI up to resolution 1920 x 1200 @ 60Hz refresh rate
- **VGA:** Supports VGA up to resolution 2048 x 1536 @ 75Hz refresh rate

1.3.5 Ethernet LAN

- Supports dual 10/100/1000 Mbps Ethernet ports via PCI Express x1 bus which provides 500 MB/s data transmission rate
- **Controller:** LAN1: Intel 82578DM(PHY); LAN2: Intel 82583v

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:** -40 ~ 85° C (-40 ~ 185° F)
- **Humidity:** 5 ~ 95% non-condensing
- **Power supply voltage:** +3.3 V, +5 V, +12 V, -12 V, 5 Vsb
- **Power consumption:**

  Intel® LGA1156 Core™ i5 3.33 GHz, 4 MB L2 cache, 2 GB DDR3 1333 MHz

  +5 V @ 1.85 A, +3.3 V @ 0.73 A, +12 V @ 3.14 A, 5 VSB @ 0.31 A, -12 V@ 0.11 A

  Measured at the maximum current value with system under maximum load (CPU: Top speed, RAM & Graphic: Full loading)
- **Board size:** 170 mm x 170 mm (6.69" x 6.69")
- **Board weight:** 0.365 kg

1.4 Jumpers and Connectors

Connectors on the AIMB-280 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: Jumpers

Label	Function
JFP1+JFP2	Power switch/HDD LED/SMBus/Speaker
JFP3	Power LED and Keyboard lock
JCMOS1	CMOS clear (Default 1-2)
JMECLR1	ME clear (Default 1-2)
PSON1	AT(1-2) / ATX(2-3), (Default 2-3)
JWDT1+JOBS1	Watchdog Reset/ OBS Alarm
JCASE1	Case open

Table 1.2: Connectors

Label	Function
USB56	USB port 5, 6 (on board)
USB78	USB port 7, 8 (on board)
VGA1+DVI1	VGA and DVI connector
COM12	Serial port connector(RS232)
KBMS1	PS/2 Keyboard and Mouse connector
CPUFAN1	CPU FAN connector(4-pin)
SYSFAN1	System FAN1 connector(4-pin)
SYSFAN2	System FAN2 connector(4-pin)
LAN1_USB12	LAN1 / USB port 1, 2
LAN2_USB34	LAN2 / USB port 3, 4
AUDIO1	Audio connector
SPDIF_OUT1	SPDIF Audio out pin header
LPC1	Low pin count pin header
PCIEX16_1	PCIe x16 Slot
SATA1	Serial ATA data connector 1
SATA2	Serial ATA data connector 2
SATA3	Serial ATA data connector 3
SATA4	Serial ATA data connector 4
DIMMA1	Memory connector channel
SPI_CN1	SPI flash update connector
ATX12V_1	ATX 12V Auxiliary power connector (for CPU)
ATX1	ATX 20 Pin Main power connector (for System)
LANLED1	LAN1/2 LED extension connector

