



User Manual

AKMB-G41M

**Intel® LGA775 Core™2 Quad/
Core™2 Duo mATX Motherboard
with VGA/DDR3/GbE LAN/6COM**

ADVANTECH

Enabling an Intelligent Planet

Safety Information

Electrical Safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices unplugged before the signal cables are connected. If possible, disconnect all power cables from existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it yourself. Contact a qualified service technician or your retailer.

Operational Safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuit, keep paper clips, screws and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

Caution! *The symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.*



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

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 A 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.*



CPU Compatibility

CPU family	sSpec	Core stepping	Power	FSB	Mgn tech	L2 cache	Advantech PN
Core2 Quad Q9400 2.66Hz EM64T Quad Core	SLB9B	R0	95W	1333	45nm	6M	96MP2QD-26FB-6M7T
Core2 Quad Q6600 2.4GHz EM64T Quad Core	SLACR	G0	95W	1066	65nm	8M	96MP2QD-24FA-8M7T
Core2 Duo E8400 3.0GHz EM64T Dual Core	SLB9J	E0	65W	1333	45nm	6M	96MP2DD-3FB-6M7T1
Celeron 440 2GHz	SL9XL	A1	35W	800	65nm	512KB	96MPC4-2.0F8-5K7T

Memory Compatibility

Brand	Size	Speed	Type	ECC	Vendor PN	Advantech PN	Memory
Kingston	1 GB	DDR3 1333	DDR3	N	KVR1333D3 N9/1G	N/A	ELPIDA J1108BABG-DJ-E
Transcend	1 GB	DDR3 1066	DDR3	N	TS128MLK6 4V1U	96D3-1G1066NN-TR	SEC 813 HCF8 K4B1G08460
Kingston	1 GB	DDR3 1066	DDR3	N	KVR1066D3 N7/1G	N/A	Kingston D1288JPNDPLD9U
Kingston	2GB	DDR3 1066	DDR3	N	KVR1066D3 N7/2G	N/A	ELPIDA J1108BDSE-DJ-F

Ordering Information

AKMB-G41M Ordering Information

Part Number	On-board Display	Chipset	Memory	LAN	COM	Display Processor
AKMB-G41MF-00A1E	Yes	G41	DDR3 800/1066	1	6	CRT

Product Warranty (18 months)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for 18 months from the date of purchase.

This warranty does not apply to any products that 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:

- LGA775 Core 2 Quad/Core 2 Duo/Pentium Dual Core/ Celeron mATX Motherboard with VGA/DDR3/Single GbE LAN/6COM
- 1 x AKMB-G41M startup manual
- 1 x CD with driver utility and manual
- 2 x Serial ATA HDD data cable
- 2 x Serial ATA HDD power cable
- 1 x I/O port bracket

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the AKMB-G41M mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the AKMB-G41M, 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 AKMB-G41M is designed with the Intel® G41 and the ICH7 for industrial applications that require both performance computing and enhanced power management capabilities. The motherboard supports Intel Pentium LGA 775 Core™ 2 Quad up to 2.66 GHz/Core 2 Duo up to 3.16 GHz/Pentium Dual-Core up to 2.93 GHz/Celeron up to 1.6 GHz with 800/1066/1333 MHz front side bus and DDR3 800/1066 MHz up to 4 GB.

The AKMB-G41M offers cost-saving integrated graphics, built on the Intel® G41 chipset and features the unique Intel® Extreme Graphics architecture that maximizes VGA performance and shares system memory up to 256 MB.

Advantech AKMB-G41M is designed with an Intel G41 chipset and supports Intel Core 2 Quad/Duo processor up to FSB 1333 MHz. A rich I/O connectivity of 6 serial ports, 8 USB 2.0, single GbE LAN and 4 SATA ports.

1.2 Features

- **Cost effective G41 chipset:** support 800/1066/1333 Front side bus
- **Rich I/O connectivity:** 6 serial ports, 8 USB 2.0, single GbE LAN
- **Standard Micro ATX form factor with industrial feature:** The AKMB-G41M is the most fully-featured Micro ATX motherboard with balanced expandability and the performance
- **Wide selection of storage devices:** SATA HDD, customers benefit the flexibility of using the most suitable storage device for large capacity
- **Optimized integrated graphic solution:** With Intel® Graphics Media Accelerator X4500, it supports versatile display options and 32-bit 3D graphics engine.

1.3 Specifications

1.3.1 System

- **CPU:** LGA775 Core 2 Quad up to 2.66 GHz/Core 2 Duo up to 3.16 GHz/Pentium Dual-Core up to 2.93 GHz/Celeron up to 1.6 GHz with 800/1066/1333 MHz front side bus
- **BIOS:** AMI SPI 8 Mbit BIOS
- **System chipset:** Intel G41 with ICH7
- **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 2 slots 240-pin SODIMM sockets. Supports dual channel DDR3 800/1066 MHz SDRAM

1.3.3 Input/Output

- **PCIe bus:** 1PCIe x 1 slot
- **Serial ports:** Six serial ports, one RS-232/422/485 and five RS-232 serial ports
- **Keyboard and PS/2 mouse connector:** Two 6-pin mini-DIN connectors are located on the mounting bracket for easy connection to a PS/2 keyboard and mouse
- **USB port:** Supports up to eight USB 2.0 ports with transmission rate up to 480 Mbps, 4 on board pin header and 4 external ports)

1.3.4 Graphics

- **Controller:** Chipset integrated VGA controller
- **Display memory:** Dynamically shared system memory up to 256 MB
- **CRT:** Up to 2048 x 1536 resolution, 400 MHz RAMDAC

1.3.5 Ethernet LAN

- Supporting single 10/100/1000 Mbps Ethernet port (s) via PCI Express x1 bus which provides 500 MB/s data transmission rate
- **Controller:** LAN: Realtek RTL8111DL

1.3.6 Industrial features

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

1.3.7 Mechanical and environmental specifications

- **Operating temperature:** 0 ~ 60° C (32 ~ 140° F, Depending on CPU)
- **Storage temperature:** -20 ~ 70° C (-4 ~ 158° F)
- **Humidity:** 5 ~ 95% non-condensing
- **Power supply voltage:** +3.3 V, +5 V, +12 V, -12 V, 5 Vsb
- **Power consumption:**
+5 V @ 2.59 A, +3.3 V @ 5.93 A, +12 V @ 6.83 A, 5 VSB @ 0.19 A,
-12 V @ 0.16 A
- **Board size:** 244 mm x 244 mm (9.6" x 9.6")
- **Board weight:** 0.75 kg

1.4 Jumpers and Connectors

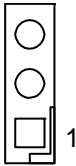
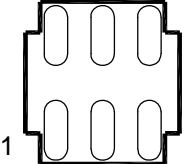
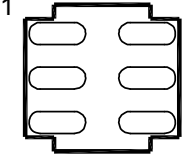
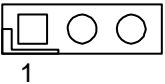
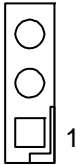
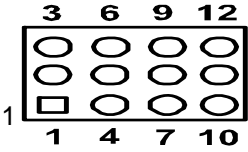
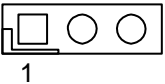
Connectors on the AKMB-G41M motherboard link it to external devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure your system for your application.

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: Connectors

Label	Function
JFP1	Power Switch / Reset connector
JFP2	External speaker / SATA HDD LED connector / SM Bus connector
JFP3	Power LED
USB56	USB port 5, 6 (on board)
USB78	USB port 7 8(on board)
VGA1	VGA connector
IDE1	Primary IDE connector (Blue)
COM1/COM2	Serial port: COM1/COM2 (9-pin connector)
COM3 ~ COM6	Serial port: CRS-232 (9 pin header)
KBMS1	PS/2 keyboard and Mouse connector (on board)
CPU_FAN1	CPU FAN connector
SYS_FAN1	System FAN connector 1
SYS_FAN2	System FAN connector 2
LAN1_USB12	LAN1/USB port 1, 2
USB34	USB port 3, 4
SATA 1 ~ 4	Serial ATA connector
ATX12V1	ATX 12 V Auxiliary power connector
EATXPWR1	ATX power connector
AUDIO1	Line Out, Mic IN connector
FPAUDIO1	Front Panel audio connector (FP_AU- DIO)
SPDIF OUT	Digital Audio connector
USB PW	USB 5 V / 5 Vsb power switch
kBPWR	Keyboard 5V/5Vsb power switch

Table 1.2: Jumpers

Jumper Name	Default	Description
KBPWR	1-2	1-2:PS2 power provided by normal power +5 V 2-3: PS2 power provided by standby power +5 VSB
		
CN32	1-2	1-2:COM port 9th pin for ring function 3-4:COM port 9th pin for +5 V power 5-6:COM port 9th pin for +12 V power
		
CN33	1-2	1-2:COM port 9th pin for ring function 3-4:COM port 9th pin for +5 V power 5-6:COM port 9th pin for +12 V power
		
