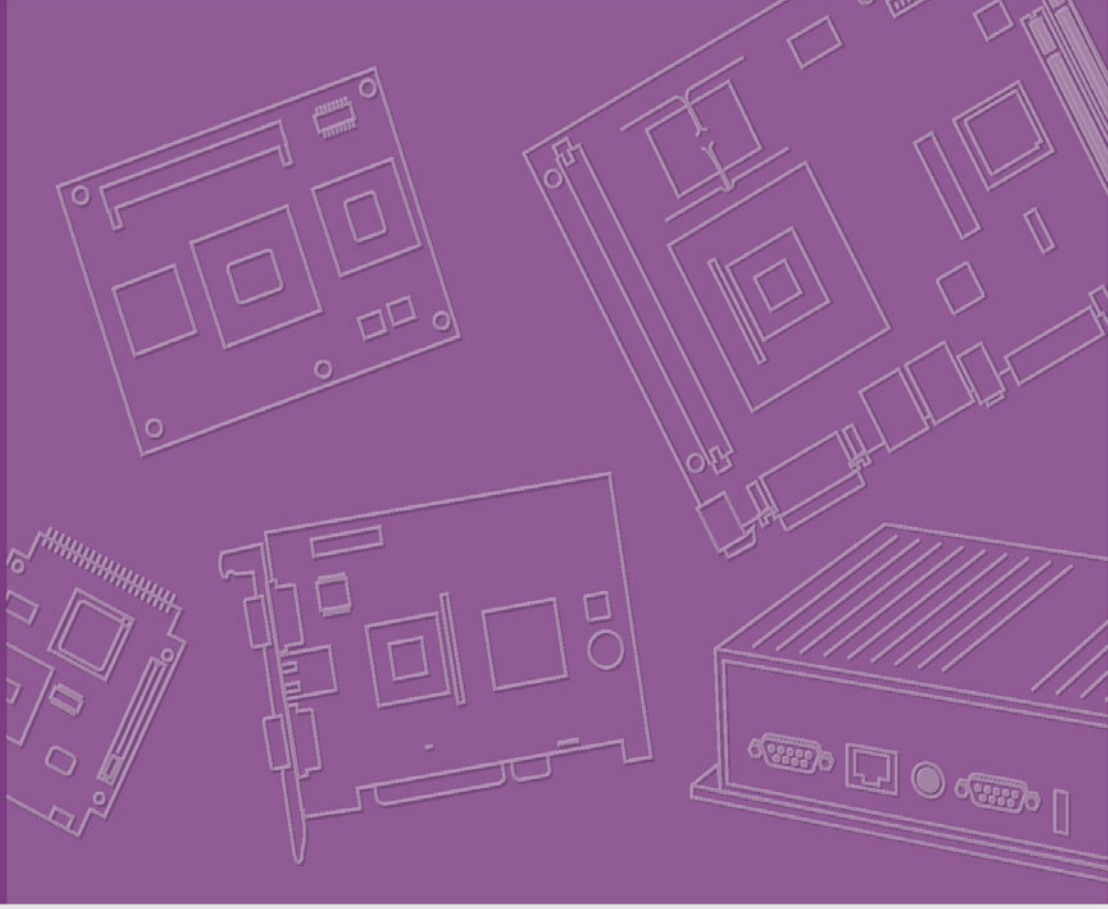


User Manual

AIMB-258

Intel® GM45 µFC-PGA 478 Core™2 Duo Mini ITX Motherboard with VGA, DVI, LVDS, 6 COM, Dual GbE, 8 USB, 2 SATA II, PCIe x 16

Ver.1.00

Trusted ePlatform Services

ADVANTECH

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 are unplugged before the signal cables are connected. If possible, disconnect all power cables from the 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 by yourself. Contact a qualified service technician or your retailer.

Operation 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 circuits, 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.

Part No. 2006025801 Edition 2
Printed in Taiwan June 2009

Certifications

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.*

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance. Visit the Advantech web-site for FAQ, technical guide, BIOS updates, driver updates, and other information:

http://support.advantech.com.tw/Support/default.aspx

Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x AIMB-258 Intel® µFC-PGA 478 Core 2 Duo Mini ITX Motherboard
- 2 x SATA HDD cable
- 2 x SATA Power cable
- 1 x Serial port cable 1 to 4
- 1 x I/O port bracket
- 1 x Startup manual
- 1 x Driver CD
- 1 x Warranty card

If any of the above items is damaged or missing, please contact your retailer.

Contents

Chapter 1

Product Introduction

This chapter describes the main board features and the new technologies it supports.

1.1 Before You Proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.

Caution!

- *Unplug the power cord from the wall socket before touching any component.*
- *Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity*
- *Hold components by the edges to avoid touching the ICs on them.*
- *Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.*
- *Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.*

1.2 Motherboard Overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it. Refer to the chassis documentation before installing the motherboard.

Warning!

Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

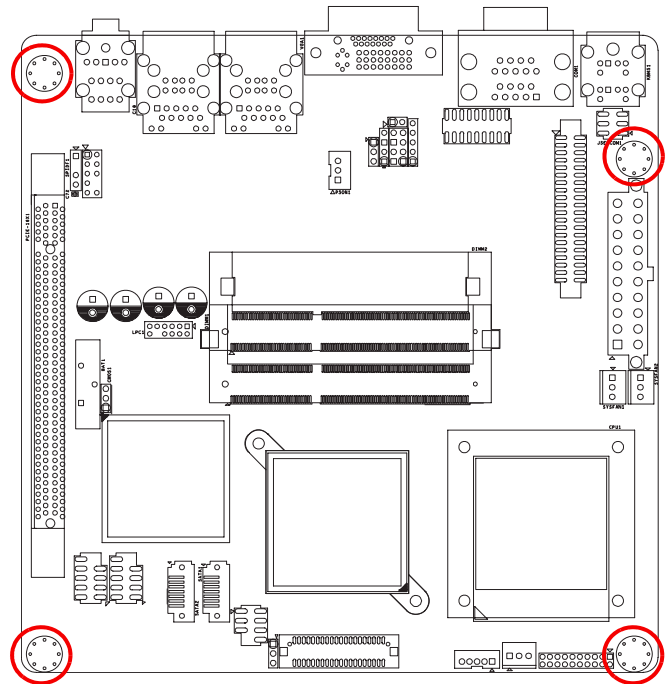
1.2.1 Placement Direction

When installing the motherboard, make sure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis.

1.2.2 Screw Holes

Place four (4) screws into the holes indicated by circles to secure the motherboard to the chassis.

Caution! *Do not over tighten the screws! Doing so can damage the motherboard.*



Place this side towards the rear of the chassis.

1.3 Motherboard Layout

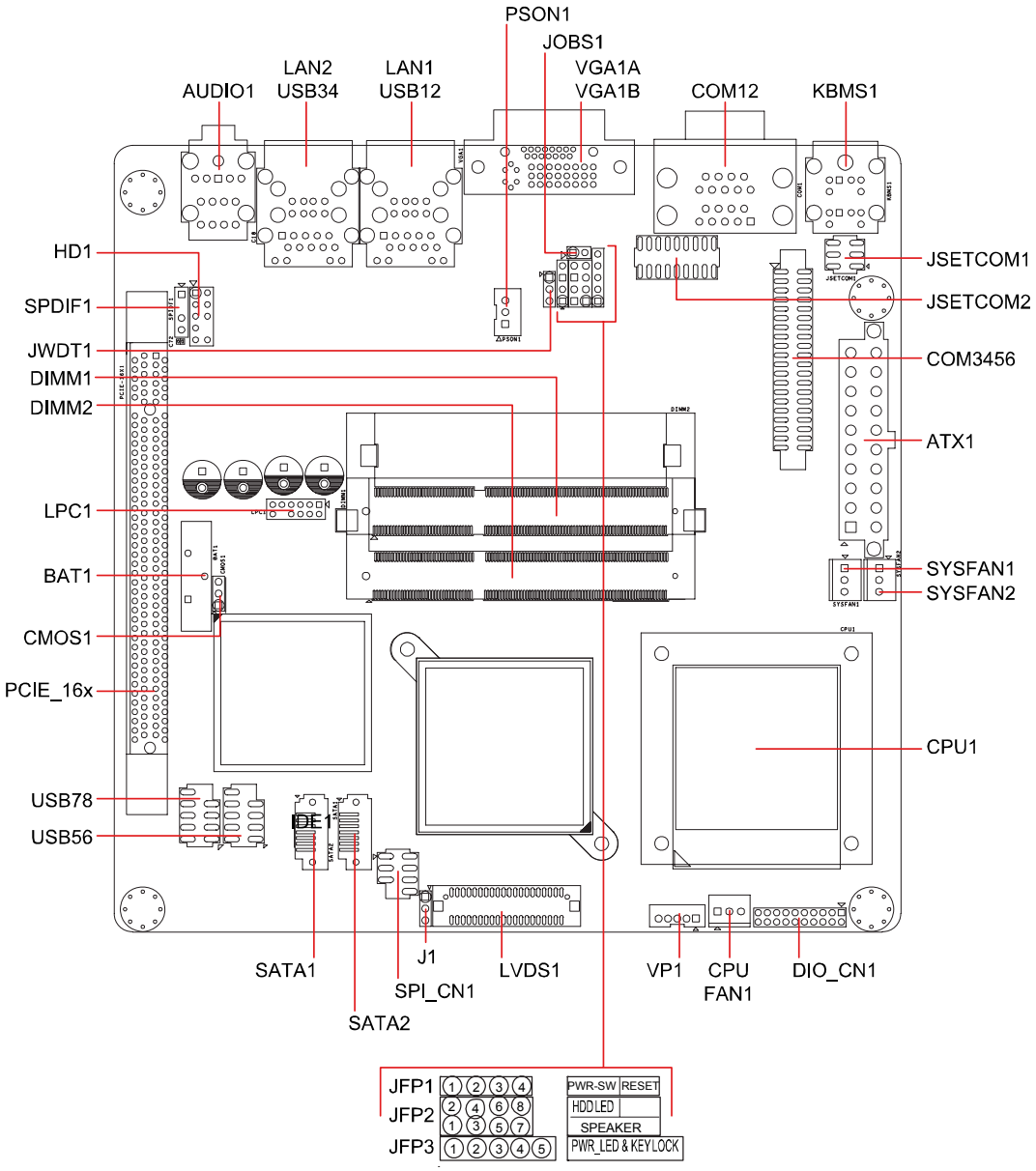


Figure 1.1 Motherboard Layout

1.4 Specifications

Processor System	CPU (45 nm µFC-PGA 478)	Intel® Core™2 Duo	Intel Celeron M
	Max. Speed	T9400 2.53 GHz	575 2.0 GHz
	Front Side Bus	667/800/1066 MHz	667 MHz
	L2 Cache	6 MB	1 MB
	Chipset	GM45 + ICH9M	
	BIOS	Award 16 Mbit, SPI	
Expansion Slot	PCI	-	
	Mini-PCI	-	
	PCIe x 16	4 GB/s per direction, 1 slot	
Memory	Technology	DDR3 800/1066 MHz SDRAM	
	Max. Capacity	4 GB	
	Socket	2 x 204-pin SODIMM	
Graphics	Controller	Intel GM45 GMCH integrated Graphics Media Accelerator X4500	
	VRAM	Shared system memory up to 384 MB video memory	
	LVDS	Single channel 18/24-bit/Dual channel 36/48-bit LVDS	
	DVI-D	Yes (if DVI is used, PCIe x16 is automatically disable)	
	Dual Display	VGA + DVI; VGA + LVDS; DVI + LVDS	
	*Dual Display Mode	Extended Mode, Clone Mode, Twin Mode	
Ethernet	Interface	10/100/1000Base-T	
	Controller	GbE LAN1: Realtek RTL8111C; GbE LAN2: Realtek RTL8111C	
	Connector	RJ-45 x 2	
SATA	Max Data Transfer Rate	300 MB/s	
	Channel	2	
SSD	Compact Flash	Compact Flash Supports compact flash type I/II	
Rear I/O	VGA	1	
	DVI	1	
	Ethernet	2	
	USB	4 (USB 2.0 compliant)	
	Serial	2 (1 of RS-232, 1 of RS-232/422/485)	
	PS/2	2 (1 x keyboard and 1 x mouse)	
Internal Connector	LVDS	1	
	USB	4 (USB 2.0 compliant)	
	Serial	4 (RS-232)	
	IDE	-	
	SATA	2	
	Audio	3 (Mic-in, Line-in, Line-out)	
	Compact Flash	1	
	Parallel	-	
	IrDA	-	
	FDD	-	
	DIO	16-bit General Purpose I/O for digital signal input/output	
Watchdog Timer	Output	Interrupt, system reset	
	Interval	Programmable 1 ~ 255 sec/ min	

Power Requirement	Power On	5 V	3.3 V	12 V	5 Vsb	-12 V
		0.99 A	2.67 A	2.07 A	0.17 A	0.08 A
Environment		Operating		Non-Operating		
	Temperature	0 ~ 60°C (32 ~ 140°F)		-20 ~ 70°C (-4 ~ 158°F)		
Physical Characteristics	Dimensions	170 mm x 170 mm (6.69' x 6.69')				

***Dual Display Clone** uses both display pipes to drive the same content at the same resolution and color depth to two different displays. This configuration allows for different refresh rates on each display.