1.5 Board layout: Jumper and Connector Locations

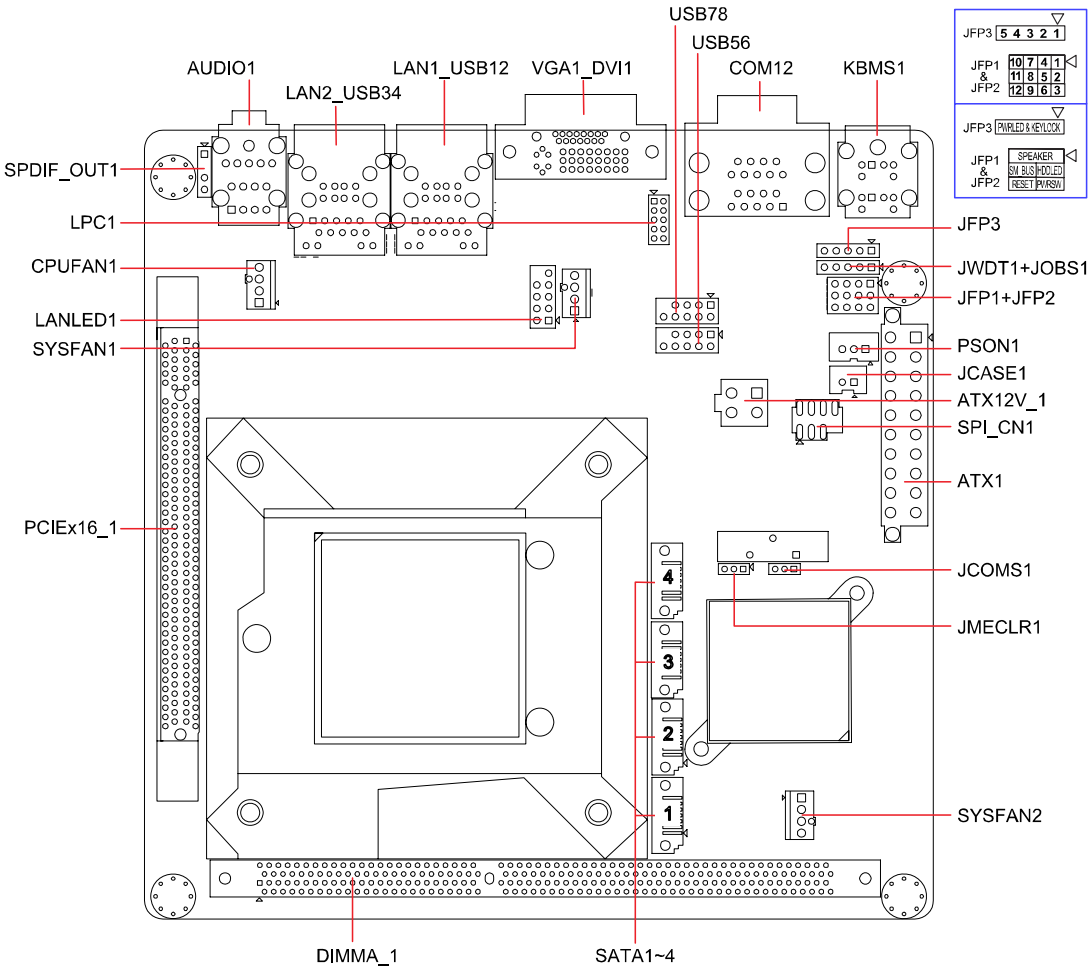


Figure 1.1 Jumper and Connector Locations

Figure 1.2 I/O Connectors

1.6 AIMB-280 Board Diagram

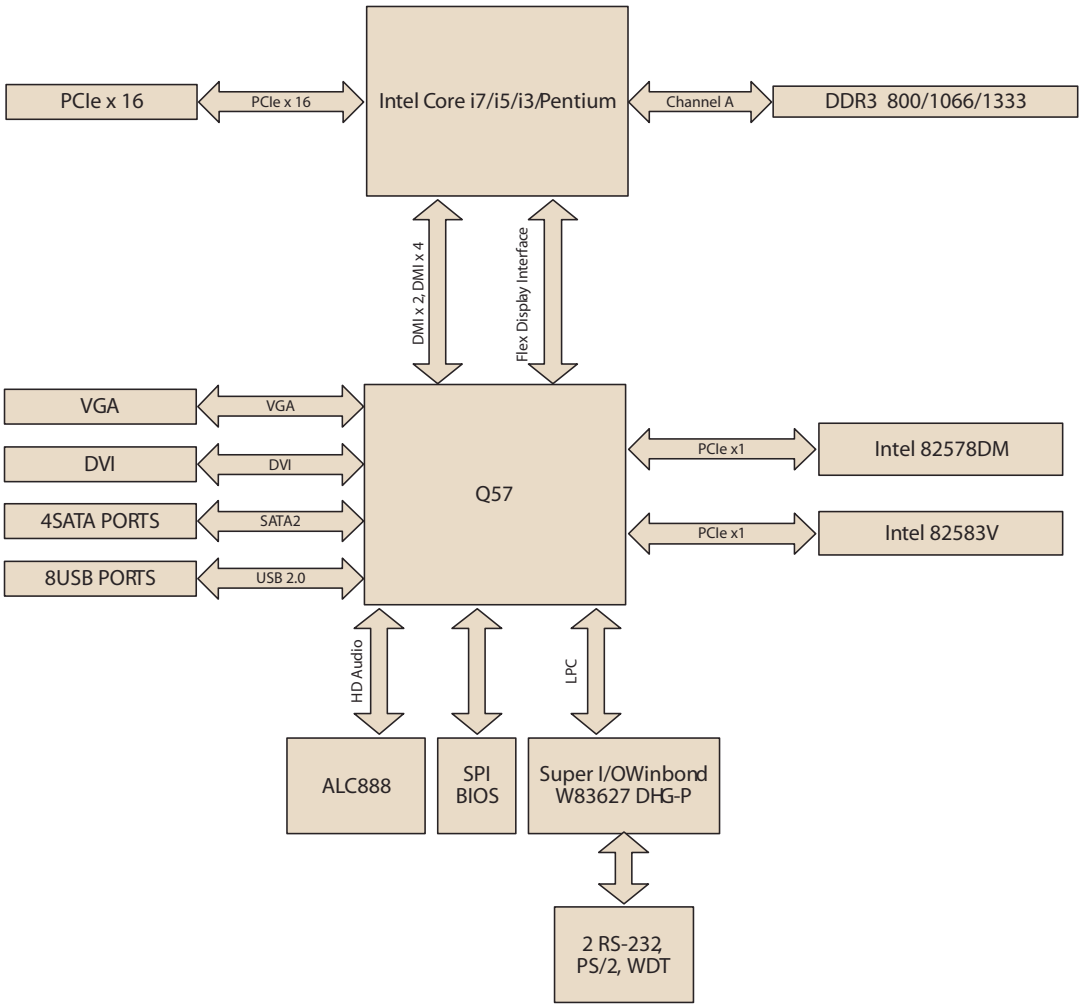


Figure 1.3 AIMB-280 Board Diagram

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 electrostatic 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.

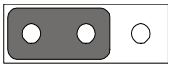
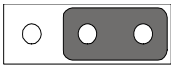
1.8.1 How to Set Jumpers

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/ME Clear (JCMOS1/JMECLR1)

The AIMB-280 motherboard contains a jumper that can erase CMOS/ME 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/ME 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/ME to its default setting.

Table 1.3: CMOS1

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

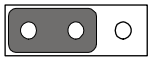
* Default

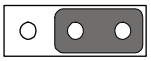
1.8.3 PSON1: ATX, AT Mode Selector

Table 1.4: PSON1: ATX, AT Mode Selector

Closed Pins	Result
1-2	AT Mode
2-3*	ATX Mode

*Default

1 
AT Mode
1-2 closed

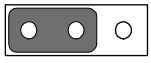
1 
ATX Mode
2-3 closed

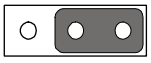
1.8.4 JWDT1+JOBS1: Watchdog Timer Output and OBS Alarm Option

Table 1.5: JWDT1+JOBS1: Watchdog Timer Output and OBS Alarm Option

Closed Pins	Result
1-2	NC
2-3	System Reset
4-5*	Error beep*

*Default

1 
NC
1-2 closed

1 
System Reset
2-3 closed

1.8.5 JCASE1: Case Open Sensor

The AIMB-280 motherboard contains a jumper, JCASE1, that offers a chassis open sensor. When a jumper is installed on JCASE1, the buzzer on the motherboard beeps when the case is opened.

1.9 System Memory

The AIMB-280 has one socket for a 240-pin DDR3 DIMM.

This socket uses a 1.5 V unbuffered double data rate synchronous DRAM (DDR SDRAM). DRAM is available in capacities of 1 GB and 2 GB. AIMB-280 does NOT support ECC (error checking and correction).