USBPW	1-2	1-2:USB power provided by +5 V DUAL 3-4:USB power provided by +5 VBS
		
CMOS1	1-2	1-2:normal 2-3:clear CMOS
		
JFP1+JFP2	1-2	4-7:Buzzer controlled by SIO 7-10:Buzzer controlled by SIO and SB
		
PSON1	1-2	1-2:ATX MODE 2-3:AT MODE
		

1.5 Board layout: Jumper and Connector Locations

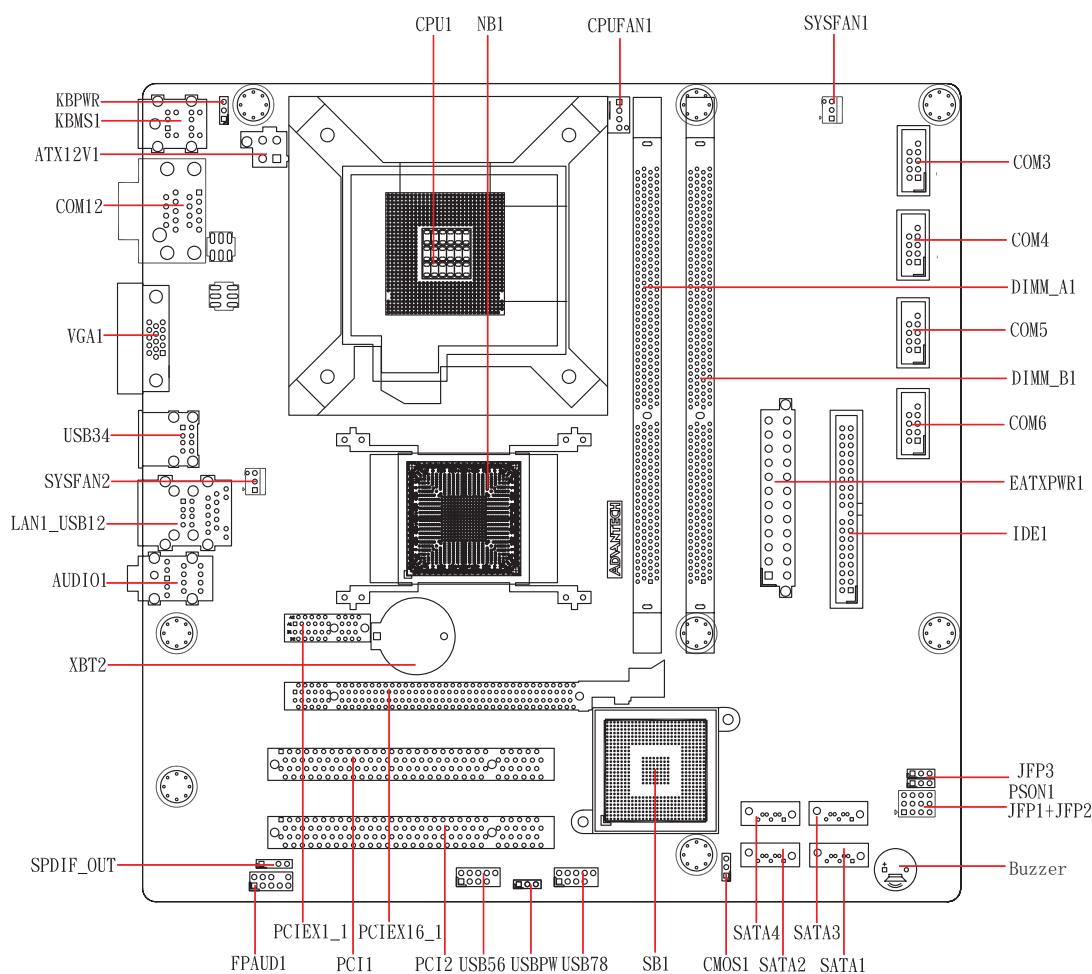


Figure 1.1 Jumper and Connector Locations



Figure 1.2 I/O Connectors

1.6 AKMB-G41M Block Diagram

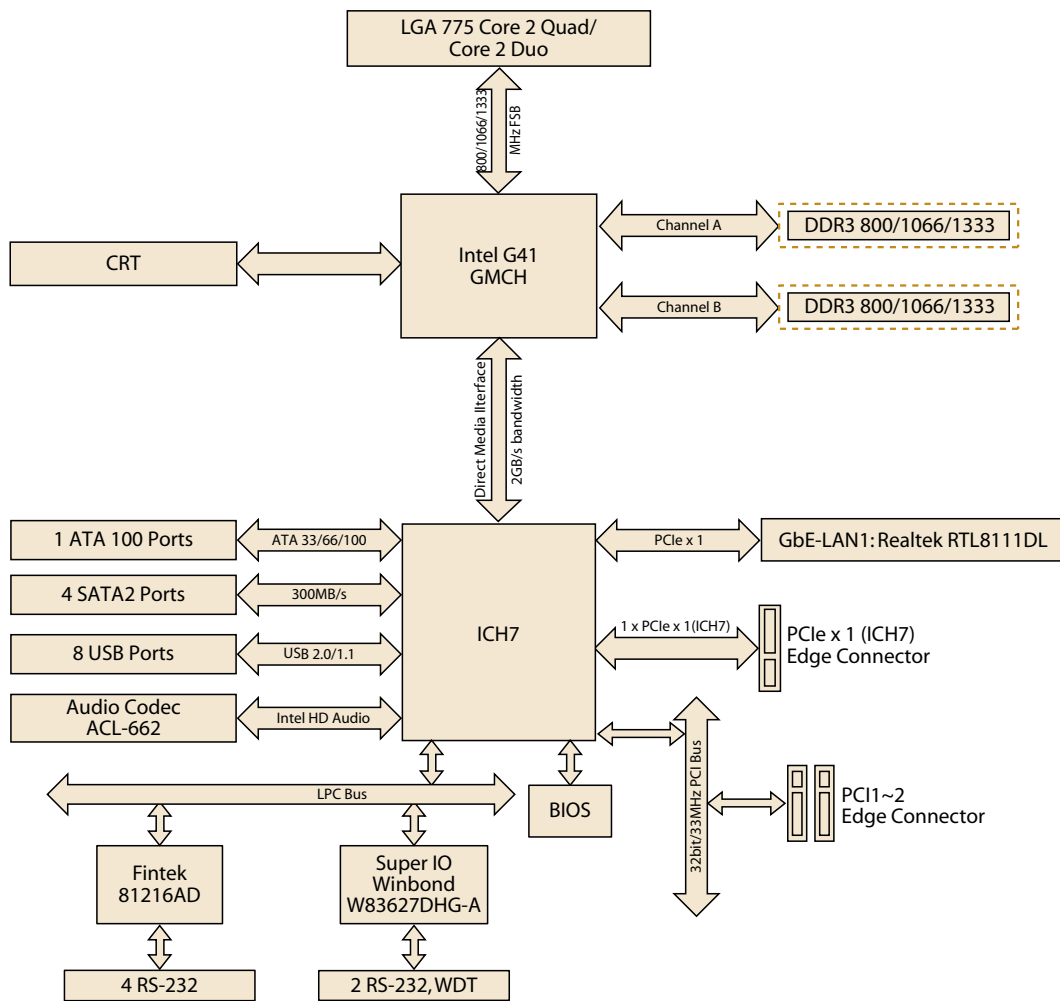


Figure 1.3 AKMB-G41M Block Diagram

1.7 Safety Precautions

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



Caution! *Always ground yourself to remove any static charge before touching the motherboard. Modern electronic devices are very sensitive to 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 clear (CMOS1)

The AKMB-G41M 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.

Table 1.3: CMOS1

Function	Jumper Setting
*Keep CMOS data	<p>1</p>  <p>1-2 closed</p>
Clear CMOS data	<p>1</p>  <p>2-3 closed</p>
*default setting	

1.8.3 Chassis instruction connector (JCASE1)

The AKMB-G41M motherboard contains a jumper that offers a chassis open sensor. The buzzer on the motherboard beeps when the case is opened.

1.8.4 ATX/AT mode selector (PSON1)

Table 1.4: ATX/AT mode selector (PSON1)

Function	Jumper Setting
AT mode	2-3 closed
*ATX mode	1-2 closed
*default setting	

1.9 System Memory

The AKMB-G41M has two sockets for 240-pin SODIMMx2.

All these sockets use 1.8 V unbuffered double data rate synchronous DRAMs (DDR3 SDRAM). They are available in capacities of 1024 MB. The sockets can be filled in any combination with DIMMs of any size, giving a total memory size on 4 GB. AKMB-G41M does NOT support ECC (error checking and correction).

1.10 Memory Installation Procedures

To install SODIMMs, first make sure the two 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 right down into the socket, until you hear a click. This is when the two handles have automatically locked the memory module into the correct position of the SODIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mechanism in the socket.

1.11 Cache Memory

The AKMB-G41M supports a CPU with one of the following built-in full speed L2 caches:

- 6 MB for Intel Core 2 Quad CPU
- 6 MB for Intel Core 2 Duo CPU
- 8 MB for Intel Pentium Duo Core CPU
- 512 KB for Intel Celeron CPU

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

1.12 Processor Installation

The AKMB-G41M is designed for LGA775, Intel Core 2 Quad, Intel Core 2 Duo, Celeron D and Intel Pentium dual core D 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 (USB34/LAN1_USB12/USB56/USB78)

The AKMB-G41M provides up to eight USB (Universal Serial Bus) ports. The USB interface complies with USB Specification Rev. 2.0, supporting transmission rates up to 480 Mbps and is fuse protected. The USB interface can be disabled in the system BIOS setup.

The AKMB-G41M is equipped with one high-performance 1000 Mbps Ethernet LAN that supports all major network operating systems. The RJ-45 jacks on the rear plate provide 1000 Mbps operation.

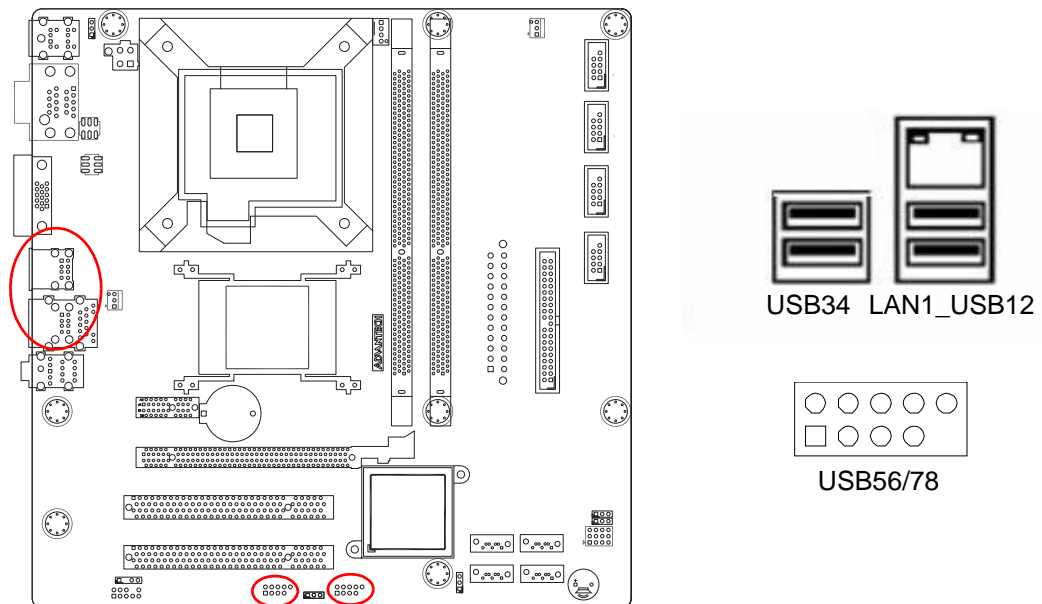
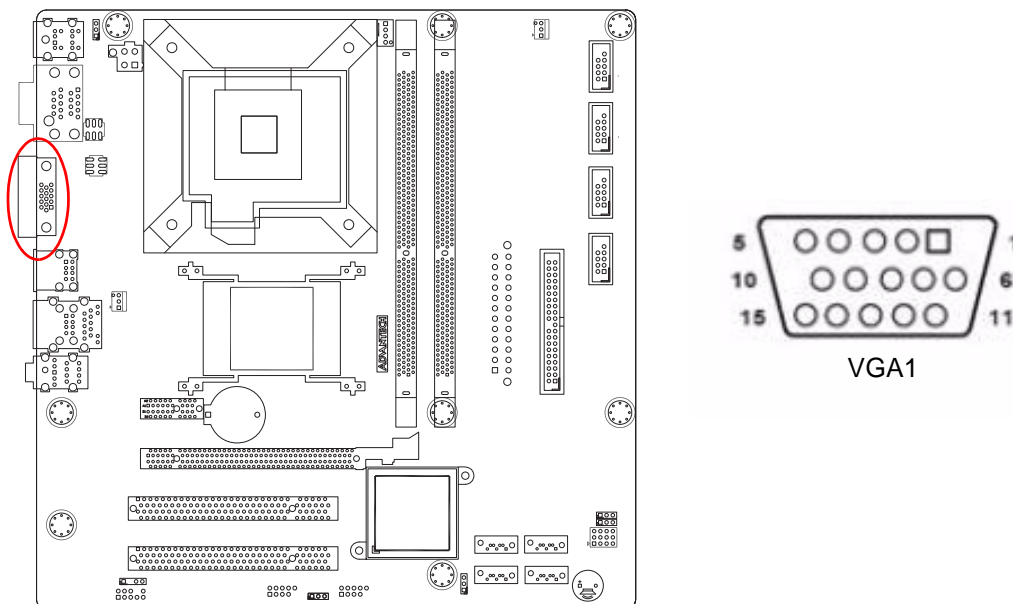