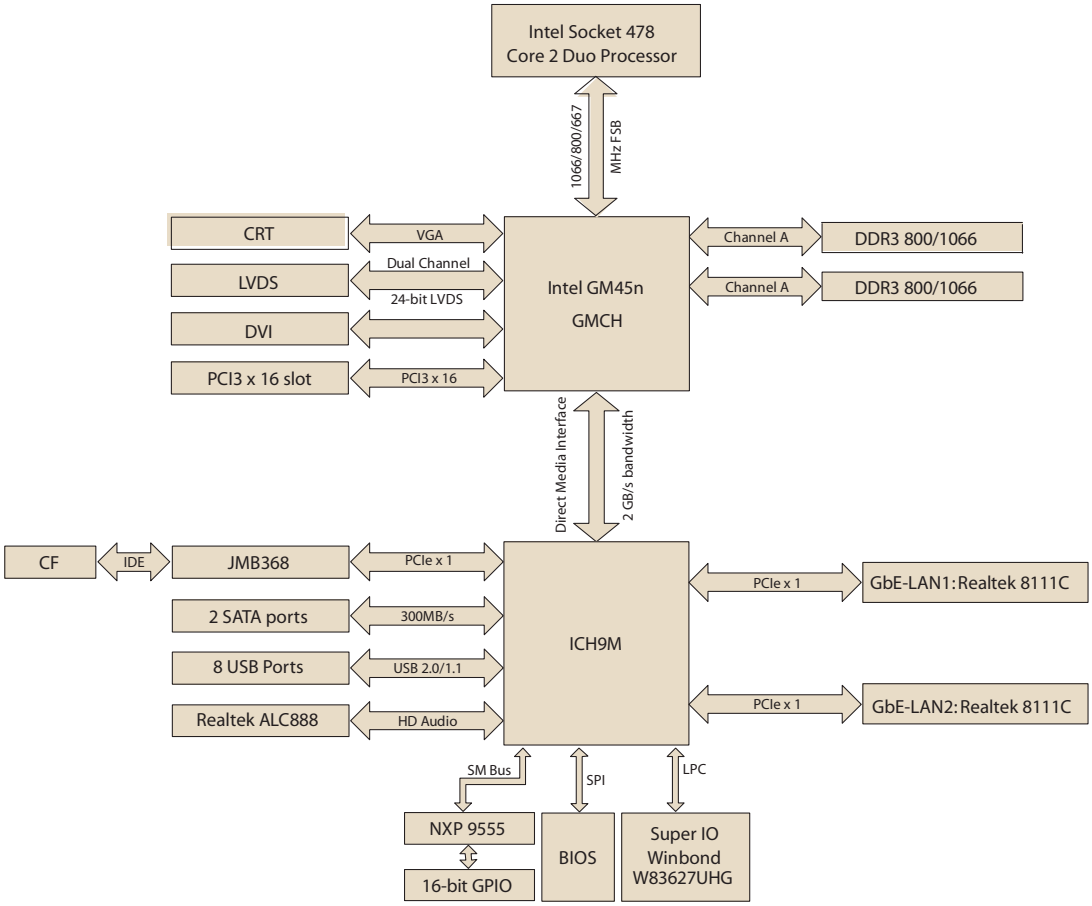
Dual Display Twin uses one of the display pipes to drive the same content, at the same resolution, color depth, and refresh rates to two different displays.

Extended Desktop uses both display pipes to drive different content, at potentially different resolutions, refresh rates, and color depths, to two different displays. This configuration allows for a larger Windows desktop by using both displays as one work surface.

1.5 Operating System support list

Operation System	AIMB-258
Windows Vista Ultimate edition (32-bit/64-bit)	Support
Windows XP professional edition (32-bit/64-bit)	Support
XP embedded	Support
Linux (Fedora)	Only OS installation and limited I/O functionality are validated
QNX	Only OS installation and limited I/O functionality are validated
WinCE 6.0	Require OEM BIOS. Please contact with Advantech FAE

1.6 Board Diagram



1.7 Ordering Information

Part Number	Display	GbE	SATA	Serial	CF
AIMB-258G2-00A1E	VGA/ DVI/ LVDS	Dual	2	6	1

1.8 Riser Card

Part Number	Description
AIMB-R430P-03A1E	2U riser card with 3 PCI slot expansion

1.9 Bracket View

1.10 Accessories

Part Number	Description
1700003195	USB cable with four ports, 17.5 cm
1700002204	USB cable with four ports, 27 cm
1700002314	USB cable with four ports, 30.5 cm

1.11 Layout Content List

Table 1.1: Jumper Setting List	
Label	**Function**
JSETCOM1	COM1/+5 V/+12 V Selection
JSETCOM2	COM2 RS232/422/485 Mode Selection
CMOS1	Clear CMOS
J1	LCD Power 3.3 V/5.5 V Selection
PSON1	ATX, AT Mode Selection
JWDT1	Watchdog Timer Output Option
JOBS1	Hardware Monitor

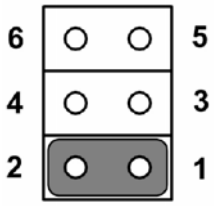
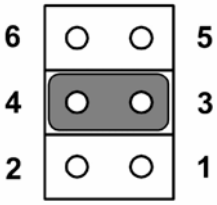
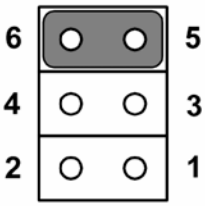
Table 1.2: JSETCOM1: COM1/+5 V/+12 V Selection	
COM1 (Default)	
+5 V	
+12 V	

Table 1.3: JSETCOM2: COM2 RS232/422/485 Mode Selection
Users can use JSETCOM2 to select among RS 232/422/485 modes for COM2. The default setting is RS 232.

Table 1.3: JSETCOM2: COM2 RS232/422/485 Mode Selection

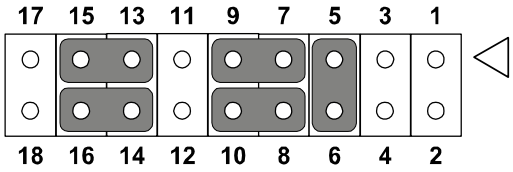
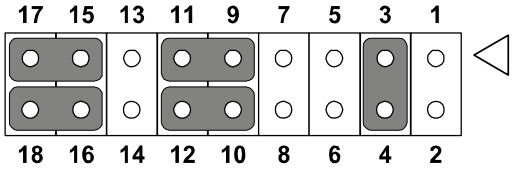
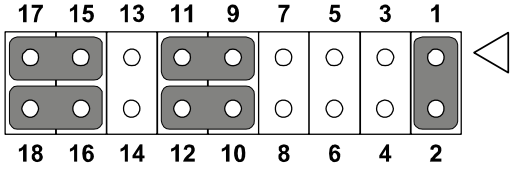
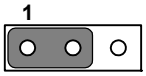
RS-232 Configuration (default)	
RS-422 Configuration	
RS-485 Configuration	

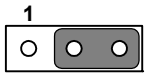
Table 1.4: CMOS1: Clear CMOS

Pins	Result
1-2*	Keep CMOS data*
2-3	Clear CMOS data

*Default



Keep CMOS data

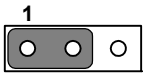


Clear CMOS

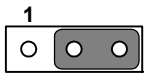
Table 1.5: J1:LCD Power 3.3 V/5.5 V Selection

Closed Pins	Result
1-2*	3.3 V*
2-3	5 V

*Default



3.3 V, 1-2 closed

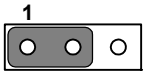


5 V, 2-3 closed

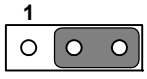
Table 1.6: PSON1: ATX, AT Mode Selection

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

*Default

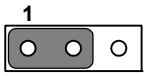


AT Mode, 1-2 closed

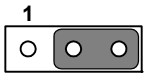


ATX Mode, 2-3 closed

Table 1.7: JWDT1: Watchdog Timer Output Option	
Closed Pins	**Result**
1-2	NC
2-3*	System Reset*
*Default	



NC, 1-2 closed



System Reset, 2-3 closed

Table 1.8: JOBS: HW monitor	
Closed Pins	**Result**
1-2*	Close: Enable OBS Alarm [Default]
1-2	Open: Disable OBS Alarm
*Default	

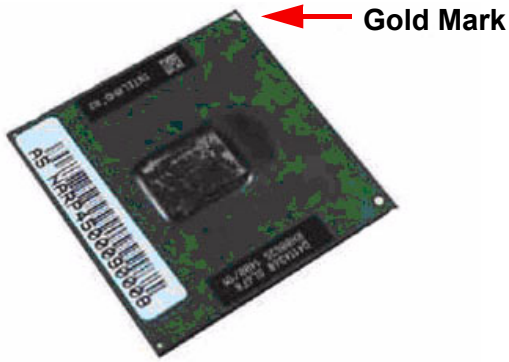
Close

Open

1.12 Central Processing Unit (CPU) for AIMB-258

The motherboard AIMB-258 comes with a surface mount 478-pin Zero Insertion Force (ZIF) socket designed for the Intel® Pentium® M / Celeron® M processor (Supports mPGA478M, Micro-FCPGA).

Take one of the marked corner (with gold triangle) on the CPU. This mark should match a specific corner on the socket to ensure correct installation.



Note!

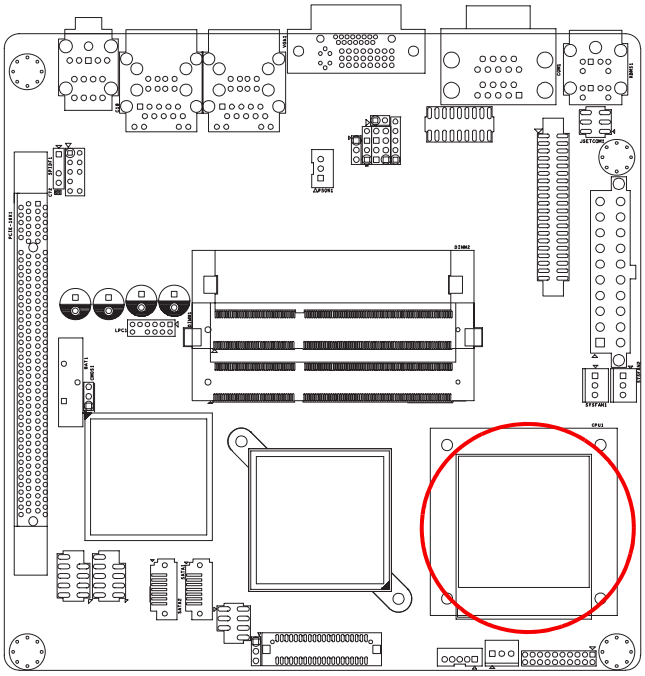
- *Make sure the AC power is off before you install the CPU.*
- *If installing a dual-core CPU, connect the CPU fan cable to the CPUFAN1 connector to ensure system stability.*

Caution!

- *Intel® socket 478 Pentium M/ Celeron M CPU with 90nm process package should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.*
- *Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. Your place of purchase or local distributor will shoulder the cost of repair only if the damage is shipment/transit-related.*
- *Keep the cap after installing the motherboard. Your place of purchase or local distributor will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the socket.*
- *The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/ incorrect removal of the PnP cap.*

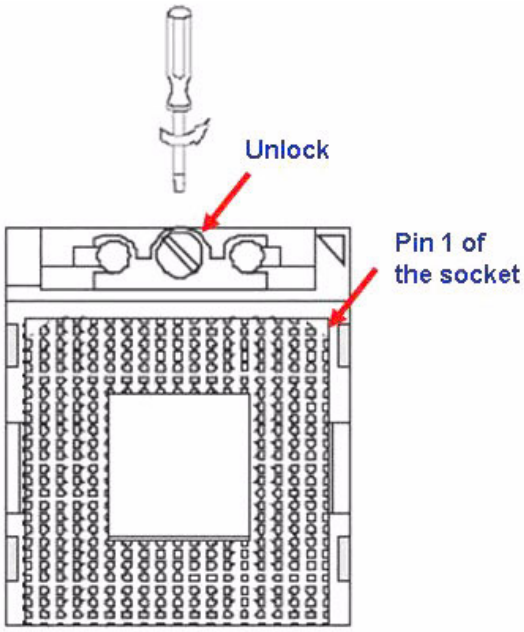
1.12.1 Installing the CPU

1. Locate the CPU socket on the motherboard.

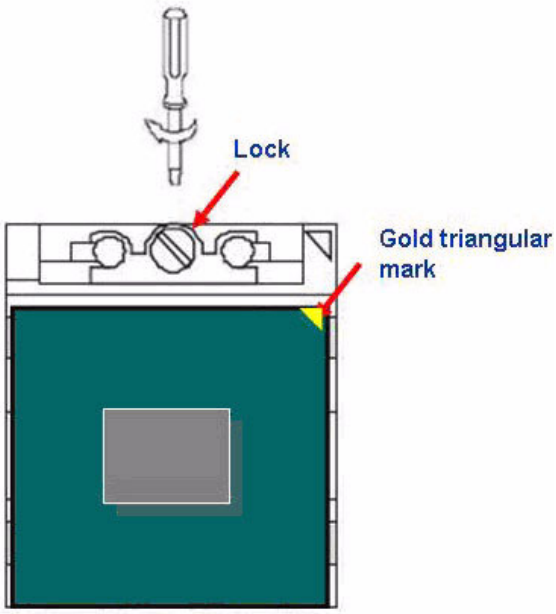


Note! *Before installing the CPU, make sure that the socket box is facing towards you.*

2. The processor socket comes with a screw to secure the processor, please unlock the screw first.



3. Position the CPU above the socket and the gold triangular mark on the CPU must align with pin 1 of the CPU socket.
4. Carefully insert the CPU into the socket until it fits in place 'Gold mark'.
5. Turn the screw to the lock position.



Warning! *The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU.*

Warning! *After installation, make sure to plug-in the ATX power cable to the motherboard.*

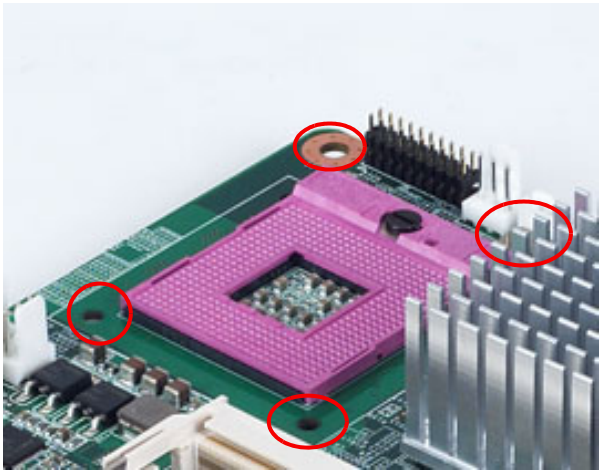
1.12.2 Installing the CPU Heatsink and Fan

The Intel® Pentium® M / Celeron® M processor (supports mPGA478M, Micro-FCPGA) requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

Caution! *If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.*

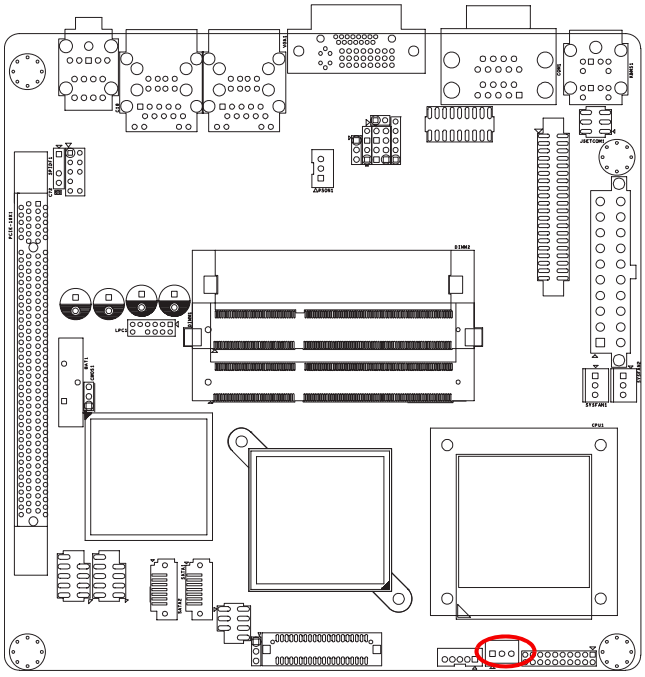
1. Place the heatsink on top of the installed CPU, making sure that the four screws match the holes on the motherboard.