1.10 Memory Installation Procedures

To install DIMM, 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 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-280 supports a CPU with one of the following built-in full speed L2 caches:

- 8 MB for Intel® Core™ i7 CPU
- 8 MB for Intel® Core™ i5-700 CPU
- 4 MB for Intel® Core™ i5-600 CPU
- 4 MB for Intel® Core™ i3 CPU
- 3 MB for Intel® Pentium® CPU

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

1.12 Processor Installation

The AIMB-280 is designed for LGA1156, Intel™ Core™ i7/Core™ i5/Core™ i3/Pentium™ processor.

Chapter 2

Connecting Peripherals

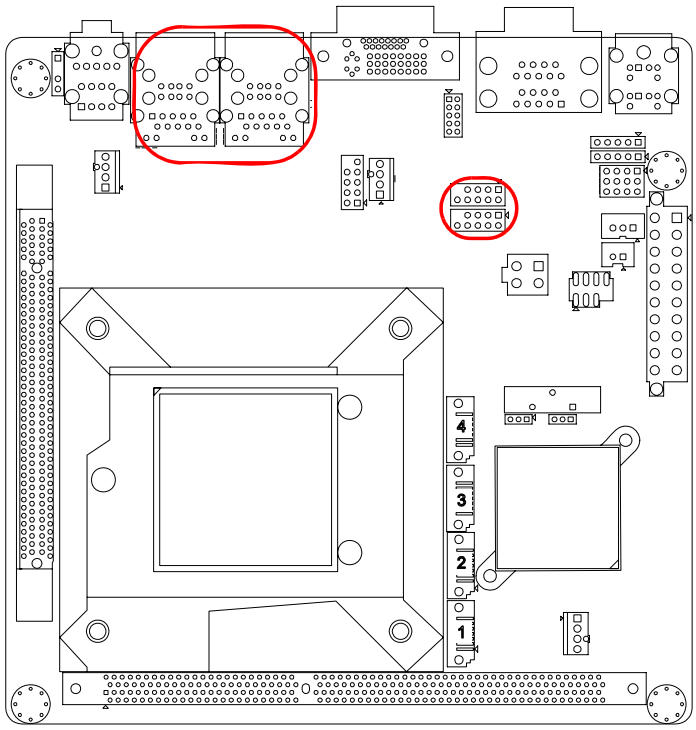
2.1 Introduction

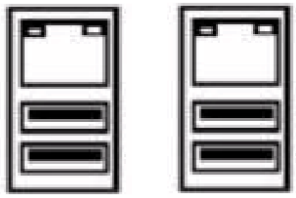
You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed or have a packed chassis, you may need to partially remove the card to make all the connections.

2.2 USB Ports (LAN1_USB12/LAN2_USB34/USB56/USB78)

The AIMB-280 provides up to eight USB ports. The USB interface complies with USB Specification Rev. 2.0 supporting transmission rate up to 480 Mbps and is fuse protected. The USB interface can be disabled in the system BIOS setup.

The AIMB-280 is equipped with one high-performance 1000 Mbps Ethernet LAN adapter, and one 100 Mbps LAN adapter, both of which are supported by all major network operating systems. The RJ-45 jacks on the rear panel provide for convenient LAN connection.