Table 2.1: LAN LED Indicator

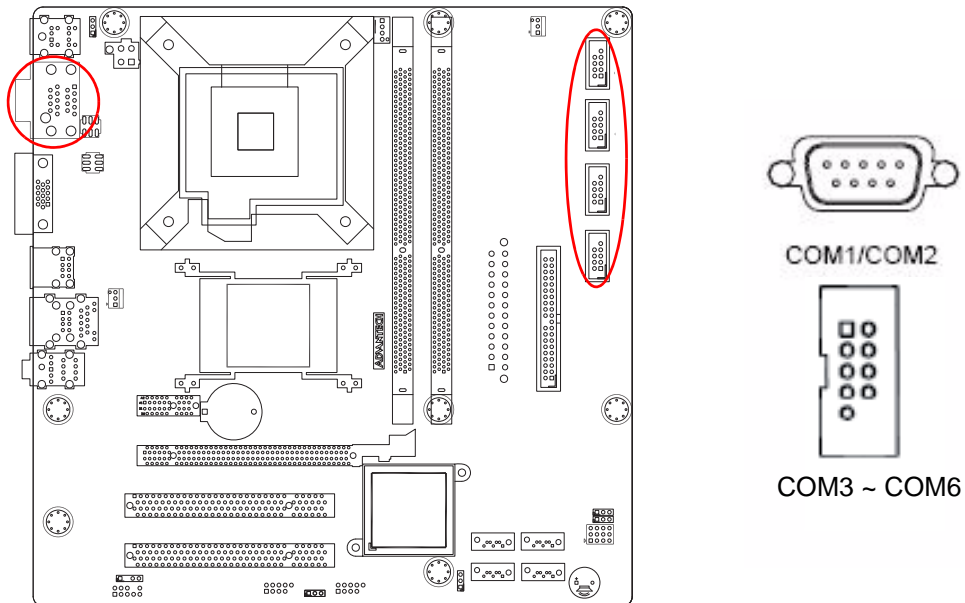
LAN Mode	Lan Indicator
1 Gbps Link on	LED1 Green on
10 Mbps Link on	LED1 off
100 Mbps Link on	LED1 Orange on
Active	LED2 Yellow flash

2.3 VGA Connector (VGA1)



The AKMB-G41M includes a VGA interface that can drive conventional CRT displays. VGA1 is a standard 15-pin D-SUB connector commonly used for VGA. Pin assignments for CRT connector VGA1 are detailed in Appendix B.

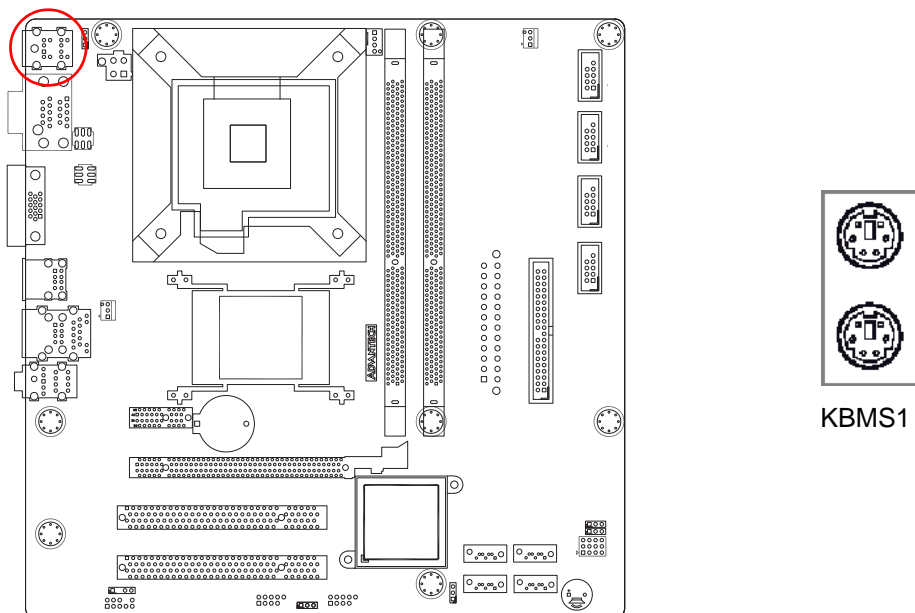
2.4 Serial Ports (COM1~COM6)



AKMB-G41M supports six serial ports - six RS-232s. These ports can connect to serial devices, such as a mouse or a printer, or to a communications network.

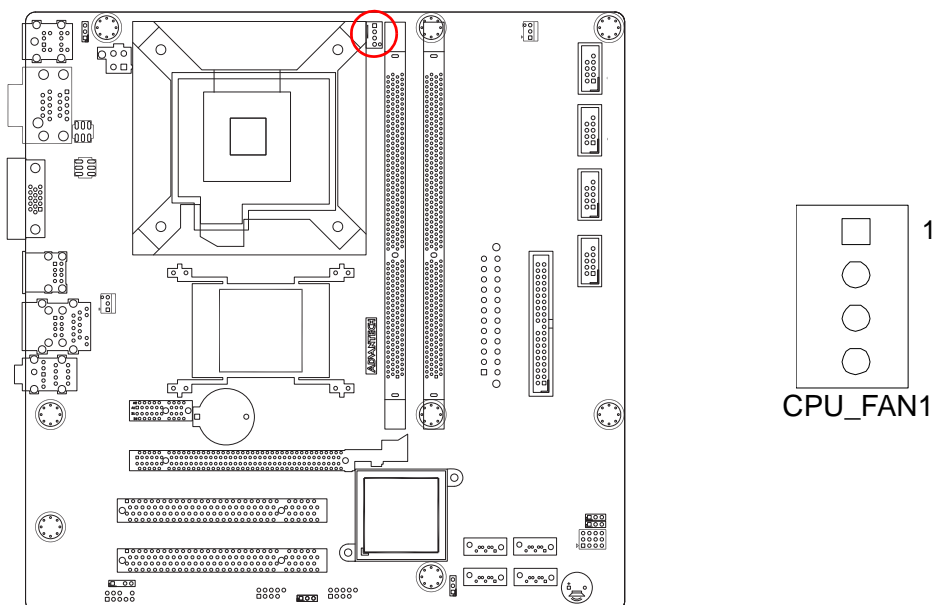
The IRQ and address ranges for both ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup. Different devices implement the RS-232 standards in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector.

2.5 PS/2 Keyboard and Mouse Connector (KBMS1)



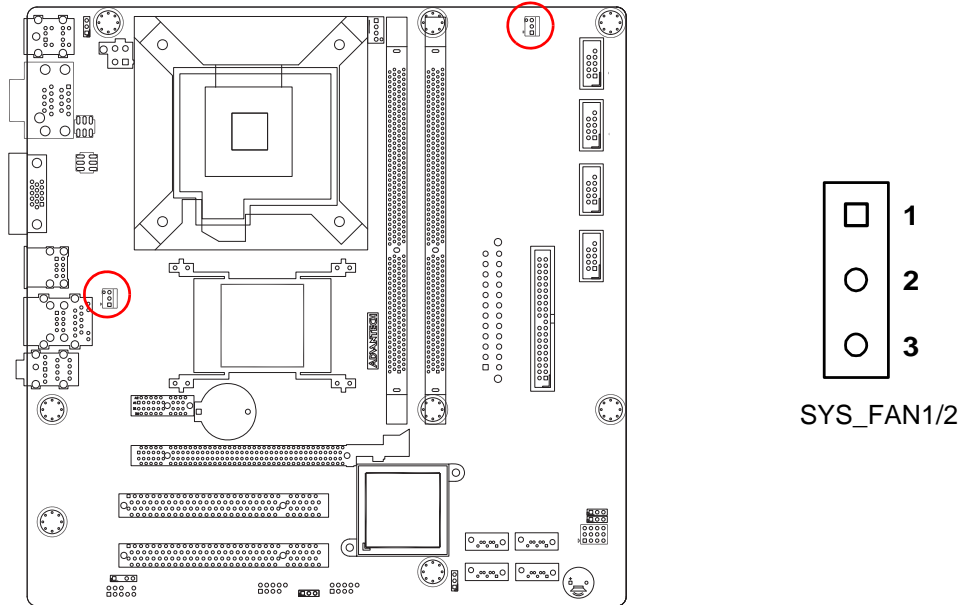
Two 6-pin mini-DIN connectors (KBMS1) on the motherboard provide connection to a PS/2 keyboard and a PS/2 mouse, respectively.

2.6 CPU Fan Connector (CPU_FAN1)



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

2.7 System FAN Connector (SYS_FAN1/2)



The SYS_FAN1 is SMART control, but SYS_FAN2 is without SMART control. If a fan is used, this connector supports cooling fans of 500 mA (6 W) or less.

2.8 Front Panel Connectors (JFP1/2/3)

There are several external switches to monitor and control the AKMB-G41M. JFP1+JFP2 are for Front panel (HDD LED/SNMP SMBus/Speaker pin header/ Power switch/Reset Switch). JFP3 is for Power LED.