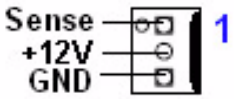
Motherboard Hole



Note! *Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.*

2. Connect the CPU fan cable to the connector on the motherboard labelled CPUFAN1.



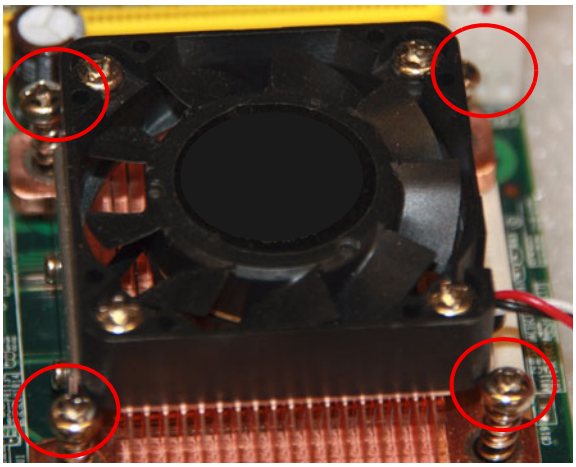


Caution!

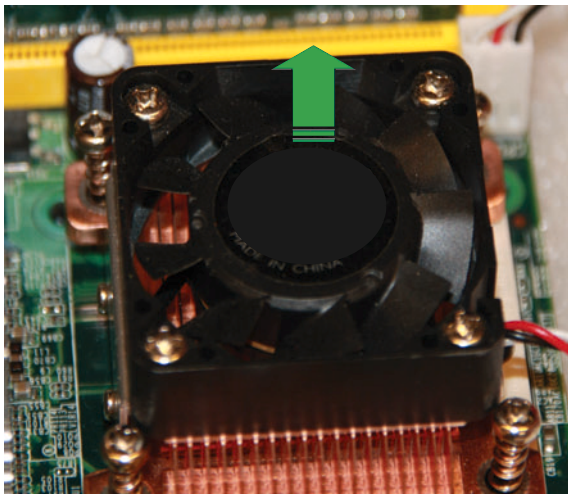
- *Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components, and hardware monitoring errors can occur if you fail to plug this connector.*
- *These are not jumpers! DO NOT place jumper caps on the fan connectors.*

1.12.3 Uninstalling the CPU Heatsink and Fan

1. Disconnect the CPU fan cable from the connector on the motherboard.
2. Rotate each screw counter- clock-wise.



3. Carefully remove the heatsink and fan assembly from the mother-board.

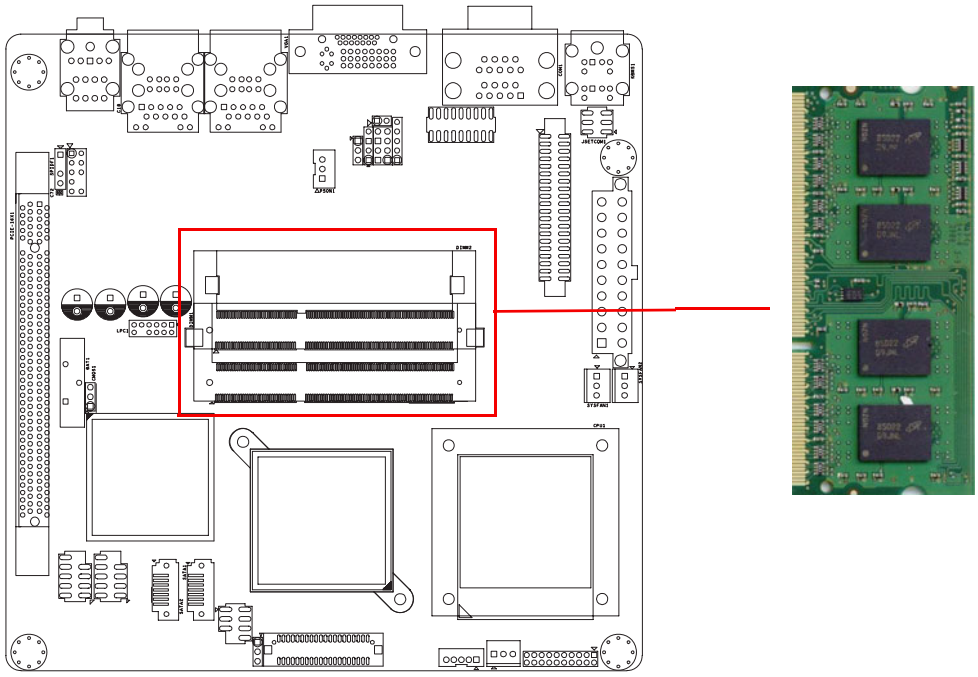


Note! *Refer to the documentation in the boxed or stand-alone CPU fan package for detailed information on CPU fan installation.*

1.13 System Memory

1.13.1 DIMM Sockets Location

The motherboard comes with two 204-pin Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets. The following figure illustrates the location of the sockets:



1.13.2 System Memory

The AIMB-258 has two sockets for 204-pin SODIMMx2.

All these sockets use 1.5 V unbuffered double data rate synchronous DRAMs (DDR SDRAM). They are available in capacities of 256, 512, and 1024 MB. The sockets can be filled in any combination with SODIMMs of any size, giving a total memory size between 256 MB and 2 GB. AIMB-258 does NOT support ECC (error checking and correction).

1.13.2.1 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.

1.13.2.2 Cache Memory

The AIMB-258 supports a CPU with one of the following built-in full speed L2 caches:

2048 MB for Intel Core 2 Duo CPU

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

1.13.3 Memory Support List

Table 1.9: SODIMM DDR3

SODIMM DDR3							
Brand	**Size**	**Speed**	**Type**	**ECC**	**Vendor PN**	**Advantech PN**	**Memory**
Transcend	1GB	DDR3 1066	SODIMM DDR3	N	TS128MSK64V1U	96SD3-1G1066NN-TR	SEC K4B1G0846D-HCF8(128x8)
	2GB	DDR3 1066	SODIMM DDR3	N	TS256MSK64V1U	96SD3-2G1066NN-TR	SEC K4B1G0846D-HCF8(128x8)
Apacer RAM							
Apacer	1GB	DDR3 1066	SODIMM DDR3	N	NA	NA	ELPIDA J1108BABG-DJ-E 084909DE7
	2GB	DDR3 1066	SODIMM DDR3	N	NA	NA	ELPIDA J1108BABG-DJ-E 084909D8T

1.14 Connectors

1.14.1 Rear Panel Connectors

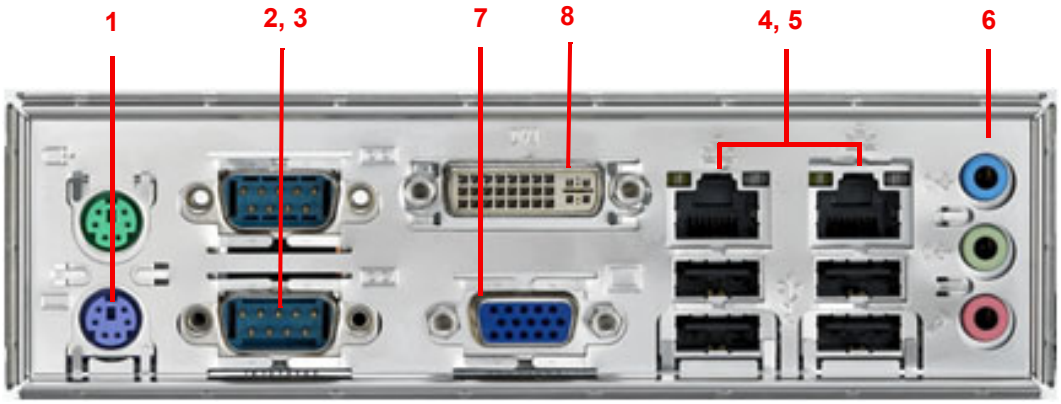


Table 1.10: Rear Panel Connectors

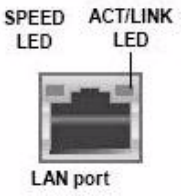
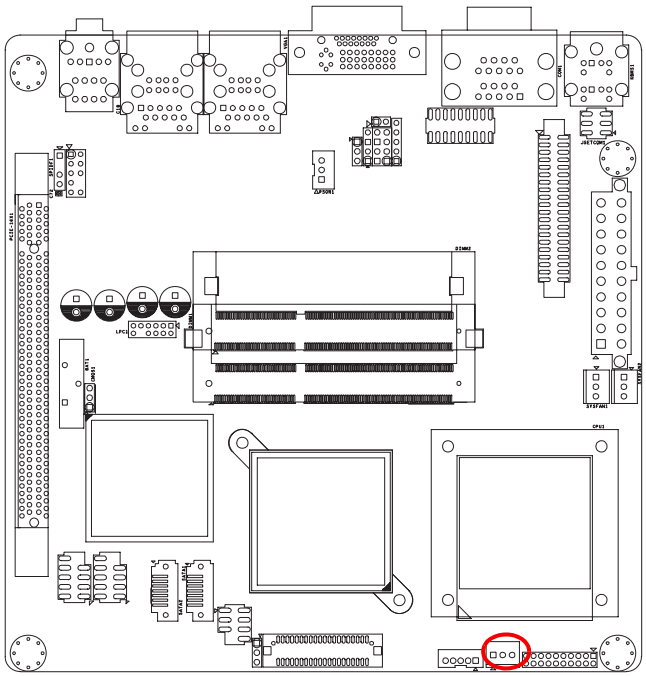
No.	Label	Function	Description
1	KBMS1	PS/2 mouse connector	The standard PS/2 mouse DIN connector is for a PS/2 mouse.
2	COM1(Top)	Serial port connector x 1	D-sub 9-pin, male
3	COM2(Bottom)	Serial port connector x 1	D-sub 9-pin, male
4,5	LAN1_USB12/ LAN2_USB34	LAN (RJ-45) connector 	This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table 1.11 for the LAN port LED indications. The optional 10/100 Mbps LAN controller allows 10/100 Mbps connection to a Local Area Network (LAN) through a network hub.
6	Audio1	3 ports audio connector	Mic-in, Line-in, Line-out
7	VGA	VGA port	Analog graphical output
8	DVI-D	DVI port	Digital graphical output

Table 1.11: LEDs

ACT / LINK LED		**SPEED LED**	
Status	**Description**	**Status**	**Description**
OFF	No link	OFF	10 Mbps connection
Green	Linked	ORANGE	100 Mbps connection
Blinking	Data activity	GREEN	1 Gbps connection

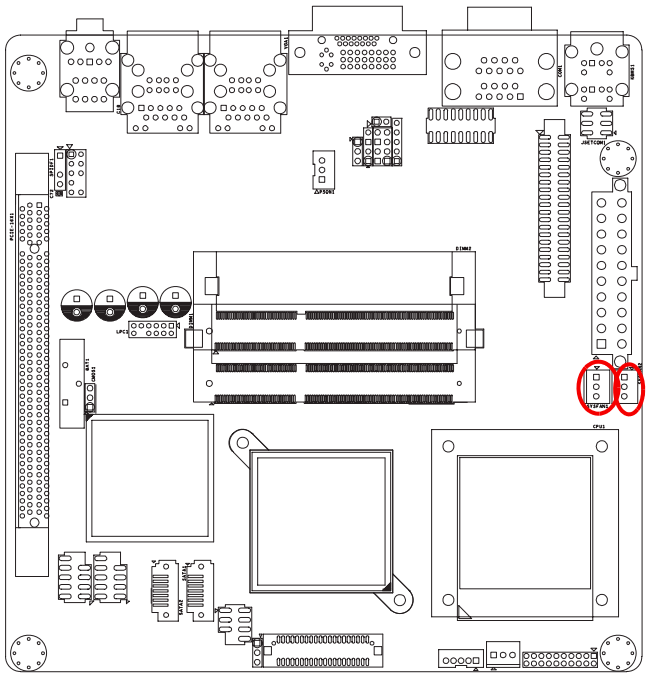
1.14.2 CPU Fan Connector (CPUFAN1)



Caution!

- *Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components, and hardware monitoring errors can occur if you fail to plug this connector.*
- *These are not jumpers! DO NOT place jumper caps on the fan connectors.*

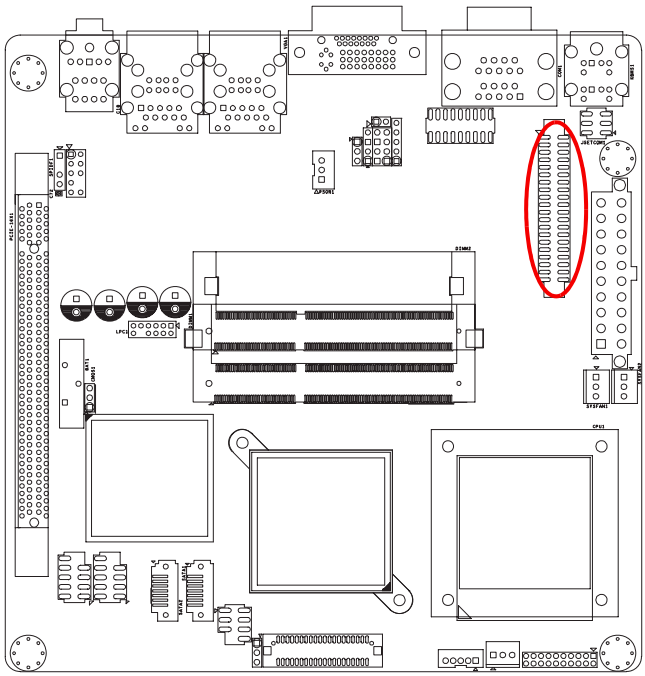
1.14.3 System Fan Connector (SYSFAN1, SYSFAN2)

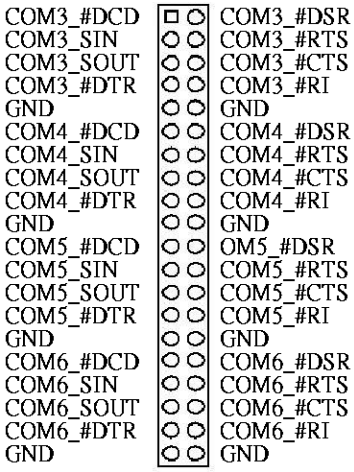


Caution!