LAN1_USB12 LAN2_USB34

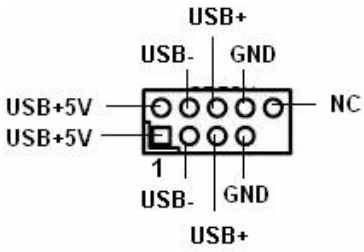
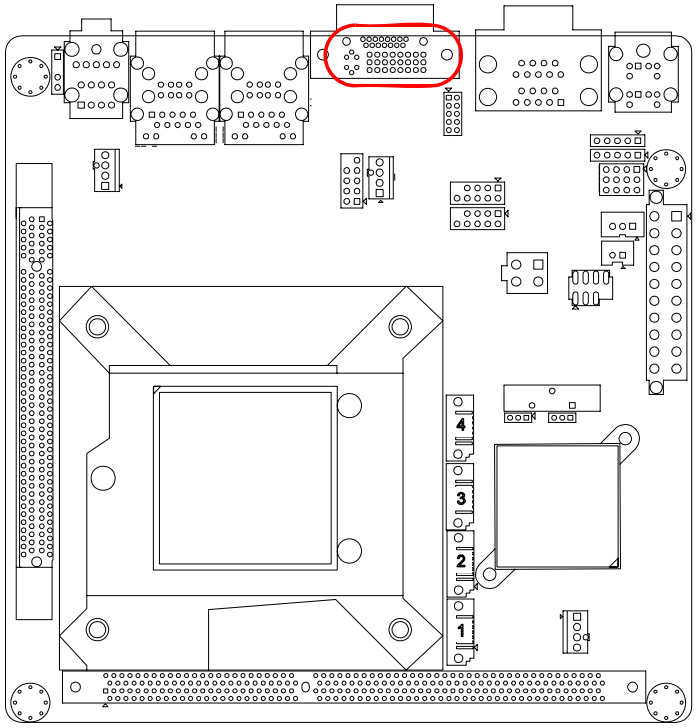
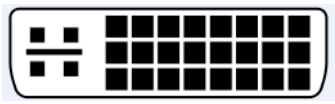


Table 2.1: LAN LED Indicator

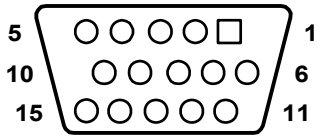
LAN Mode	LAN Indicator	
LAN1 indicator	LED1 (Right)	off for mal-link; Link (On) / Active (Flash)
	LED2 (Left)	100 Mbps (On) / 10 Mbps (Off)
	LED2 (Left)	1000 Mbps (On)
LAN2 indicator	LED1 (Right)	off for mal-link; Link (On) / Active (Flash)
	LED2 (Left)	100 Mbps (On) / 10 Mbps (Off)
	LED2 (Left)	1000 Mbps (On)

2.3 VGA/DVI Connector (VGA1+DVI1)





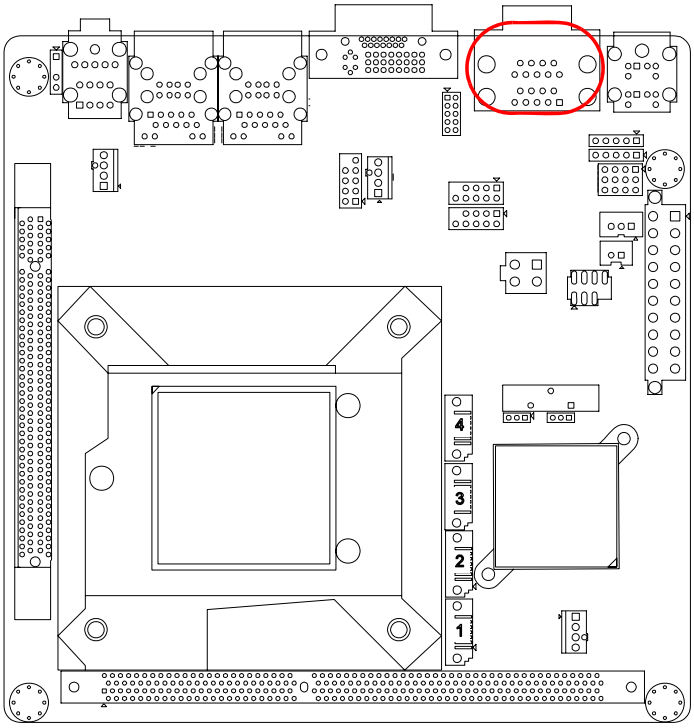
DVI1

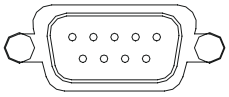


VGA1

The AIMB-280 includes VGA and DVI interface that can drive conventional VGA and DVI displays. VGA1 is a standard 15-pin D-SUB connector commonly used for VGA. DVI1 is DVI-I connector but only for DVI-D single link signals output. Pin assignments for VGA and DVI connector are detailed in Appendix B.