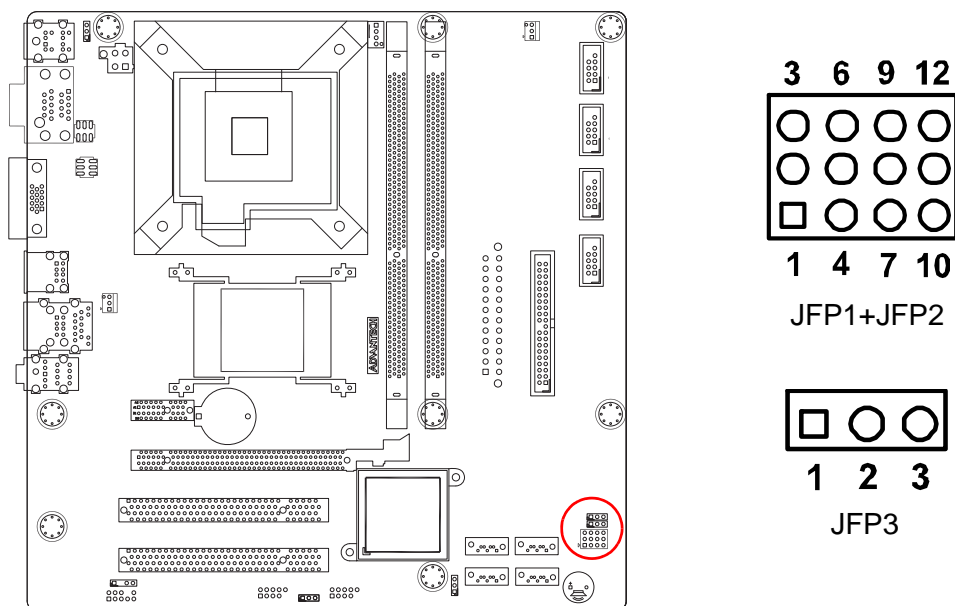


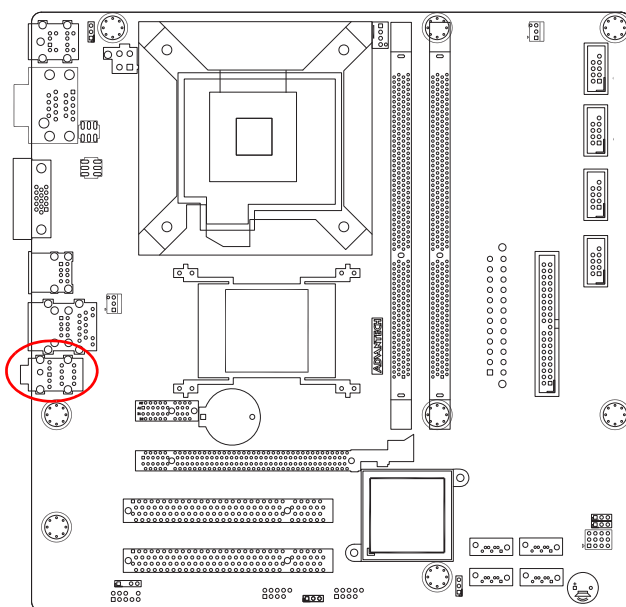
Table 2.2: JFP1+JFP2

1	+5 V	8	NC
2	HDLED+	9	SYS_RESET#
3	PWRBTN#	11	NC
5	HD_LED#	12	GND
6	GND (Pulled down 100 Ohm)		

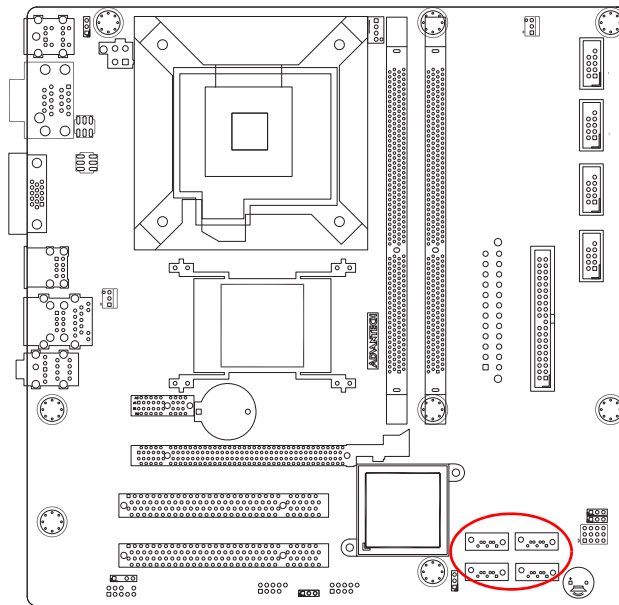
Table 2.3: JFP3

1	PWLED+
2	NC
3	PWLED-

2.9 Line Out and Mic In Connector (AUDIO1)



2.10 Serial ATA Interface (SATA 1/2/3/4)

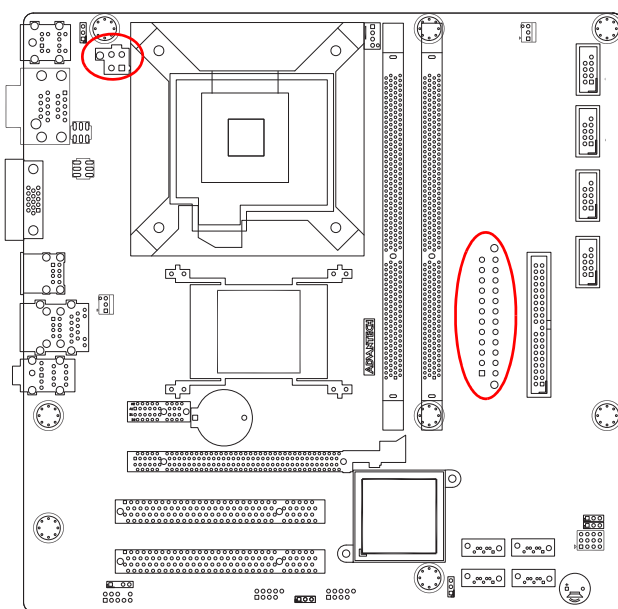


SATA1/2/3/4

AKMB-G41M features four high performance serial ATA interfaces (up to 300 MB/s) which eases cabling to harddrives with improved long, thin cables.

2.11 ATX Power Connector (ATX12V1, EATXPWR1)

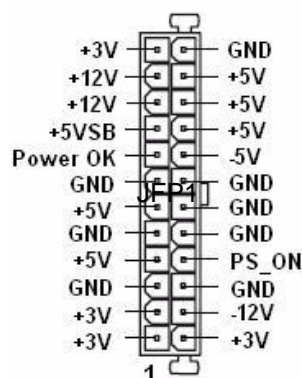
These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors mate completely.



CPU_+12V CPU_+12V



AGND AGND
ATX12V



EATXPWR1

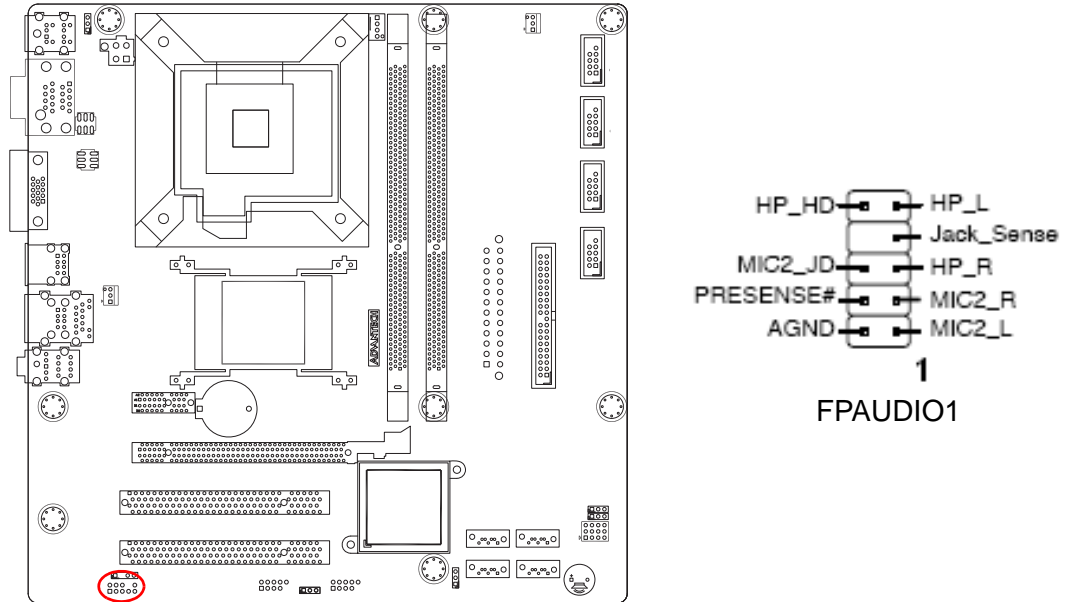
Note!



1. Make sure that your ATX 12V power supply can provide 8A on the +12V lead and at least 1A on the +5-volt standby lead (+5VSB). The minimum recommended wattage is 230W, or 300W for a fully configured system. The system can become unstable and might experience difficulty powering up if the power supply is inadequate.
2. You must install a PSU with a higher power rating if you intend to install additional devices.

2.12 Front Panel Audio Connector (FPAUDIO1)

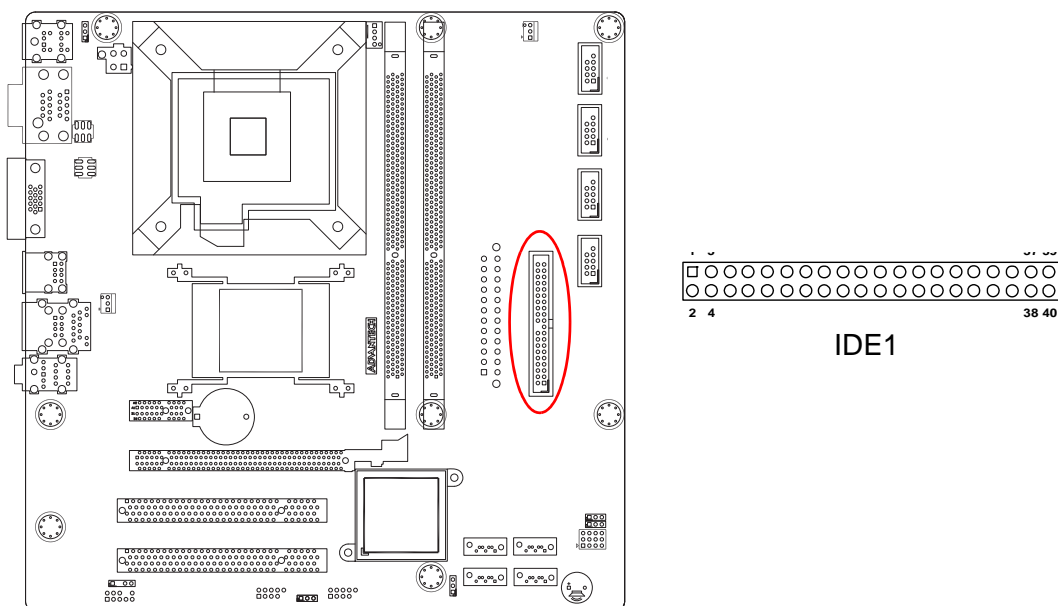
This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 (optional) audio standard. Connect one end of the front panel audio I/O module cable to this connector.