- *Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components, and hardware monitoring errors can occur if you fail to plug this connector.*
- *These are not jumpers! DO NOT place jumper caps on the fan connectors.*

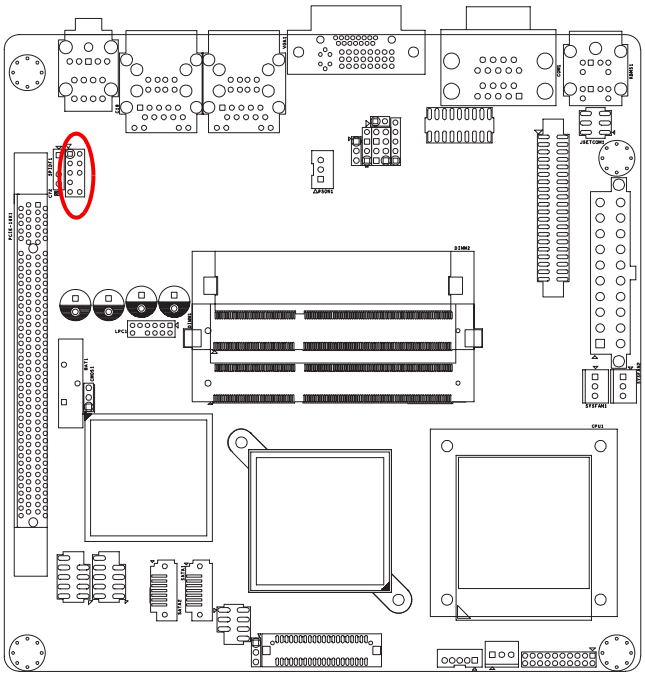
1.14.4 Serial Port Connector 3456 (COM3456)

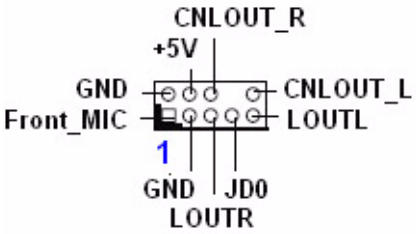




1.14.5 Front Headphone Connector (HD1)

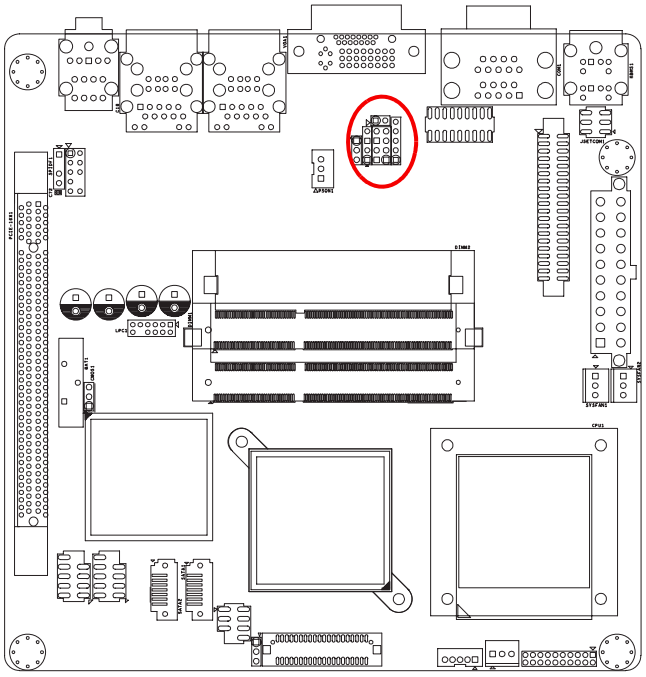
This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio. Connect one end of the front panel audio I/O module cable to this connector.

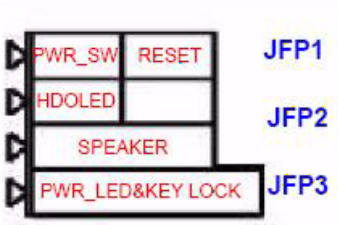




Note! *For motherboards with the optional HD Audio feature, we recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high definition audio capability.*

1.14.6 Front Panel Connector (JFP1/JFP2/JFP3)





There are several external switches to monitor and control the AIMB-258.

1.14.7 ATX soft power switch (JFP1 / PWR_SW)

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_SW). This connection enables you to turn your computer on and off.

1.14.8 Reset (JFP1 / RESET)

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

1.14.9 HDD LED (JFP2 / HDDLED)

You can connect an LED to connector (JFP2/HDDLED) to indicate when the HDD is active.

1.14.10 External speaker (JFP2 / SPEAKER)

(JFP2 / SPEAKER) is a 4-pin connector for an external speaker. If there is no external speaker, the AIMB-258 provides an onboard buzzer as an alternative. To enable the buzzer, set pins 3-4 as closed.

1.14.11 Power LED and keyboard lock connector (JFP3 / PWR_LED&KEY LOCK)

(JFP3 / 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 Power LED cable should be connected to pin 1-3. The key lock button cable should be connected to pin 4-5.

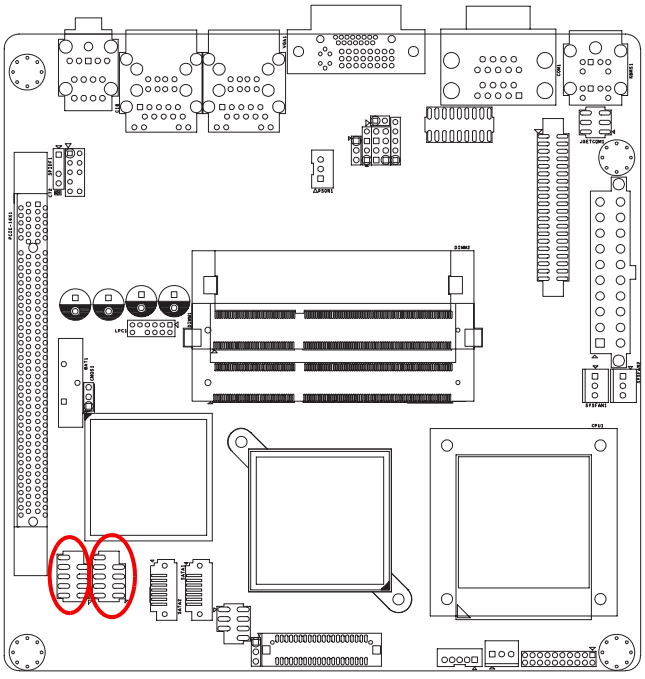
There are 3 modes for the power supply connection. The first is “ATX power mode”, system is on/off by a tentative power button. The second is “AT Power Mode”, system is on/off by the switch of the Power supply. The third is another “AT Power Mode” which is using the front panel power switch. The power LED status is indicated as following table:

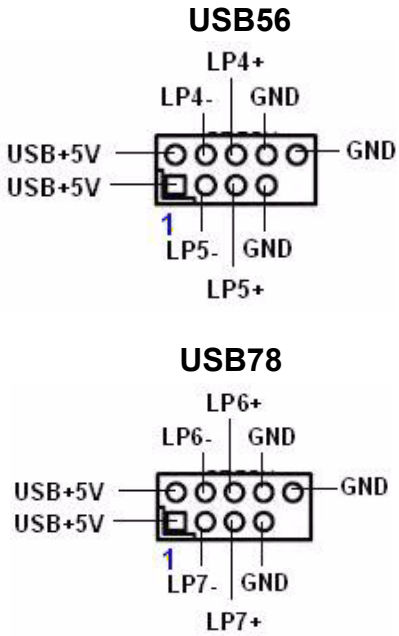
Table 1.12: ATX power supply LED status (No support for AT power)

Power Mode	LED (ATX Power Mode) (On/Off by tentative 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	2-3 pin closed	1-2 pin closed	Connect 1-2 pin cable with switch
System On	On	On	On
System Status	Fast flashes	Fast flashes	Fast flashes
System Off	Slow flashes	Off	Off

1.14.12 USB 2.0 Connector (USB56, USB78)

These connectors are for USB 2.0 ports. Connect the USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



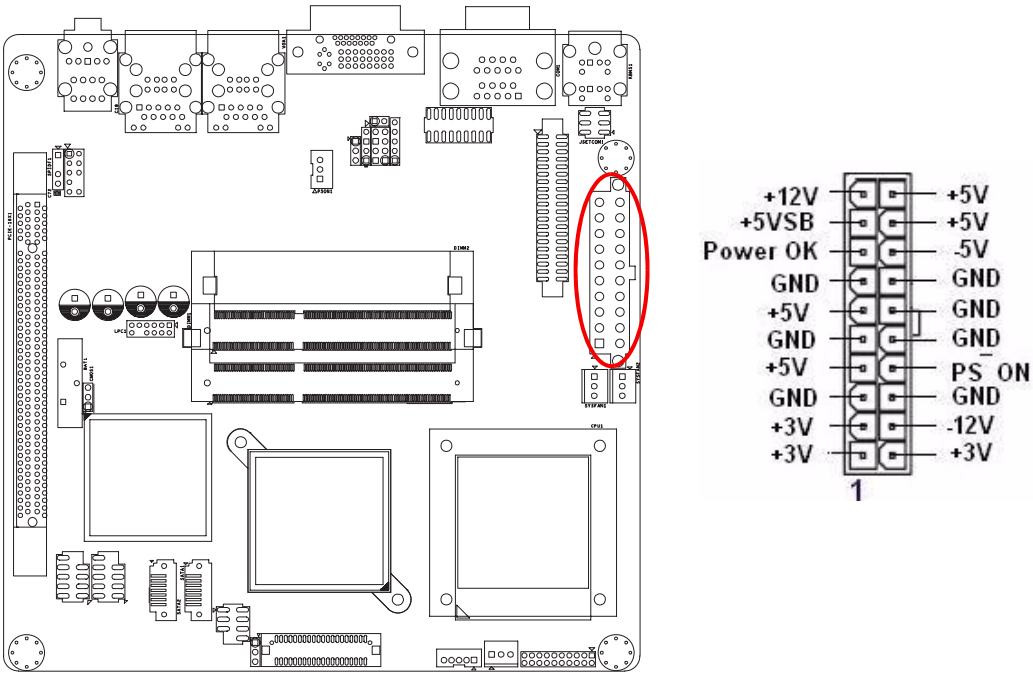


Caution! *Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!*

Note! *The USB module is purchased separately.*

1.14.13 ATX Power Connector (ATX1)

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

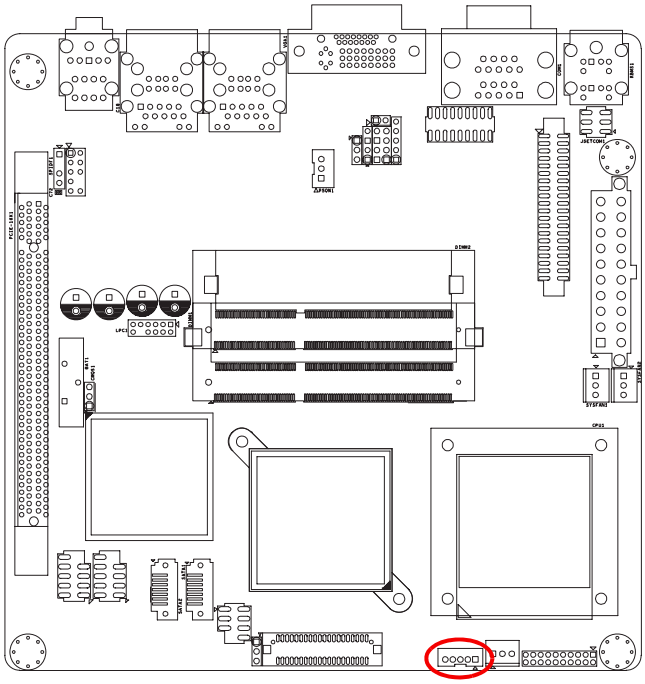


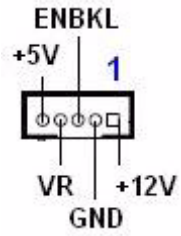
Important notes on the Motherboard Power Requirements

Note!