2.4 Serial Ports (COM12)



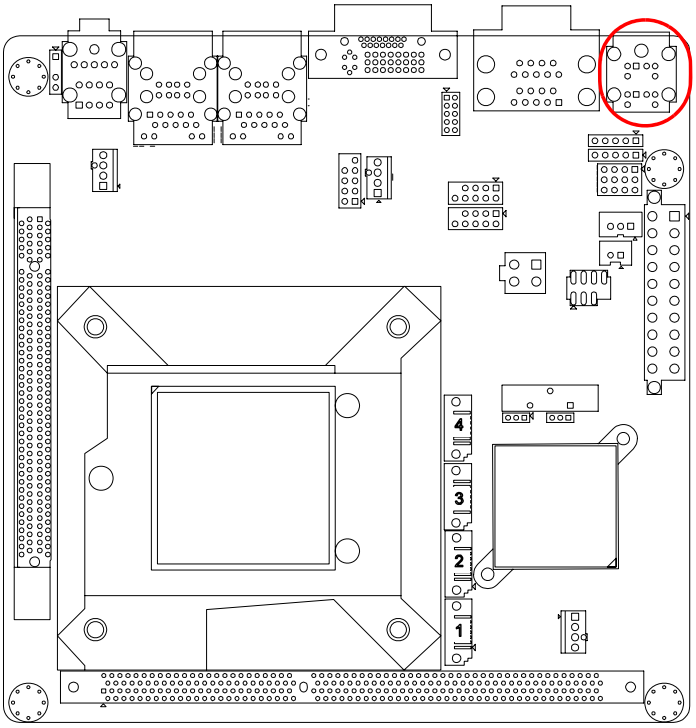


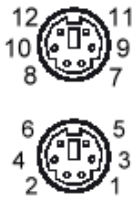
AIMB-280 support two serial ports. both COM1 and COM2 only support RS-232. These ports can connect to serial devices, such as a mouse or a printer, or to a communications network.

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.

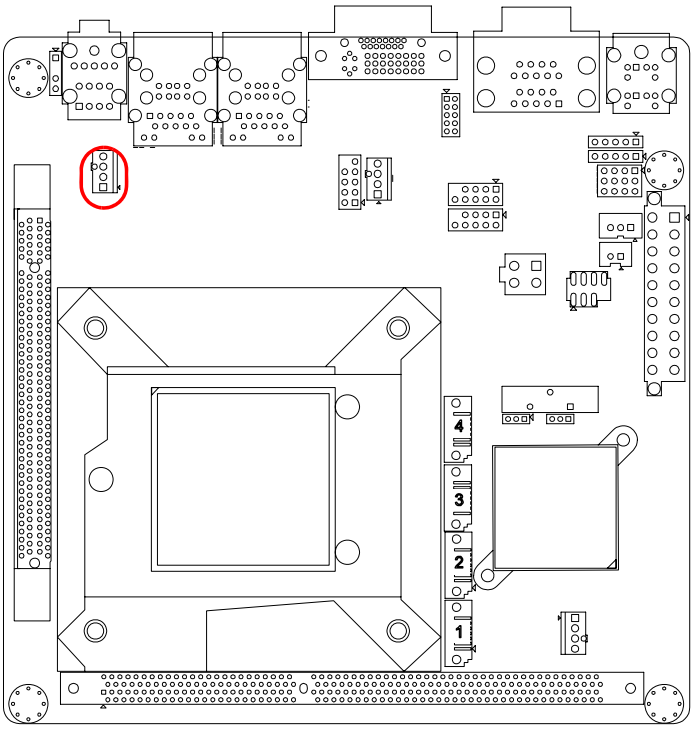
2.5 PS/2 Keyboard and Mouse Connector (KBMS1)

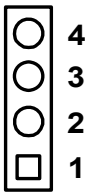




Two 6-pin mini-DIN connectors (KBMS1) on the motherboard provide connection to a PS/2 keyboard and a PS/2 mouse, respectively.

2.6 CPU Fan Connector (CPU_FAN1)





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