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

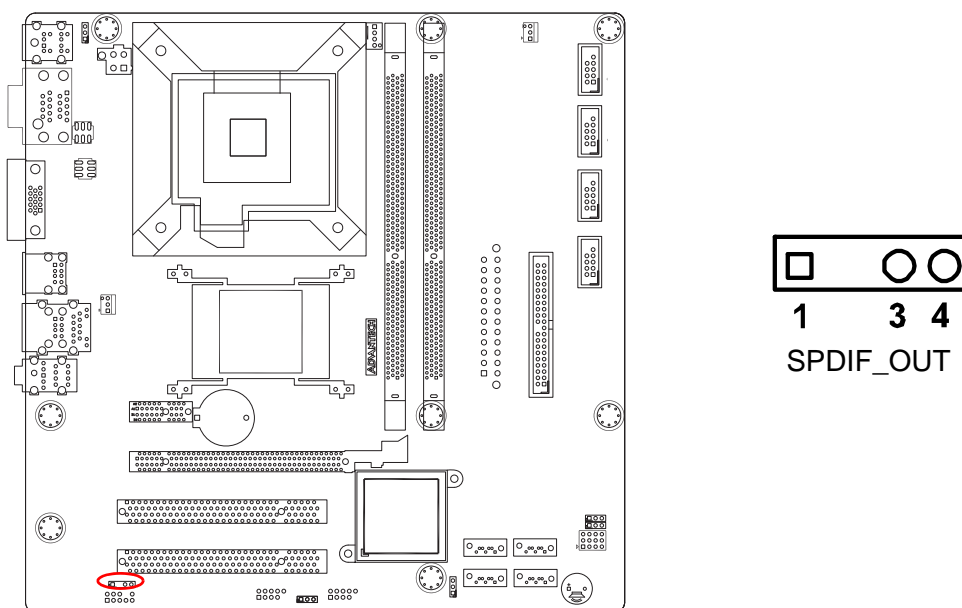


2.13 Primary EIDE Connector (IDE1)



2.14 Digital Audio Connector (SPDIF_OUT1)

This connector is for the S/PDIF audio module to allow digital sound output. Connect one end of the S/PDIF audio cable to this connector and the other end to the S/PDIF module.



Note! The S/PDIF out module is purchased separately.



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 AKMB-G41M setup screens.

3.2 BIOS Setup

The AKMB-G41M Series system has build-in AMI BIOS with a CMOS SETUP utility which allows user 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 the CMOS RAM.

When the power is turned on, press the button during the BIOS POST (Power-On Self Test) will take you to 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
------	-----------

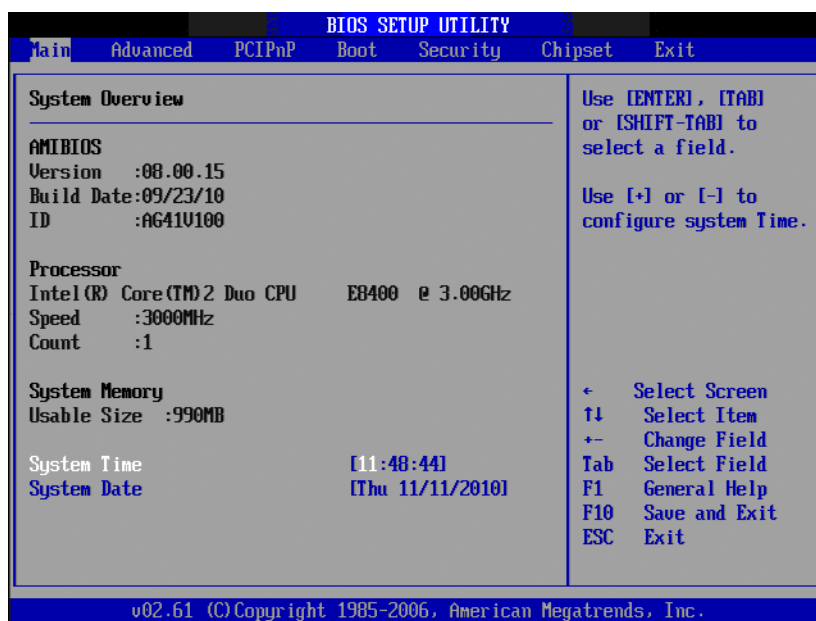
<F5>	Load Previous Values
------	----------------------

<F7>	Load Setup Default
------	--------------------

<F10>	Save all CMOS changes
-------	-----------------------

3.2.1 Main Menu

Press 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

The second tab enters the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

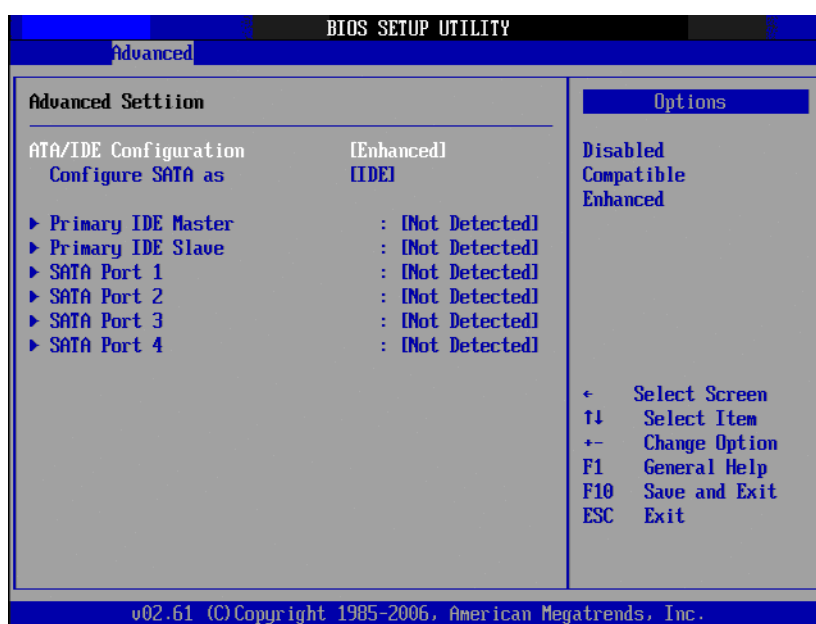


3.2.3 CPU Configuration



- **C1E support**
C1 Enhanced Halt State enable could adjust CPU frequency to reduce the power voltage to save energy.
- **Max CPUID Value Limit**
This item allows you to limit CPUID maximum value.
- **Intel® Virtualization Tech**
Intel Virtualization Technology (Intel VT) is a set of hardware enhancements to Intel server and client platforms that provide software-based virtualization solutions. Intel VT allows a platform to run multiple operating systems and applications in independent partitions, allowing one computer system can function as multiple virtual systems.
- **Execute-Disable Bit Capability**
This item allows you to enable or disable the No-Execution page protection technology.
- **Core Multi-Processing**
Support multi-core function. It will become single core process when this item disable.

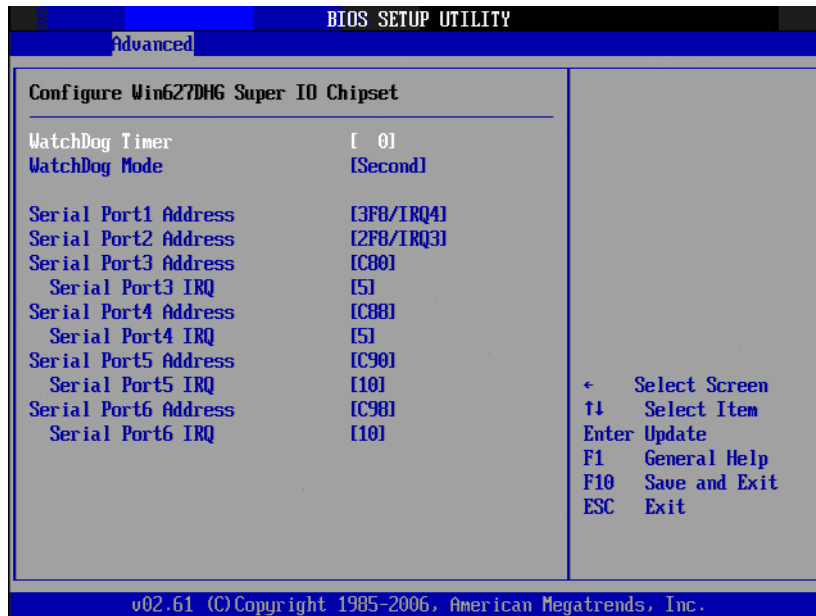
3.2.4 IDE/SATA Configuration



- **ATA/IDE Configuration**
This can be configured as Disabled, Compatible or Enhanced.
- **Configure SATA as**
This can be configured as IDE.
- **SATA1/SATA2/SATA3/SATA4**
While entering setup, the BIOS automatically detects the presence of SATA devices. This displays the status of SATA device auto-detection.

3.2.5 Super IO Configuration

This item enables users to set the Super IO device status, including enabling of COMs.