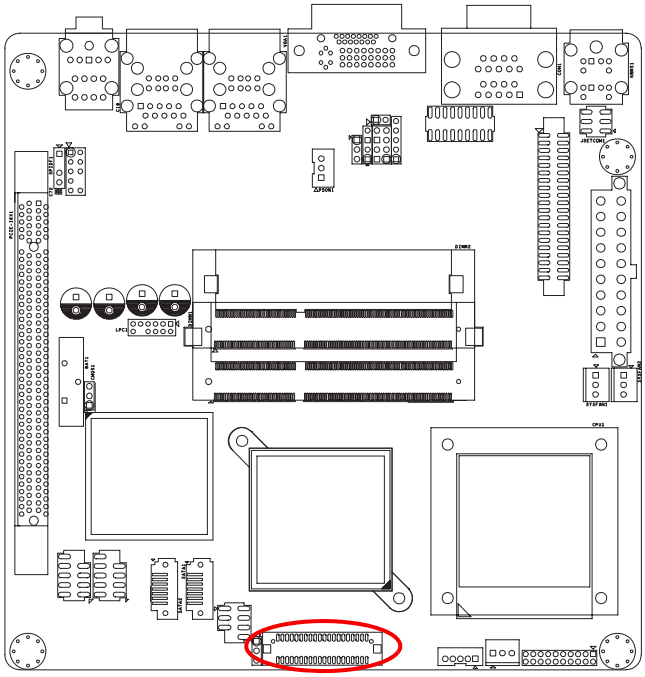
- *Make sure that your ATX 12 V power supply can provide 6 A on the +12 V lead and at least 1A on the +5-volt standby lead (+5 VSB). The minimum recommended wattage is 180 W for a fully configured system. The system can become unstable and might experience difficulty powering up if the power supply is inadequate.*
- *You must install a Power Supply with a higher power rating if you intend to install additional devices.*

1.14.14 LCD Inverter Connector (VP1)



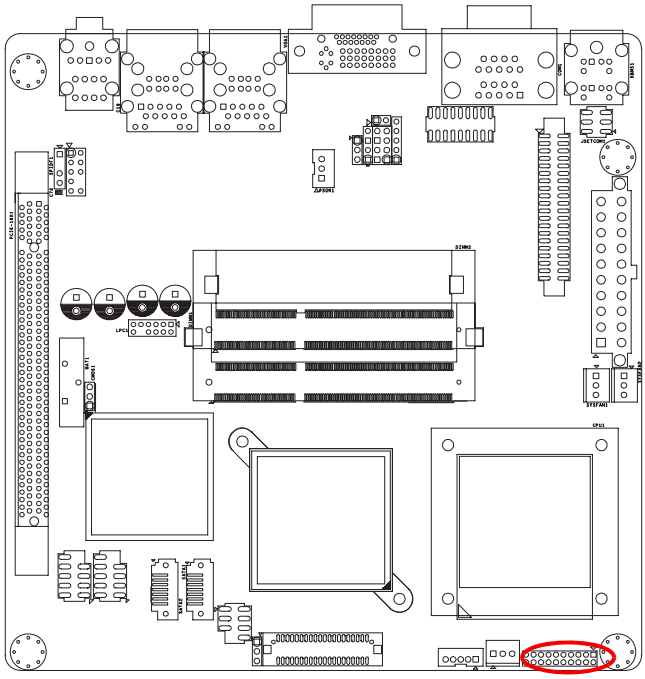


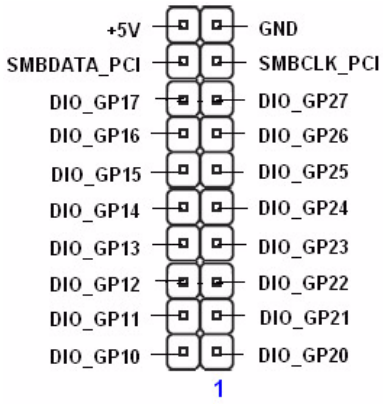
1.14.15 LVDS Connector (LVDS1)



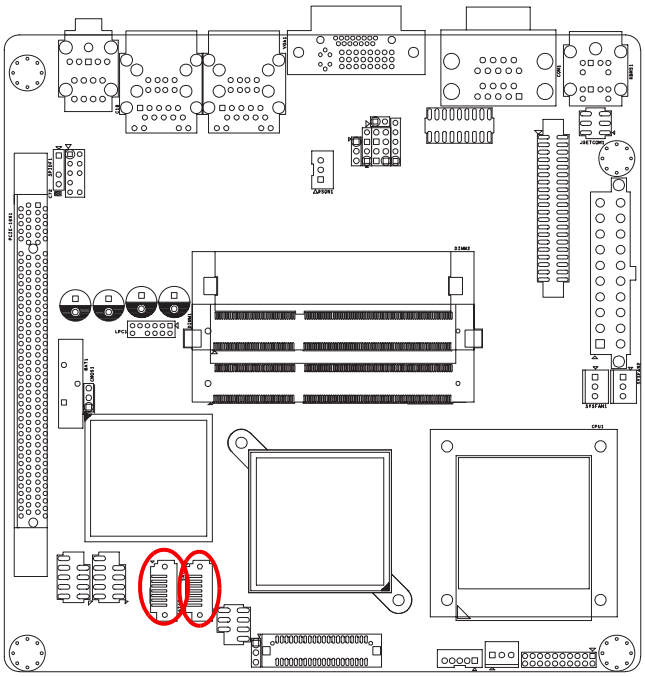
VDDSAFE_1	1	2	VDDSAFE_2
GND_1	3	4	GND_7
VDDSAFE_3	5	6	VDDSAFE_4
OD0-	7	8	ED0-
OD0+	9	10	ED0+
GND_2	11	12	GND_8
OD1-	13	14	ED1-
OD1+	15	16	ED1+
GND_3	17	18	GND_9
OD2-	19	20	ED2-
OD2+	21	22	ED2+
GND_4	23	24	GND_10
OCK-	25	26	ECK-
OCK+	27	28	ECK+
GND_5	29	30	GND_11
DDC_CLK	31	32	DDC_DAT
GND_6	33	34	GND_12
NC	35	36	NC
NC	37	38	NC
HPLG	39	40	VCON

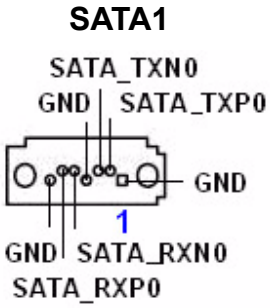
1.14.16 Digital I/O Connector (DIO_CN1)

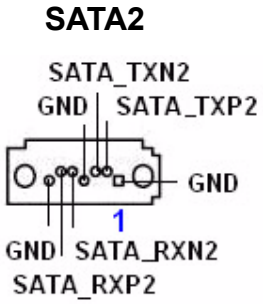




1.14.17 Serial ATA Connector 1 & 2 (SATA1, SATA2)

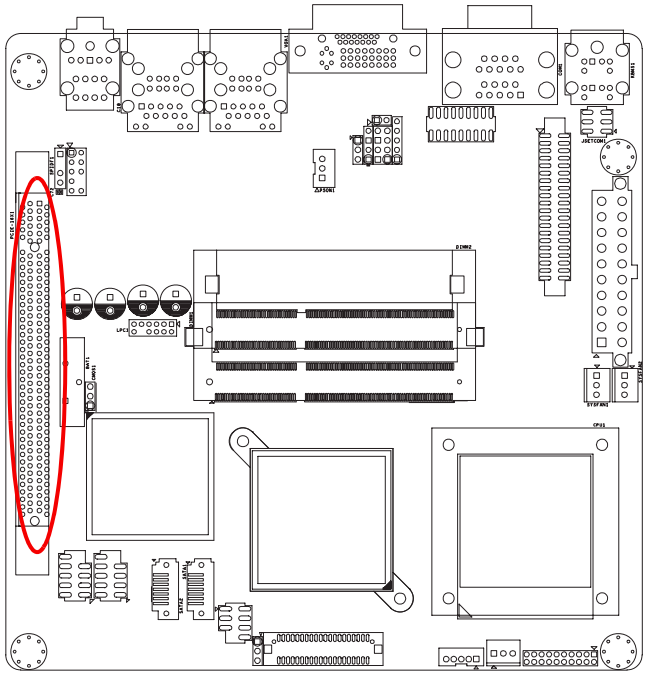


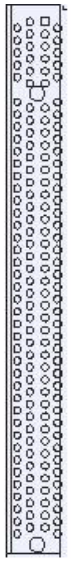




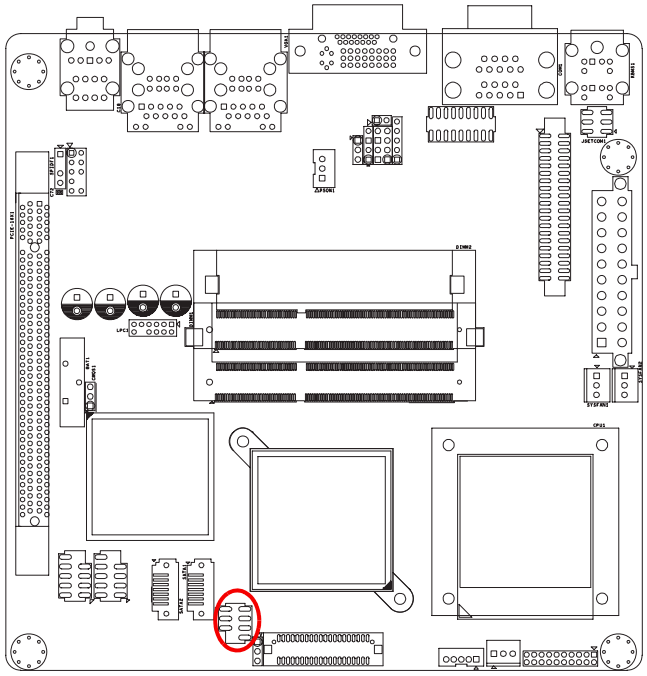
Note! *AIMB-258 features a high performance serial ATA interface (up to 300 MB/s) which eases cabling to hard drives with thin and long cables.*

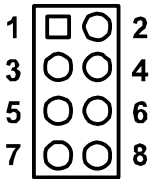
1.14.18 PCIe x 16 Slot (PCIE X 16)





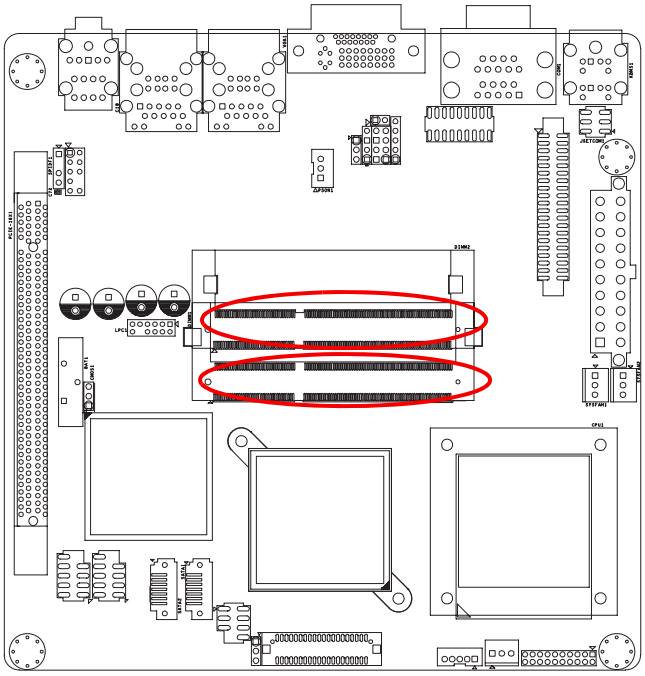
1.14.19 SPI Flash Connector(SPI_CN1)



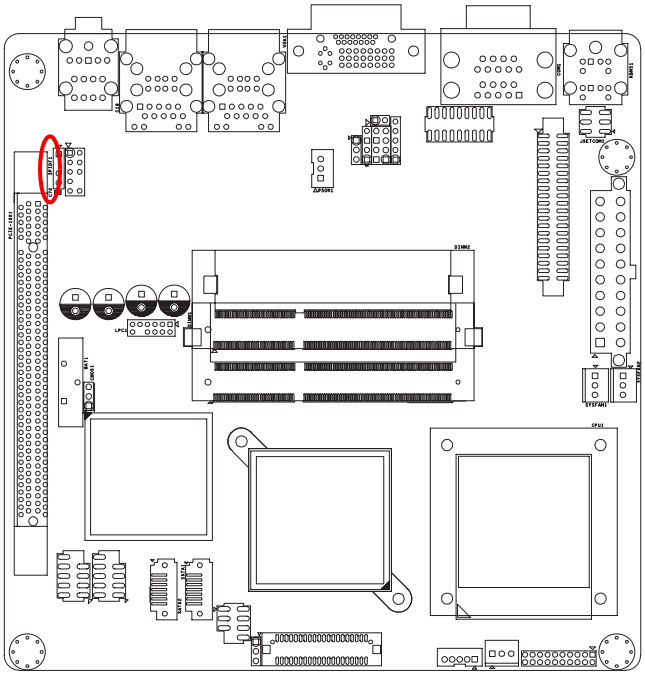


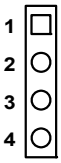
Note! *This connector is for factory use only.*

1.14.20 Memory Connector Channel A/B(DIMM1/2)

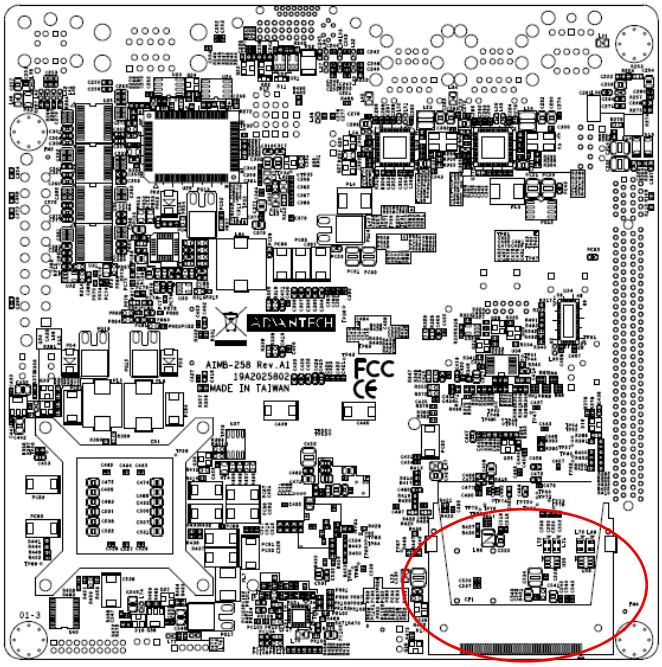


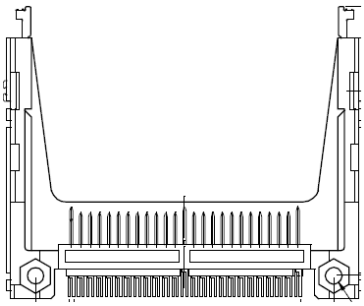
1.14.21 SPDIF1 out connector(SPDIF1)





1.14.22 CF connector





Chapter 2

BIOS Operation

2.1 BIOS Introduction

Advantech provides full-featured AwardBIOSes, which deliver the superior performance, compatibility, and functionality that today's manufacturers of industrial PCs and embedded boards demand. The many options and extensions let you customize your products to a wide range of designs and target markets.

The modular, adaptable AwardBIOS 6.0 supports the broadest range of third-party peripherals and all popular chipsets, plus Intel®, AMD, nVidia, VIA, and compatible CPUs from 386 through Pentium and AMD Geode, K7 and K8 (including multiple processor platforms), and VIA Eden C3 and C7 CPU.

You can use Advantech's utilities to select and install features to suit your exclusive designs.

2.2 BIOS Setup

The AIMB-258 Series system has built-in AwardBIOS with a CMOS SETUP utility which allows user to configure required settings or to activate certain system features.

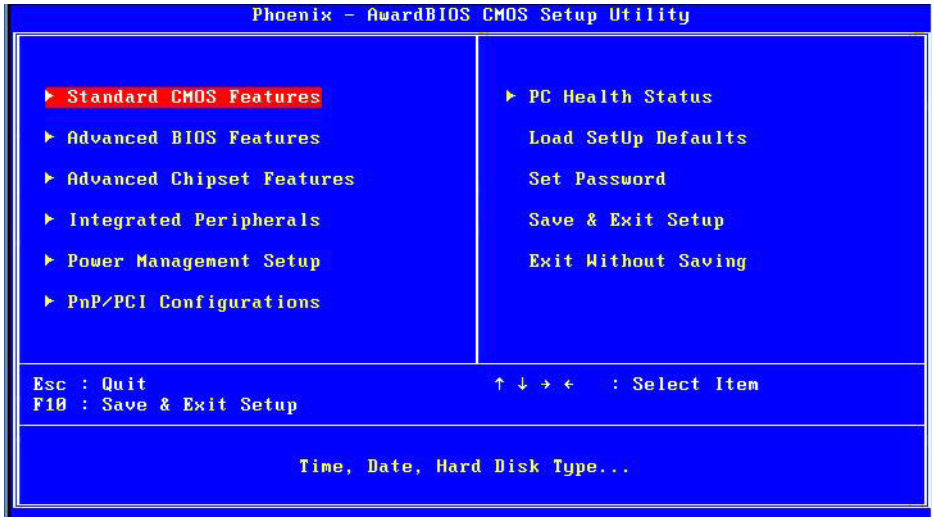
The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to the CMOS RAM.

When the power is turned on, pressing the <Del> 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 Optimized Default
<F10>	Save all CMOS changes

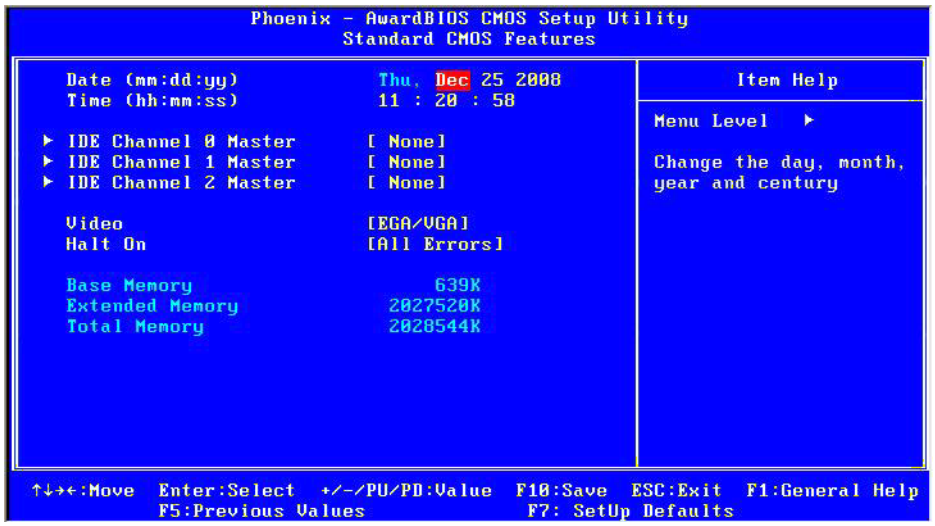
2.2.1 Main Menu

Press <Del> to enter AwardBIOS 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.



- **Standard CMOS Features**
  This setup page includes all the items in standard compatible BIOS.
- **Advanced BIOS Features**
  This setup page includes all the items of Award BIOS enhanced features.
- **Advanced Chipset Features**
  This setup page includes all the items of Chipset configuration features.
- **Integrated Peripherals**
  This setup page includes all onboard peripheral devices.
- **Power Management Setup**
  This setup page includes all the items of Power Management features.
- **PnP/PCI Configurations**
  This setup page includes PnP OS and PCI device configuration.
- **PC Health Status**
  This setup page includes the system auto detect CPU, and reports system temperature, CPU temperature, fan speeds, and system voltages.
- **Load Setup Defaults**
  This setup page includes Load system optimized value, and the system would be in best performance configuration.
- **Set Password**
  Establish, change or disable password.
- **Save & Exit Setup**
  Save CMOS value settings to CMOS and exit BIOS setup.
- **Exit Without Saving**
  Abandon all CMOS value changes and exit BIOS setup.

2.2.2 Standard CMOS Features



- **Date**

  The date format is <weekday>, <month>, <day>, <year>.

Weekday	From Sun to Sat, determined and display by BIOS only
Month	From Jan. to Dec.
Day	From 1 to 31
Year	From 1999 through 2098

- **Time**

  The times format in <hour> <minute> <second>, based on the 24-hour time

- **IDE Channel 0/1/2, Master**

  IDE HDD Auto-Detection Press "Enter" for automatic device detection.

- **Video**

  Select EGA or VGA display.

- **Halt on**

  The item determines whether the computer will stop if an error is detected during power up.

No Errors	The system boot will not stop for any error
All Errors	Whenever the BIOS detects a non-fatal error the system will be stopped.
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors. (Default value)
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for al other errors.

- **Base Memory**

  The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system.

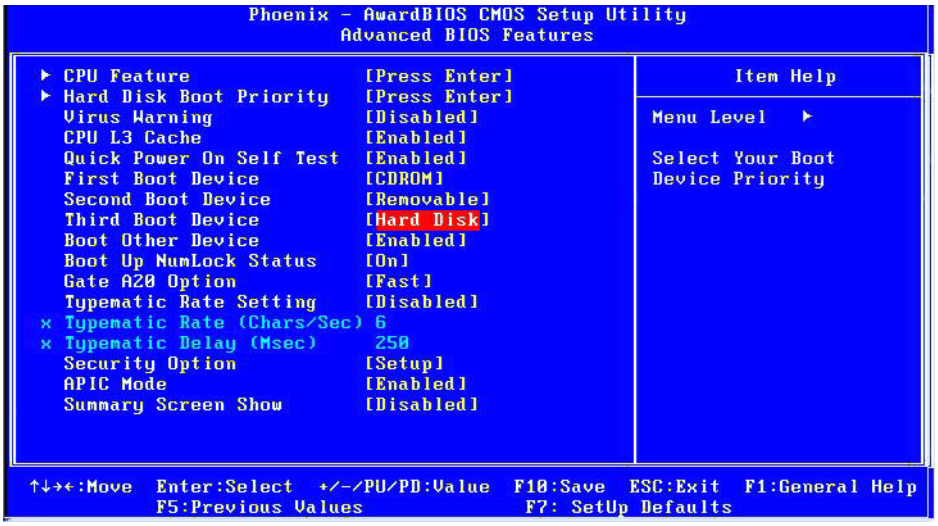
- **Extended Memory**

  The POST of the BIOS will determine the amount of extended memory (above 1MB in CPU's memory address map) installed in the system.

- **Total Memory**

  This item displays the total system memory size.

2.2.3 Advanced BIOS Features



- **CPU Feature**

  This item allows user to adjust CPU features, CPU ratio, VID and thermal and special feature like XD flag.

- **Hard Disk Boot Priority**

  This item allows user to select boot sequence for system device HDD, SCSI, RAID.

- **Virus Warning [Disabled]**

  Enables or disables the virus warning.

- **CPU L3 Cache**

  This item allows users to enable CPU L3 cache.

- **Quick Power On Self Test [Enabled]**

  This field speeds up the Power-On Self Test (POST) routine by skipping retesting a second, third and forth time. Setup setting default is enabled.

- **First / Second / Third / Other Boot Drive**

BIOS attempts to load the operating system from the boot devices in the order assigned.

Hard Disk	Assign this boot device priority to Hard Disk.
CDROM	Assign this boot device priority to CDROM.
USB-FDD	Assign this boot device priority to USB-FDD.
USB-ZIP	Assign this boot device priority to USB-ZIP.
USB-CDROM	Assign this boot device priority to USB-CDROM.
LAN	Assign this boot device priority to LAN.
Disabled	Do not attempt to boot from this device.

- **Boot Other Device**

  Use this to boot another device. The options are "Enabled" and "Disabled".

- **Boot Up NumLock Status [Enabled]**

  This item enables users to activate the Number Lock function upon system boot

- **Gate A20 Option [Fast]**

  This item enables users to switch A20 control by port 92 or not.

- **Typematic Rate Setting**

  This item enables users to set the two typematic controls items.

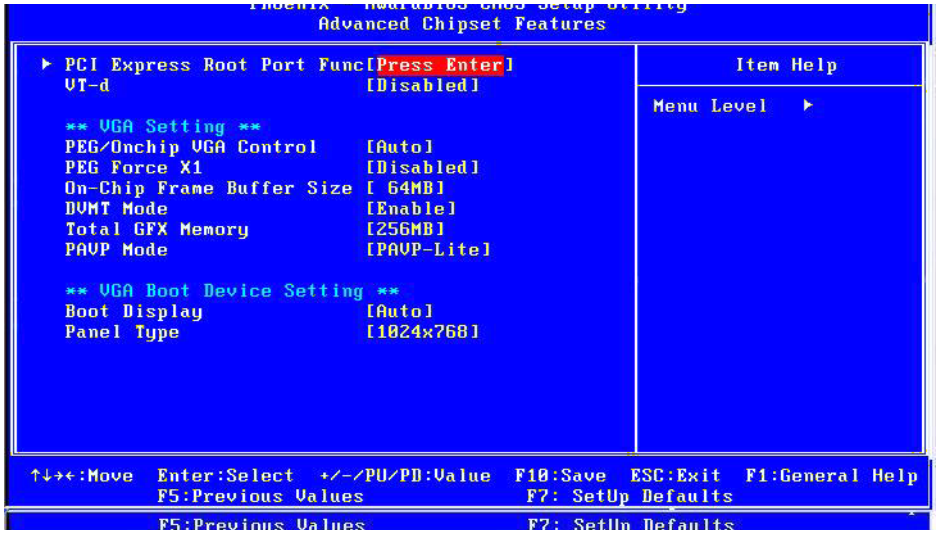
– Typematic Rate (Chars/Sec)
  This item controls the speed at which the system registers repeated key-strokes. The eight settings are 6, 8, 10, 12, 15, 20, 24 and 30.
– Typematic Delay (Msec)
  This item sets the keypress delay before typematic repetition kicks in. The four delay options are 250, 500, 750 and 1000.

- **Security Option [Setup]**

System	System requires password both for bootup and for access to the Setup page.
Setup	Setup requires password only for access to the Setup page, not for bootup. (Default value)

- **APIC Mode [Enabled]**
  This item allows user to enabled of disabled “Advanced Programmable Interrupt Controller”. APIC is implemented in the motherboard and must be supported by the operating system, and it extends the number of IRQ's available.
- **Show summary screen**
  This item is allowed you to decide if to show the system configuration table.

2.2.4 Advanced Chipset Features

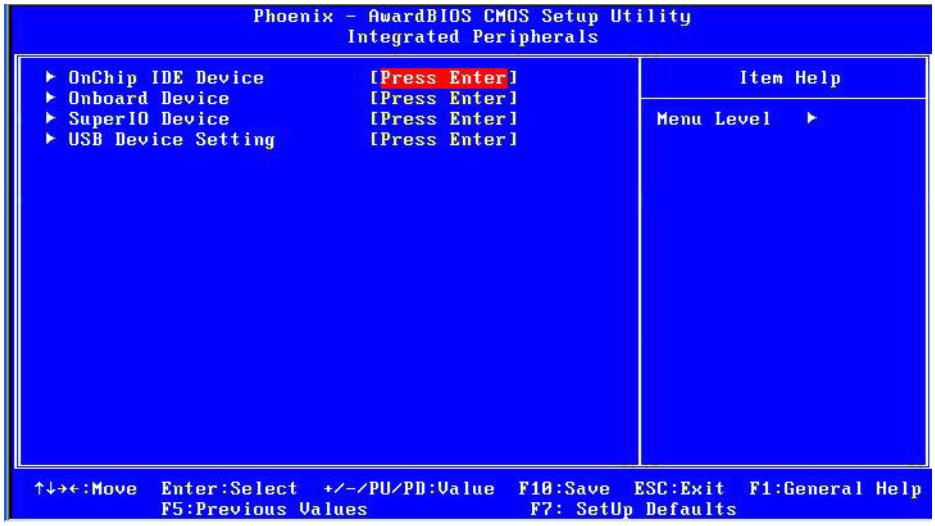


Note! *This “Advanced Chipset Features” screen controls the configuration of the board’s chipset for fine-tuning system performance. Screen options depend on the specific chipset. It is strongly recommended that only technical users make changes to the default settings.*

- **PCI Express Root port Func [Press Enter]**
  This item allows the user to adjust PCIE port on, off or auto.
- **VT-d (Intel(R) Virtualization Tech)**
  Virtualization enhanced by Intel Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple “virtual” systems.
- **PEG / Onchip VGA Control**
  Use this field to select PEG or Onchip VGA. The default is AUTO.

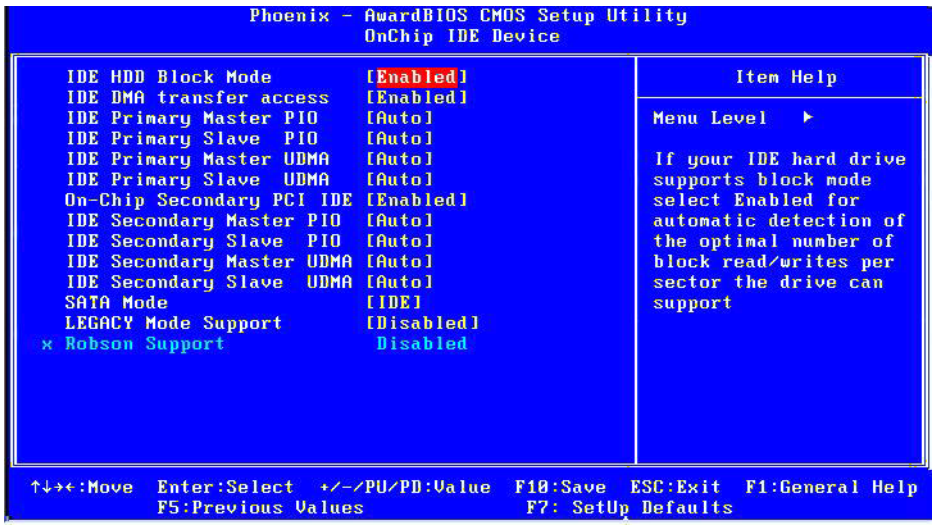
- **PEG Force x1**
  Enabled or Disabled.
- **On-Chip Frame Buffer Size**
  The On-Chip Frame Buffer Size can be set to 1 MB or 8 MB. This memory is shared with the system memory.
- **DVMT Mode**
  Intel's Dynamic Video Memory Technology (DVMT) allows the system to dynamically allocate memory resources according to the demands of the system at any point in time. The key idea in DVMT is to improve the efficiency of the memory allocated to either system or graphics processor.
- **Total GFX Memory**
  When "Enable" DVMT Mode, the graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.
- **PAVP Mode**
  This setting enables/disables the Protected Audio/Video Path (PAVP) mode.
- **Boot Display**
  Use the field to select the type of device you want to use as the display(s) of the system.
- **Panel type**
  Select panel resolution.