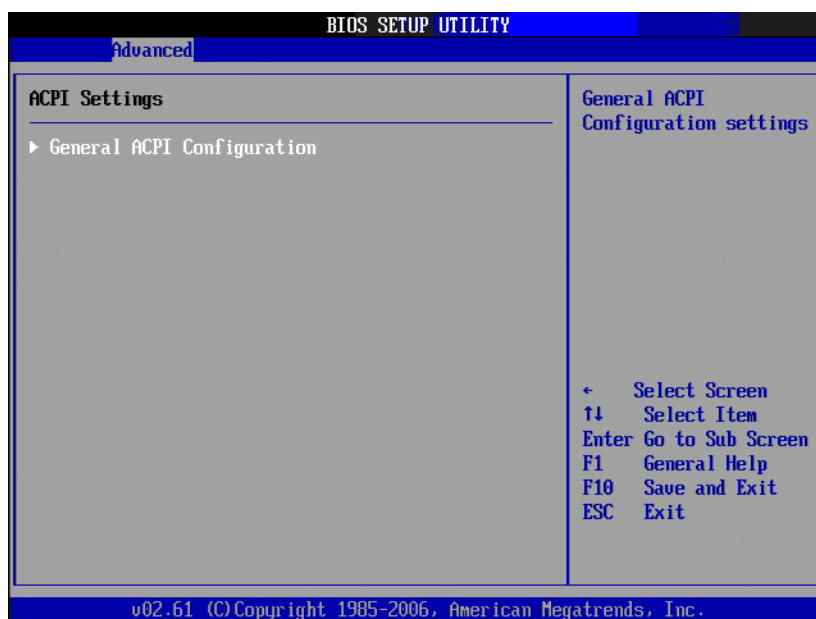


3.2.6 Hardware Health Configuration

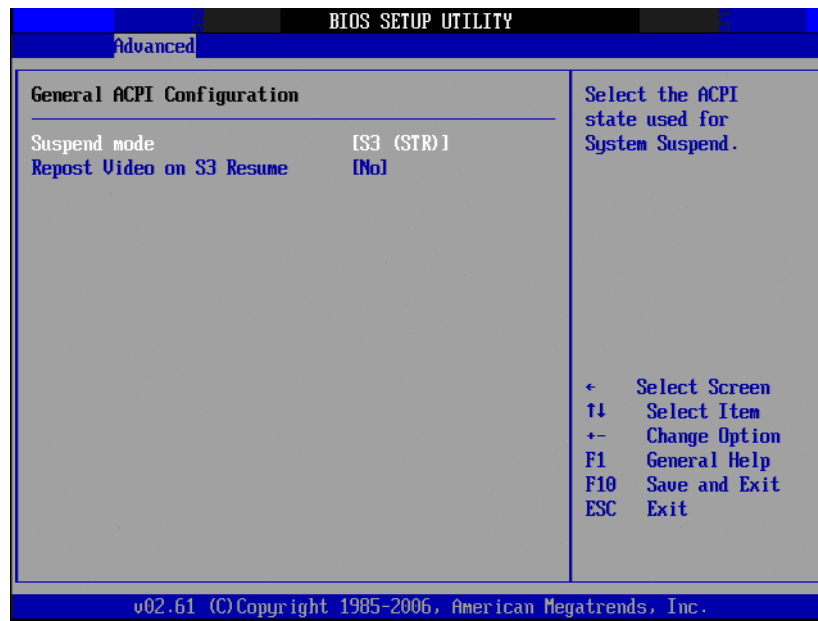


- **CPU warning temperature**
Use this to set the CPU warning temperature threshold. When the system CPU reaches the warning temperature, the onboard buzzer will beep.
- **ACPI Shut Down Temperature**
This option allows user to set the CPU temperature at which the system will automatically shut down to prevent CPU overheat damage.
- **CPU Temperature**
The onboard hardware monitor automatically detects and displays the CPU temperatures.
- **System Temperature**
The onboard hardware monitor automatically detects and displays the system temperatures.
- **CPUFAN Speed**
To show CPU FAN speed [xxxxRPM].
- **SYSTEMFAN Speed**
To show system fan speed [xxxxRPM].
- **CPU Smart FAN**
To enable or disable the Smart fan control feature.

3.2.7 ACPI Setting



3.2.8 General ACPI Configuration



■ Suspend mode

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend.

[Auto] The system automatically configures the ACPI suspend mode.

[S1(POS) only] Sets the ACPI suspend mode to S1/POS(Power On Suspend).

[S3 only] Sets the ACPI suspend mode to S3/STR(Suspend to RAM)

3.2.9 APM Configuration



- **Resume on PCIE WAKE#**
Disable/Enable PCIE wake event.
- **Resume On RTC Alarm**
Disable/Enable RTC wake event.
- **High Performance Event Timer**
Disable/Enable High Performance event.
- **Restore on AC power Loss**
Use this to set up the system response after a power failure. The "Off" setting keeps the system powered off after power failure, the "On" setting boots up the system after failure, and the "Last State" returns the system to the status just before power failure.

3.2.10 Advanced PCI/PnP Setting

Select the PCI/PnP tab from the AKMB-G41M setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.



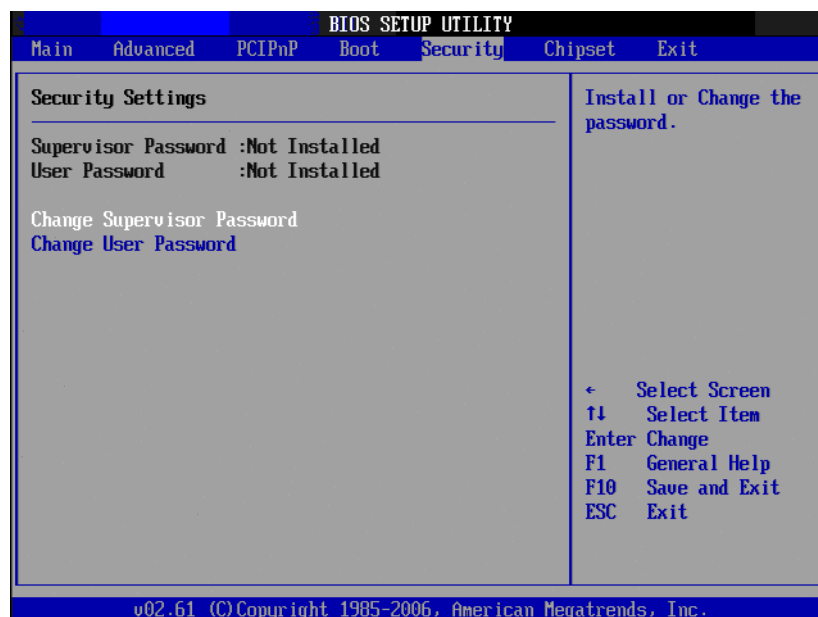
- **Clear NVRAM**
Set this value to force the BIOS to clear the Non-Volatile Random Access Memory (NVRAM). The Optimal and Fail-Safe default setting is No.
- **Plug & Play O/S**
When set to No, BIOS configures all the devices in the system. When set to Yes and if you install a Plug and Play operating system, the OS configures all Plug and Play devices not required for bootup.
- **PCI Latency Timer**
Value in units of PCI clocks for PCI device latency timer register.
- **PCI IDE BusMaster**
Increase the HDD write/read speed when enable.

3.2.11 Boot Setting



- **Quick Boot**
This item allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
- **Quiet Boot**
If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Bootup Num-Lock**
Select the Power-on state for Numlock.
- **Wait For .F1. If Error**
Wait for the F1 key to be pressed if an error occurs.

3.2.12 Security Setting



Select Security Setup from the AKMB-G41M 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>:

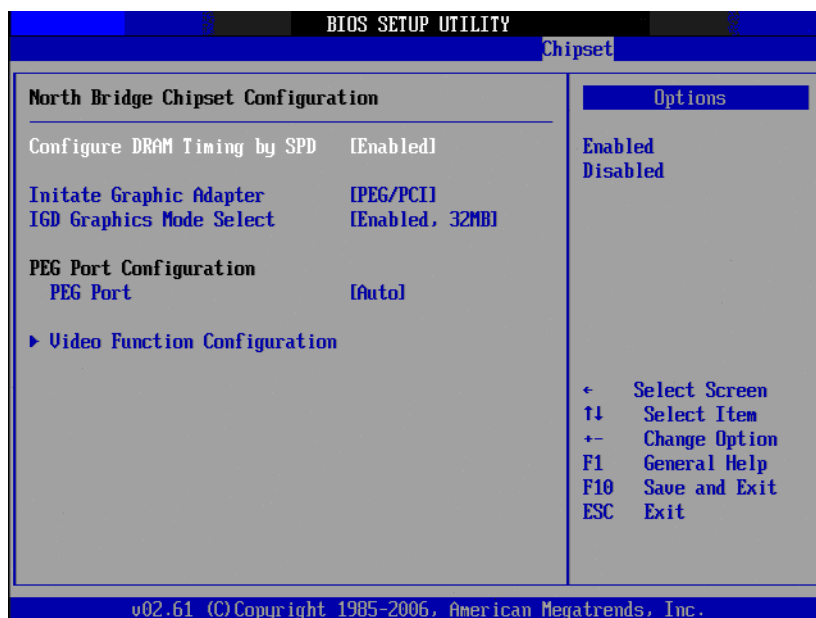
- **Change Supervisor / User Password**

Provides for either installing or changing the password.

3.2.13 Advanced Chipset Settings



3.2.14 North Bridge Chipset Configuration



- **Configure DRAM Timing by SPD**
This item allows you to enable or disabledetect by DRAM SPD.
- **Initiate Graphic Adapter**
This item allows you to select which graphics controller to use as the primary boot device.
- **IGD Graphics Mode Select**
Select the amount of system memory used by the Internal graphics device.

3.2.15 South Bridge Chipset Configuration



- **USB Functions**
Select: Disabled, 2 USB Ports, 4 USB Ports, 6 USB Ports or 8 USB Ports.
- **USB 2.0 controller**
Enables or disables the USB 2.0 controller.
- **Audio Controller**
Enables or disables the Audio controller.
- **Onboard LAN controller**
Enables or disables the GbE controller.
- **Onboard LAN BOOTROM**
Enables or disables GbE LAN boot.
- **SLP_S4# Min. Assertion Width**
This item allows you to set a delay of a set number of seconds.

3.2.16 Exit Option



■ Save Changes and Exit

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

1. Select Save Changes and Exit from the Exit menu and press <Enter>. The following message appears:

Save Configuration Changes and Exit Now?
[Ok] [Cancel]

2. Select Ok or Cancel.

■ Discard Changes and Exit

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

1. Select Save Changes and Exit from the Exit menu and press <Enter>. The following message appears:

Save Configuration Changes and Exit Now?
[Ok] [Cancel]

2. Select Ok to discard changes and exit.

■ Discard Changes

1. Select Discard Changes from the Exit menu and press <Enter>.

■ Load Optimal Defaults

The AKMB-G41M automatically configures all setup items to optimal settings when you select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal.

Defaults if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

Chapter 4

Chipset Software
Installation Utility

4.1 Before you begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the AKMB-G41M are located on the software installation CD. The driver in the folder of the driver CD will guide and link you to the utilities and drivers under a Windows system. Updates are provided via Service Packs from Microsoft*.