2.2.5 Integrated Peripherals



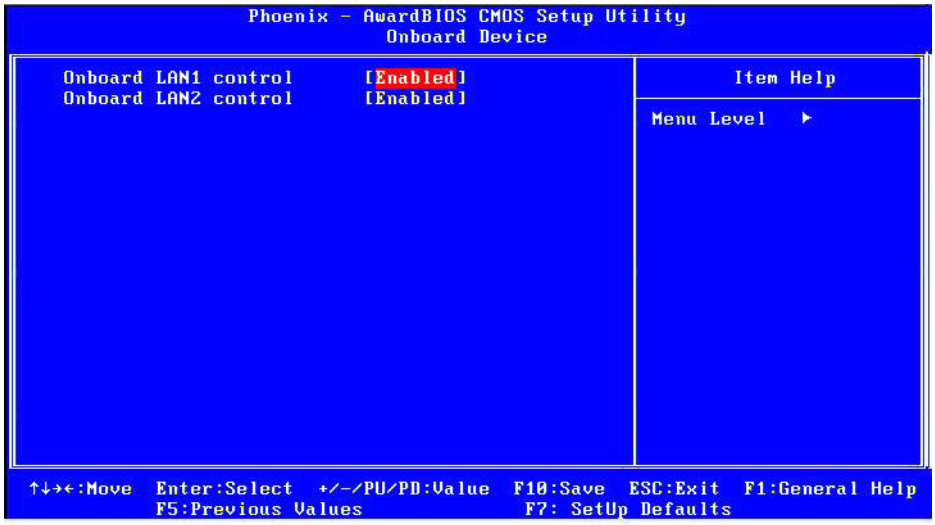
Note! *This "Integrated Peripherals" option controls the configuration of the board's chipset, includes IDE, ATA, SATA, USB, AC97, MC97 and Super IO and Sensor devices; this page this page depends on the particular chipset installed.*

- **OnChip IDE Device**
  This item enables users to set the OnChip IDE device status, includes enable IDE devices and setting PIO and DMA access mode, and some of new chipset also support for SATA device (Serial-ATA)



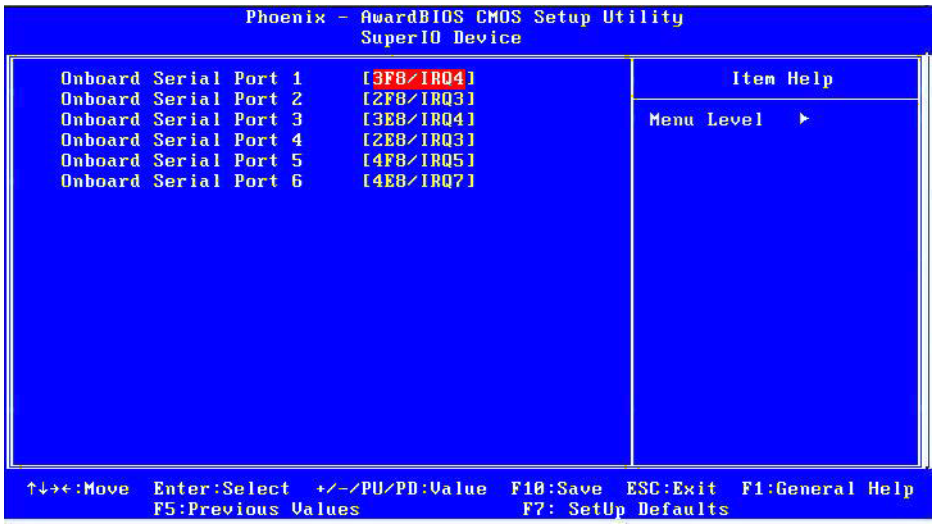
- **Onboard Device**

  This item enables users to set the Onboard device status; it includes enable LAN1 and LAN2 devices.



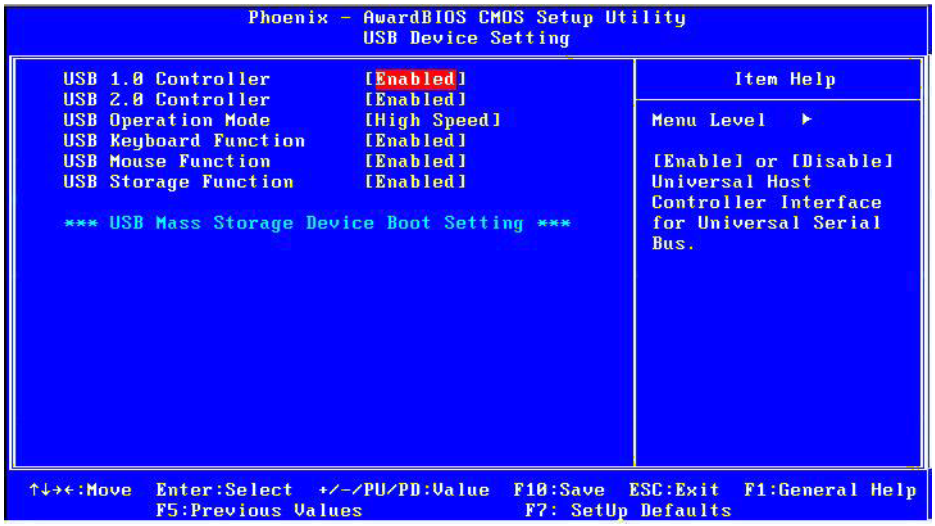
- **Super IO Device**

  This item enables users to set the Super IO device status; it includes enabling COM1~COM6.



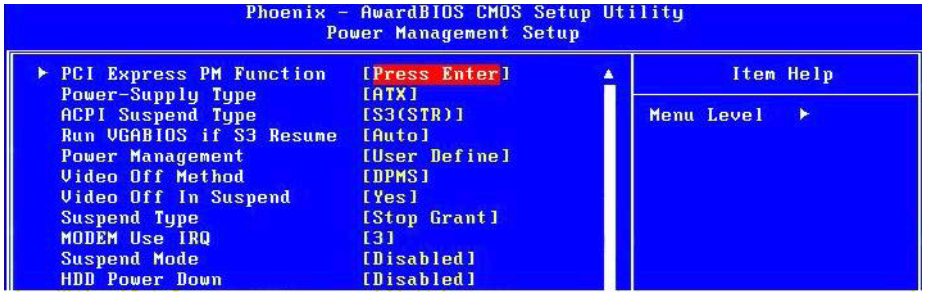
- **Onboard Serial port 1 [3F8 / IRQ4]**
  This item allows user to adjust serial port 1 address and IRQ.
- **Onboard Serial port 2 [2F8 / IRQ3]**
  This item allows user to adjust serial port 2 address and IRQ.
- **Onboard Serial port 3 [3E8 / IRQ4]**
  This item allows user to adjust serial port 3 address and IRQ.
- **Onboard Serial port 4 [2E8 / IRQ3]**
  This item allows user to adjust serial port 4 address and IRQ.
- **Onboard Serial port 5 [4F8 / IRQ5]**
  This item allows user to adjust serial port 5 address and IRQ.
- **Onboard Serial port 6 [4E8 / IRQ7]**
  This item allows user to adjust serial port 6 address and IRQ.

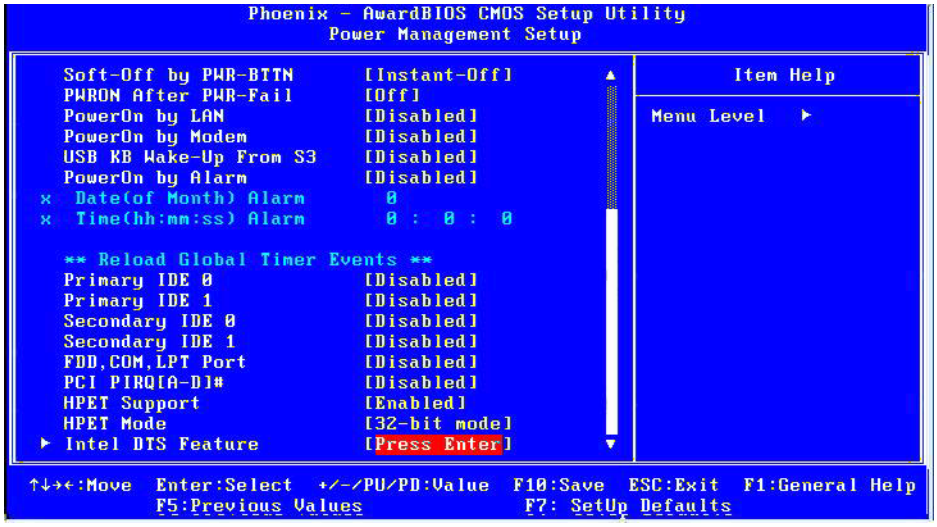
2.2.6 USE Device Setting



- **USB 1.0 Controller**
  Select “Enabled” if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals. The choices are "Enabled" and "Disabled".
- **USB 2.0 Controller**
  This entry is used to disable/enable the USB 2.0 controller only. The BIOS itself may or may not have high-speed USB support. If the BIOS has high speed USB support built in, the support will automatically turn on when a high speed device is attached. The choices are "Enabled" or "Disabled".
- **USB Operation Mode**
  Set the USB 2.0 controller to Hi Speed (480 Mbps) or Full Speed (12 Mbps).
- **USB Keyboard / Mouse Function**
  Select Enabled. if you plan to use a USB keyboard/Mouse. The choices are "Enabled" and "Disabled".
- **USB Storage Function**
  Select "Enabled" if you plan to use an external USB storage device to boot the system under DOS mode. The choices are "Enabled" and "Disabled".

2.2.7 Power Management Setup





Note! *Use this "Power Management Setup" screen to configure the system for most effective power management while still operating in a manner consistent with intended computer use.*

- **PCI Express PM Function**

  This allows you to enable or disable system wake up via PCI Express PME (Power Management Event).

- **Power-Supply Type [ATX]**

  This item allows user to set power-supply type, ATX or AT mode.

- **ACPI Function [Enabled]**

  This item defines the ACPI (Advanced Configuration and Power Management) feature that makes hardware status information available to the operating system, and communicate PC and system devices for improving the power management.

- **ACPI Suspend Type [S3 (STR)]**

  This item allows user to select sleep state when suspend.

S1(POS)	The suspend mode is equivalent to a software power down;
S3(STR)	The system shuts down with the exception of a refresh current to the system memory.

- **Run VGA BIOS if S3 Resume [Auto]**

  This item allows system to reinitialize VGA BIOS after system resume from ACPI S3 mode.

- **Power Management [User Defined]**

  This item allows user to select system power saving mode.

Min Saving	Minimum power management. Suspend Mode=1 hr.
Max Saving	Maximum power management. Suspend Mode=1 min.
User Define	Allows user to set each mode individually. Suspend Mode= Disabled or 1 min ~1 hr.

- **Video Off Method [DPMS]**

  This item allows user to determine the manner is which the monitor is blanked.

V/H SYNC+Blank	This option will cause system to turn off vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

- **Video Off In Suspend [Yes]**

  This item allows user to turn off Video when the system enters suspend mode.

- **Suspend Type [Stop Grant]**

  This item allows user to determine the suspend type.

- **Modem use IRQ [3]**

  This item allows user to determine the IRQ which the MODEM can use.

- **Suspend Mode [Disabled]**

  Shows the time of system inactivity before all devices except the CPU will be shut off.

- **HDD Power Down Mode [Disabled]**

  This item allows user to determine the time of system inactivity, the hard disk drive will be powered down.

- **Soft-Off by PWR-BTTN [Instant-Off]**

  This item allows user to define function of power button.

Instant-Off	Press power button then Power off instantly.
Delay 4 Sec	Press power button 4 sec. to Power off.

- **PWRON After PWR-Fail [ON/Off/Former-Sts]**

  Use this to set up the system after power failure. The “Off” setting keeps the system powered off after power failure, the “On” setting boots up the system after failure, and the “Former-Sts” returns the system to the status before power failure.

- **PowerOn by LAN [Enabled]**

  This item allows users to power on the system via LAN. The choices are “Enabled” and “Disabled”.

- **PowerOn by Modem [Enabled]**

  This item allows users to power on the system by Modem. The choices are “Enabled” and “Disabled”.

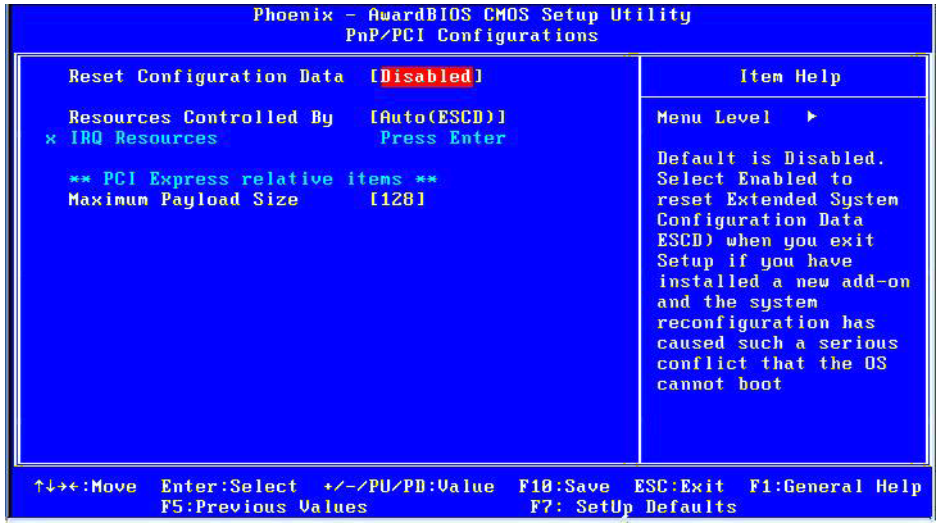
- **USB KB Wake_Up From S3 [Disabled]**

  This item allows user to set USB keyboard wake up system from S3 Enable or Disable.