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



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

4.2 Introduction

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

- Core PCI PnP services
- IDE Ultra ATA 100/66/33 and Serial ATA interface support
- USB 1.1/2.0 support (USB 2.0 driver needs to be installed separately for Win98)
- Identification of Intel® chipset components in the Device Manager
- Integrates superior video features. These include filtered sealing of 720 pixel DVD content, and MPEG-2 motion compensation for software DVD

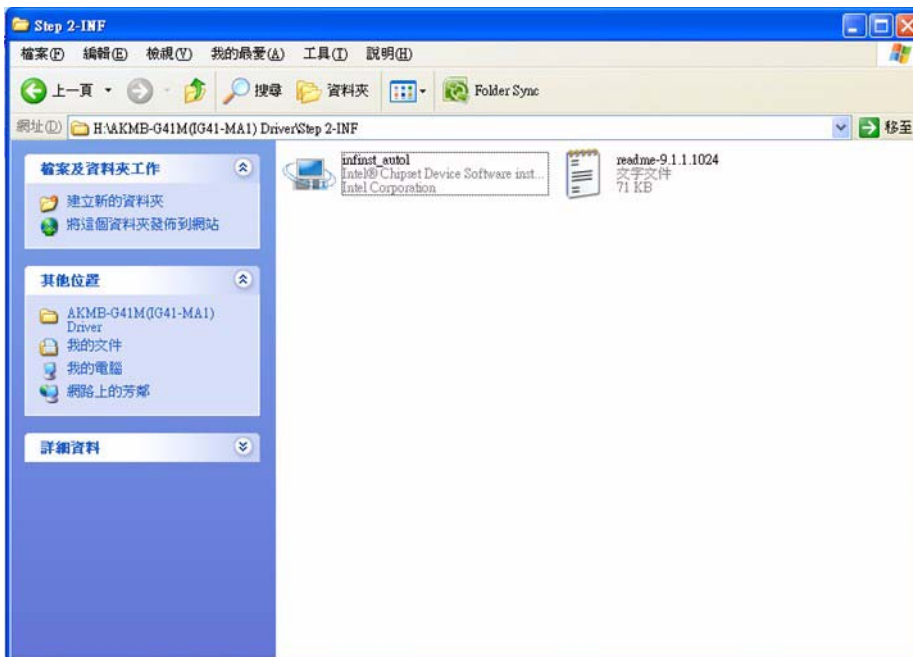
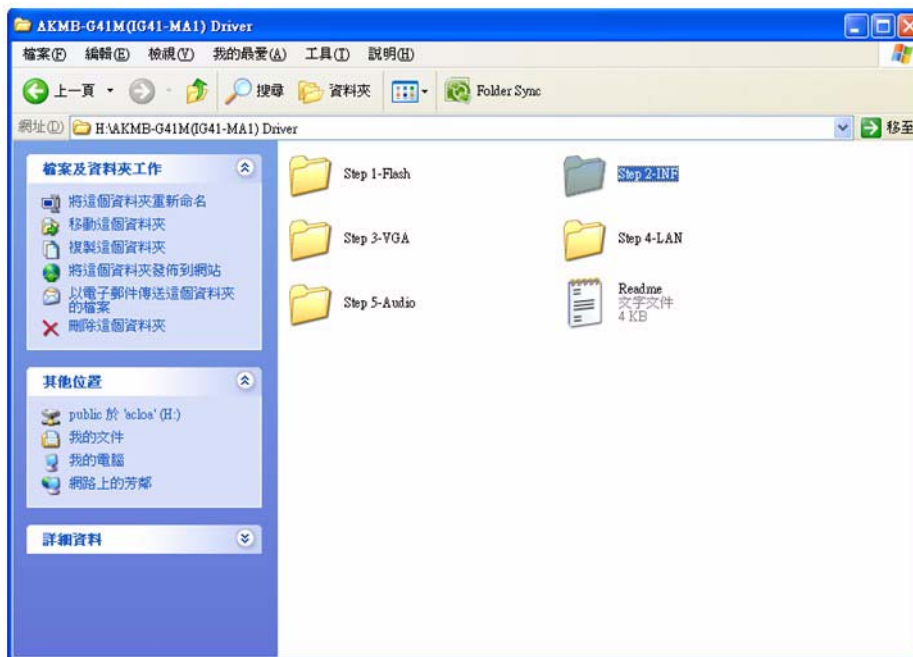
Note! *This utility is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*



- *Windows 7 (32-bit)*
- *Windows 7 (64-bit)*
- *Windows XP professional edition (32-bit)*
- *Windows XP professional edition (64-bit)*

4.3 Windows XP/Windows 7 Driver Setup

1. Insert the driver CD into your system's CD-ROM drive. You can see the driver folder items. Navigate to the "INF" folder and click the install file to complete the installation of the driver.



Chapter 5

VGA Setup

5.1 Introduction

The Intel G41 integrated graphics controller. You need to install the VGA driver to enable the function.

The Intel G41 integrated graphics controller includes the following features:

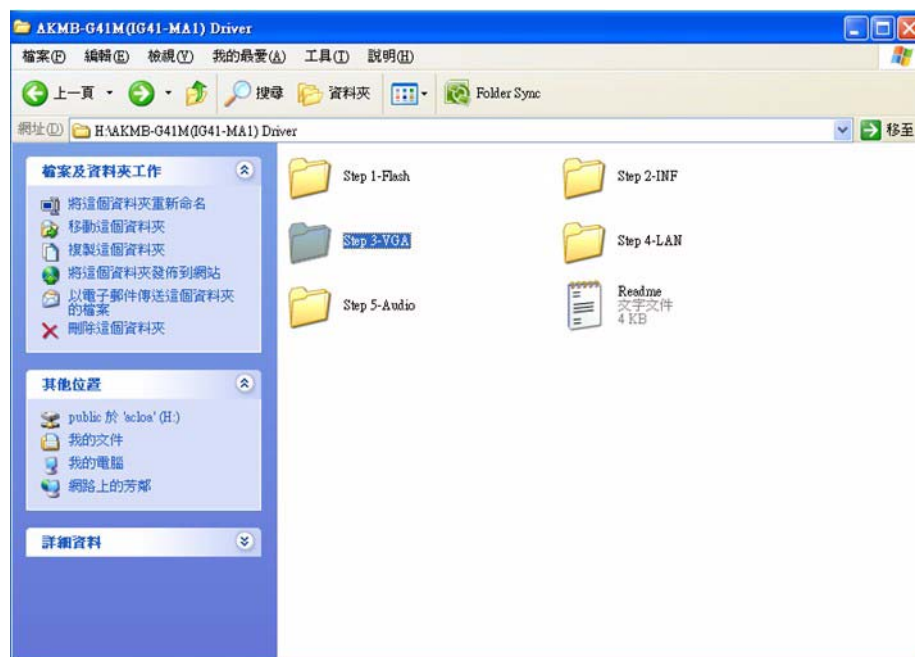
- Intel Graphics Media Accelerator X4500: Incorporating the latest Microsoft* DirectX*9 support capabilities, it allows software developers to create lifelike environments and characters. Dual independent display, enhanced display modes for widescreen flat panels, and optimized 3D support deliver an intense and realistic visual experience without requiring a separate graphics card.

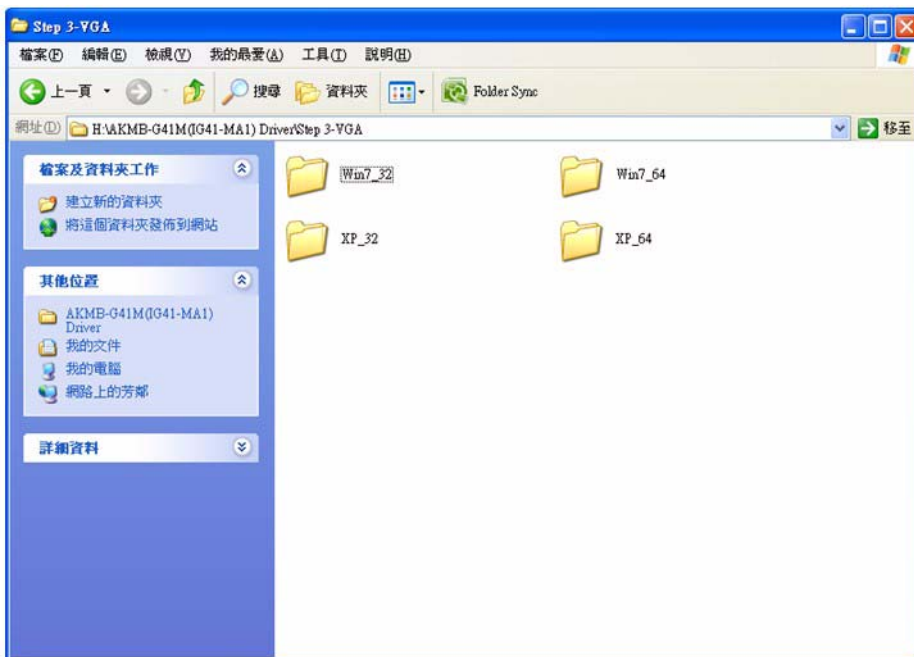
5.2 Windows XP/7

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



Insert the driver CD into your system's CD-ROM drive. You can see the driver folders items. Navigate to the "VGA" folder, and the appropriate sub folder, and click "setup.exe" to complete the installation of the drivers for Windows 7, Windows XP.





Chapter 6

LAN Configuration

6.1 Introduction

The AKMB-G41M has one Gigabit Ethernet LAN via dedicated PCI Express x1 lane (Realtek RTL8111DL) that offers bandwidth of up to 500 MB/ sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

6.2 Features

- Integrated 10/100/100 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 X1 host interface

6.3 Installation

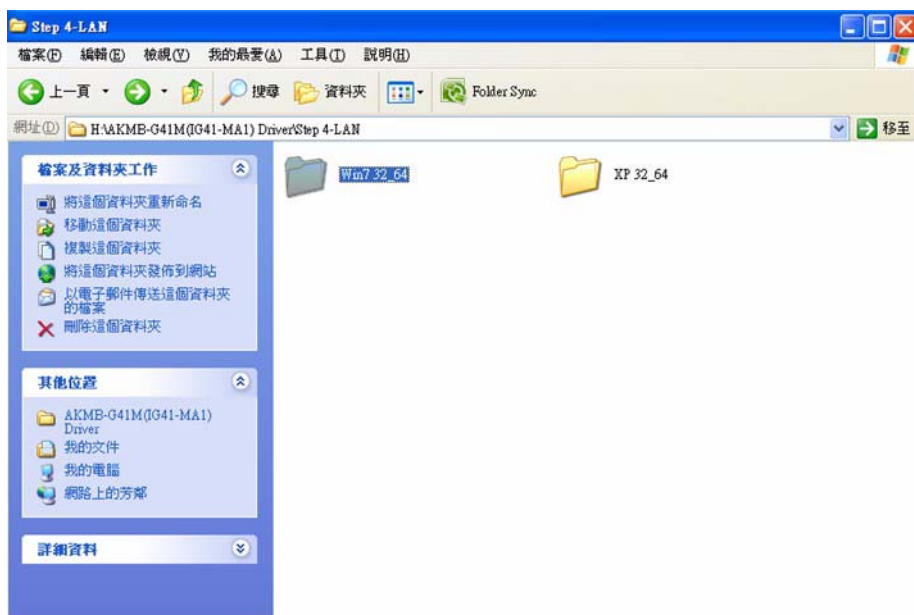
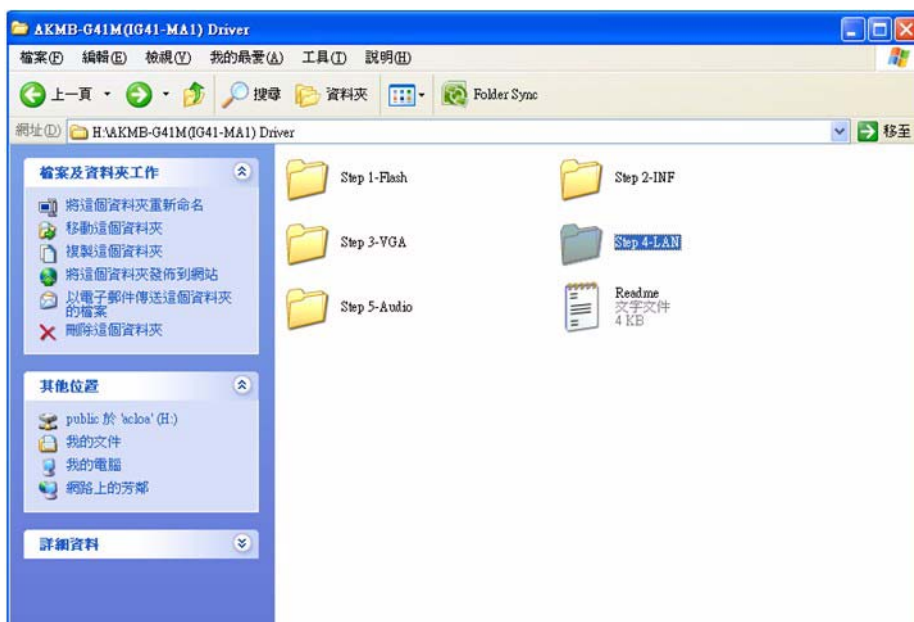
Note! *Before installing the LAN drivers, make sure the CSI utility has been installed on your system. See Chapter 4 for information on installing the CSI utility.*



The AKMB-G41M's Realtek RTL8111DL (LAN1) Gigabit integrated controllers support all major network operating systems. However, the installation procedure varies from system to system. Please find and use the section that provides the driver setup procedure for the operating system you are using.

6.4 Windows XP/ Windows 7 Setup(Realtek RTL8111DL)

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



Appendix **A**

Programming the
Watchdog Timer

A.1 Programming the Watchdog Timer

The AKMB-G41M '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 W83627DHG. 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).

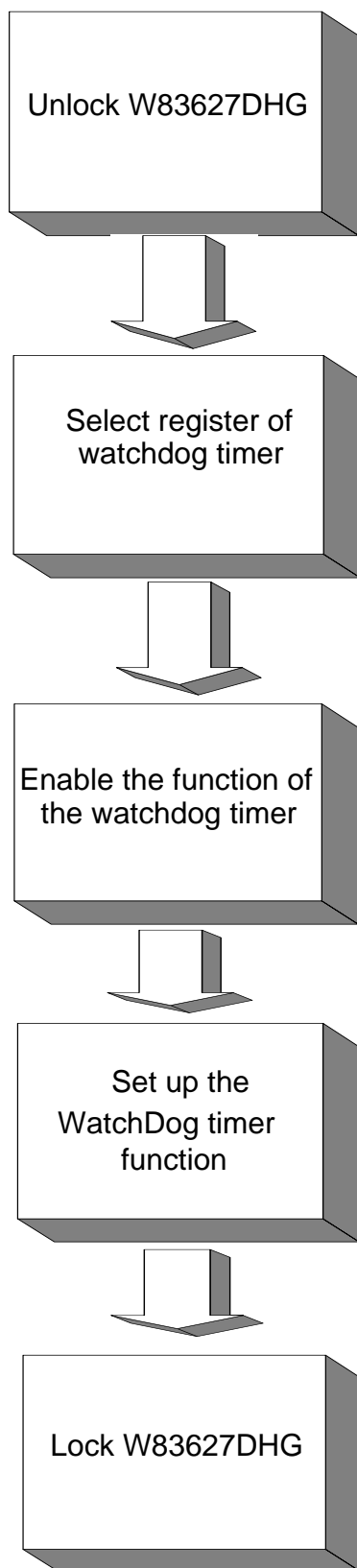


Table A.1: Watchdog Timer Registers

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 W83627DHG.
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 W83627DHG
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 W83627HG
Mov al,0aah
Out dx,al

```

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

```

;-----
Mov dx,2eh ; Unlock W83627HG
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 W83627HG
Mov al,0aah
Out dx,al
3. Enable watchdog timer to be reset by mouse
;-----
Mov dx,2eh ; Unlock W83627HG
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 W83627HG
Mov al,0aah
Out dx,al
4. Enable watchdog timer to be reset by keyboard
;-----
Mov dx,2eh ; Unlock W83627HG
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 W83627HG
Mov al,0aah
Out dx,al
5. Generate a time-out signal without timer counting
;-----
Mov dx,2eh ; Unlock W83627HG
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 W83627HG
Mov al,0aah
Out dx,al

```

Appendix **B**

I/O Pin Assignments

B.1 USB Header (USB56)

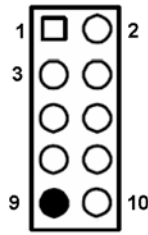


Table B.1: USB Header (USB56)

Pin	Signal	Pin	Signal
1	USB0_VCC5	2	USB1_VCC5
3	USB0_D-	4	USB1_D-
5	USB0_D+	6	USB1_D+
7	GND	8	GND
9	Key	10	N/C

B.2 USB Header (USB78)

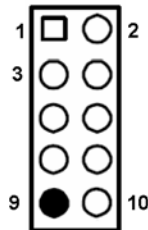


Table B.2: USB Header (USB78)

Pin	Signal	Pin	Signal
1	USB0_VCC5	2	USB1_VCC5
3	USB0_D-	4	USB1_D-
5	USB0_D+	6	USB1_D+
7	GND	8	GND
9	Key	10	N/C

B.3 VGA Connector (VGA1)

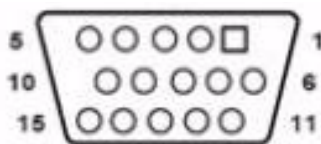


Table B.3: VGA Connector (VGA1)

Pin	Signal	Pin	Signal
1	VGA_R	9	CRT_VCCIN
2	VGA_G	10	GND
3	VGA_B	11	N/C
4	N/C	12	V_SDAT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	V_SCLK
8	GND		

B.4 RS-232 Interface (COM1-COM6)

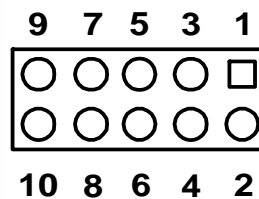


Table B.4: RS-232 Interface (COM1~COM2)

Pin	Signal
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RRI
9	GND

B.5 PS/2 Keyboard and Mouse Connector (KBMS1)



Table B.5: PS/2 Keyboard and Mouse Connector (KBMS1)

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

B.6 CPU Fan Power Connector (CPU_FAN1)

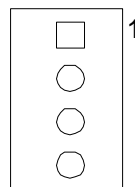


Table B.6: CPU Fan Power Connector (CPU_FAN1)

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

B.7 System Fan Power Connector (SYS_FAN1/ SYS_FAN2)

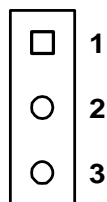


Table B.7: System Fan Power Connector (SYSFAN1/SYSFAN2)

Pin	Signal
1	GND
2	+12 V
3	DETECT

B.8 Front Panel Connectors (JFP1/2)

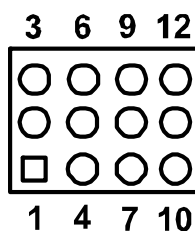


Table B.8: JFP1+JFP2

1	+5 V	8	NC
2	HDLED+	9	SYS_RESET#
3	PWRBTN#	11	NC
5	HD_LED#	12	GND
6	GND (Pulled down 100 Ohm)		

B.9 ATX1 12 V Auxiliary Power Connector (ATX12V1)

Table B.9: ATX1 12 V Auxiliary Power Connector (ATX12V1)

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

B.10 ATX Power Connector (EATXPWR1)

Table B.10: ATX Power Connector (ATX2)

Pin	Signal	Pin	Signal
1	+3.3 V	2	+3.3 V
3	GND	4	+5 V
5	GND	6	+5 V
7	GND	8	POK
9	5 VSB	10	12 V
11	12 V	12	3.3 V
13	3.3 V	14	-12 V
15	GND	16	PSON
17	GND	18	GND
19	GND	20	-5 V

B.11 USB/LAN ports (LAN1_USB12/USB34)

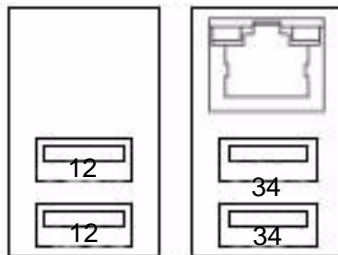


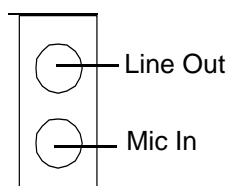
Table B.11: USB Port

Pin	Signal	Pin	Signal
1	VCC	3	Data0+
2	Data0-	4	GND

Table B.12: Ethernet 10/100Mbps RJ-45 Port

Pin	Signal	Pin	Signal
1	XMT+	5	N/C
2	XMT-	6	RCV-
3	RCV+	7	N/C
4	N/C	8	N/C

B.12 Line Out, Mic In Connector (AUDIO1)



B.13 Serial ATA0 (SATA1)

Table B.13: Serial ATA0 (SATA1)

Pin	Signal	Pin	Signal
1	GND	2	SATA_0TX+
3	SATA_0TX-	4	GND
5	SATA_0RX-	6	SATA_0RX+
7	GND	8	

B.14 Serial ATA (SATA2 ~ 4)

Table B.14: Serial ATA1 (SATA2 ~ 4)

Pin	Signal	Pin	Signal
1	GND	2	SATA_1TX+
3	SATA_1TX-	4	GND
5	SATA_1RX-	6	SATA_1RX+
7	GND	8	

B.15 AT/ATX Mode (PSON1)

Table B.15: AT/ATX Mode (PSON1)

Pin	Signal	Pin	Signal
1	#PSON_SIO (to super IO)	2	#PSON (to power supply)
3	GND		

ATX 1-2 (short)

AT 2-3 (short)

B.16 FPAUDIO1(Front Panel Audio Connector)

Table B.16: Front Panel Audio Connector (FPAUDIO1)

Pin	Signal
1	MIC2_L
2	GND
3	MIC2_R
4	F_Audio_DET#
5	LIN2_R
6	MIC_JD
7	GND
8	N/A
9	LIN2_L
10	LIN_JD

B.17 Interrupt Assignments

Table B.17: Interrupt Assignments

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

B.18 1st MB Memory Map

Table B.18: 1st MB Memory Map	
Addr. range (Hex)	Device
E0000h - FFFFFh	BIOS
CC000h - DFFFFh	Unused
C0000h - CBFFFh	VGA BIOS
A0000h - BFFFFh	Video Memory
00000h - 9FFFFh	Base memory

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