- **PowerOn by Alarm [Disabled]**

  The choices are “Enabled” and “Disabled”. If enabled, the fields that follow indicate dates and times of alarm settings.

2.2.8 PnP/PCI Configurations



- **Reset Configuration Data [Disabled]**

  The default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) if you have installed a new add-on card, and system configuration is in such a state that the OS cannot boot, enable this.

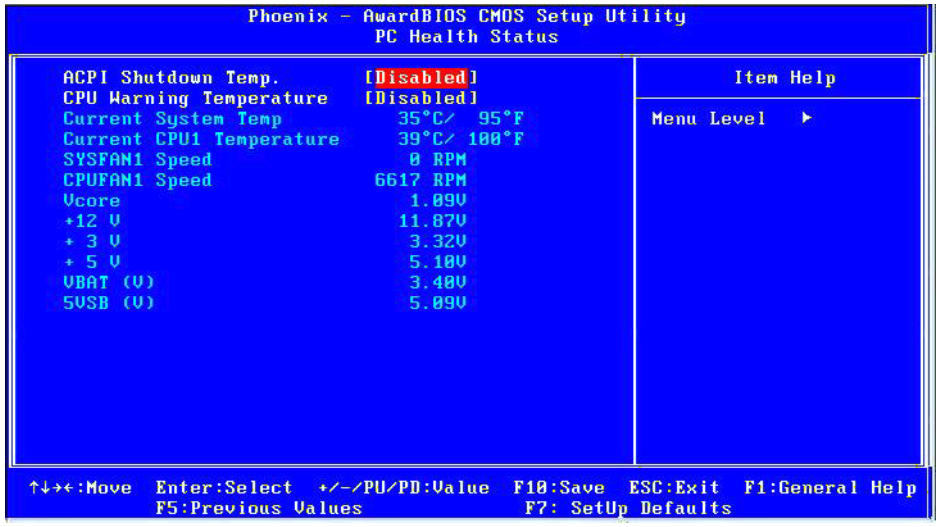
- **Resources Controlled By [Auto(ESCD)]**

  The commands here are “Auto(ESCD)” or “Manual”. Choosing “Manual” requires you to choose resources from the following sub-menu. ”Auto(ESCD)” automatically configures all of the boot and Plug and Play devices, but you must be using Windows 95 or above.

- **Maximum Payload Size [128]**

  This allows you to set the maximum TLP payload size for PCI Express devices.

2.2.9 PC Health Status

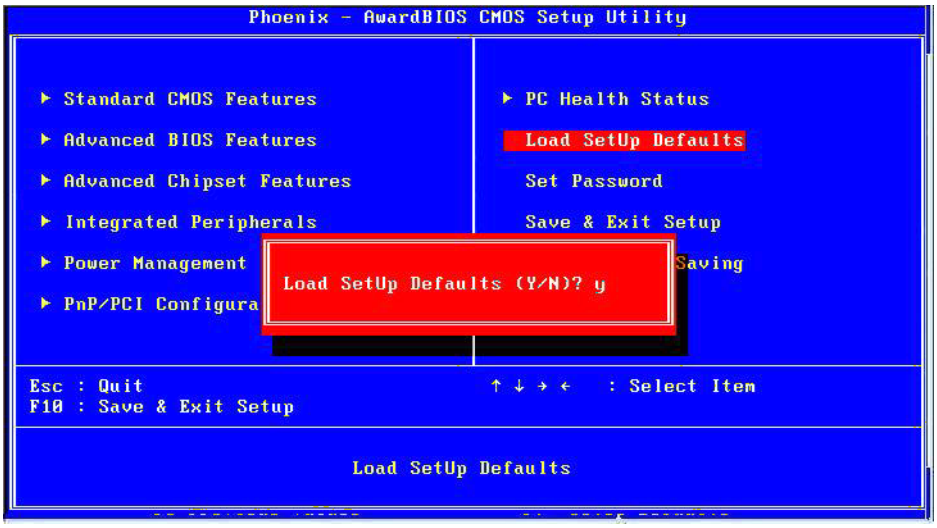


- **ACPI Shutdown Temperature [Disabled]**

  The system will shut down automatically if the CPU temperature goes over the selected setting.

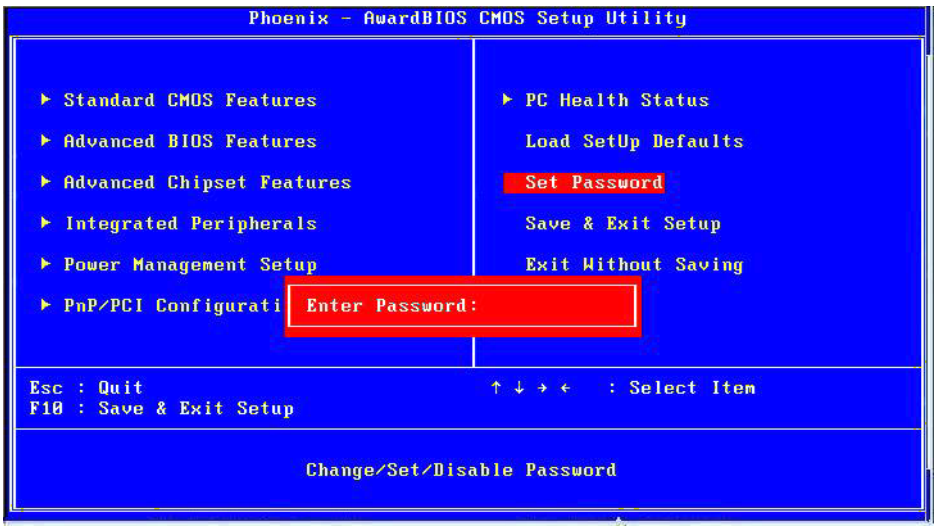
- **CPU Warning Temperature**
  The system will give an automatic warning if the CPU temperature goes over the selected setting.
- **Current System Temperature**
  This shows you the current temperature of system.
- **Current CPU Temperature**
  This shows the current CPU temperature.
- **VCORE and Other Voltages**
  This shows the voltage of VCORE, +12 V, +3 V, +5 V, VBAT (V), and 5 VSB (V).

2.2.10 Load Setup Defaults



Note! *Load Setup Defaults loads the default system values directly from ROM. If the stored record created by the Setup program should ever become corrupted (and therefore unusable), these defaults will load automatically when you turn the AIMB-258 Series system on.*

2.2.11 Set Password



Note! *To enable this feature, you should first go to the Advanced BIOS Features menu, choose the Security Option, and select either Setup or System, depending on which aspect you want password protected. Setup requires a password only to enter Setup. System requires the password either to enter Setup or to boot the system. A password may be at most 8 characters long.*

To Establish Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the desired password and press <Enter>.
3. At the “Confirm Password” prompt, retype the desired password, then press <Enter>.
4. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

To Change Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, enter the new password and press <Enter>.
5. At the “Confirm Password” prompt, retype the new password, and press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

To Disable Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, please don’t enter anything; just press <Enter>.
5. At the “Confirm Password” prompt, again, don’t type in anything; just press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

Chapter 3

Chipset Software Install Utility

3.1 Before you Begin

To facilitate the installation of the enhanced display device drivers and utility software, you should read the instructions in this chapter carefully before you begin. The device drivers for the AIMB-258 board are located on the software installation CD. The auto-run function of the driver CD will guide you to the utilities and device drivers required for a Windows system. The Intel® Chipset Software Installation Utility is not required on any systems running Windows NT 4.0. 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's manual before performing the installation.

3.2 Introduction

The Intel® Chipset Software Installation utility installs to the target system 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 and ISA PnP services
- IDE Ultra ATA 100/66/33 and Serial ATA interface support
- USB 1.1/2.0 support
- 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

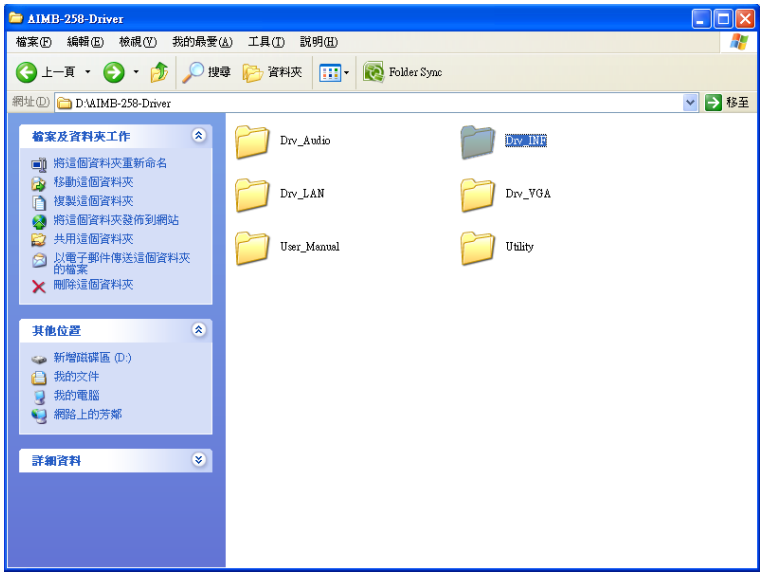
Note! *This utility is used for the following versions of Windows system, and it has to be installed before installing all the other drivers:*

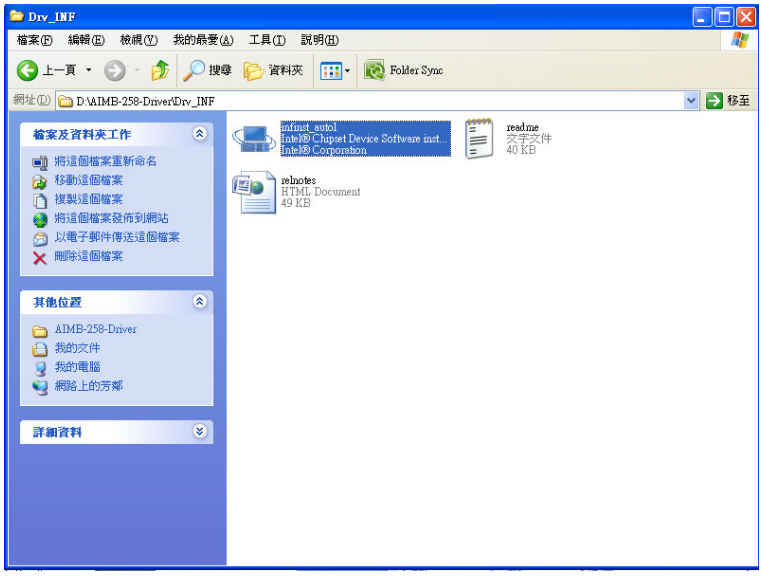
Windows XP

Windows Vista

3.3 Windows Vista/XP Driver Setup

Insert the driver CD into your system's CD-ROM drive. You can see the driver folders items. Move the mouse cursor over the folder "Drv_INF". In Drv_INF folder, you can click "infinst_autol.exe" to complete the implement of the driver.





Chapter 4

VGA Setup

4.1 Introduction

The Intel GM45 integrated graphics controller provides an analog display port. You need to install the VGA driver to enable the function.

Intel Graphics Media Accelerator 4500MHD: Incorporating the latest Microsoft* DirectX*10 support capabilities and Shader Model 4.0 features., 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. @ 75 Hz refresh rate) and Intel GMA 4500MHD provides Intel® Clear Video Technology, and graphics core speeds up to 533 MHz improve graphics and 3D rendering performance, and enable high-definition video playback.

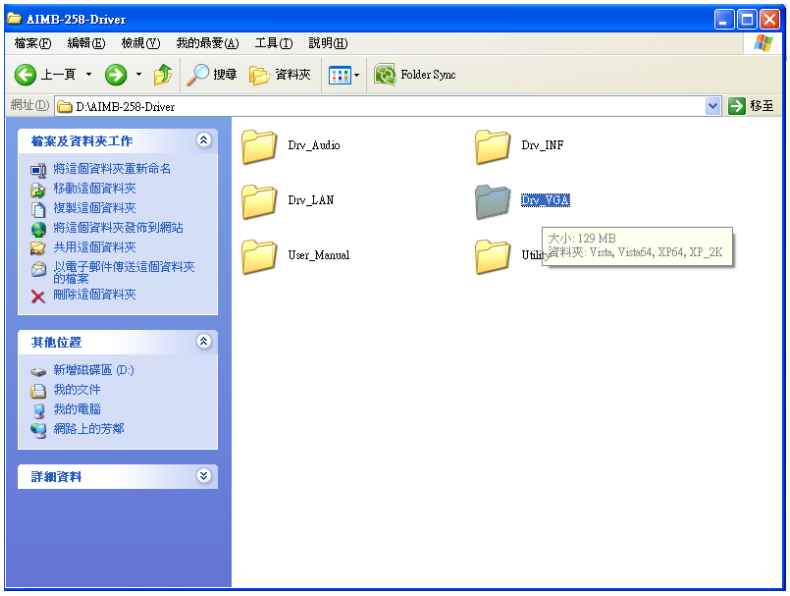
4.2 Windows Vista/XP Driver Setup

Note! *Before installing this driver, make sure the CSI utility has been installed in your system. See Chapter 3 for information on installing the CSI utility.*

Insert the driver CD into your system's CD-ROM drive. In a few seconds, the software installation main menu appears, as shown in the following figure.

The following installation procedure is for Windows XP. For other operating systems, please do a manual installation.

Move the mouse cursor over the folder "Drv_VGA". In Drv_VGA folder, you can click Installshield Wizard under folders named Vista, Vista64, XP64, or XP to automatically complete driver installation.



Chapter 5

LAN Configuration

5.1 Introduction

The AIMB-258 features single/dual Gigabit Ethernet network interface. With the Realtek RTL8111C GbE controller designed-in, AIMB-258 implements the PCI Express host interface (PCI-E X1) in LAN connection with the maximum throughput of 2Gbps for heavy-duty industrial network application.

5.2 Features

Integrated 10/100/100 BASE-T transceiver

1. 10/100/1000 BASE-T triple-speed MAC
2. High-speed RISC core with 24-KB cache
3. On-chip voltage regulation
4. Supporting Wake-on-LAN (WOL) function
5. PCI Express X1 host interface

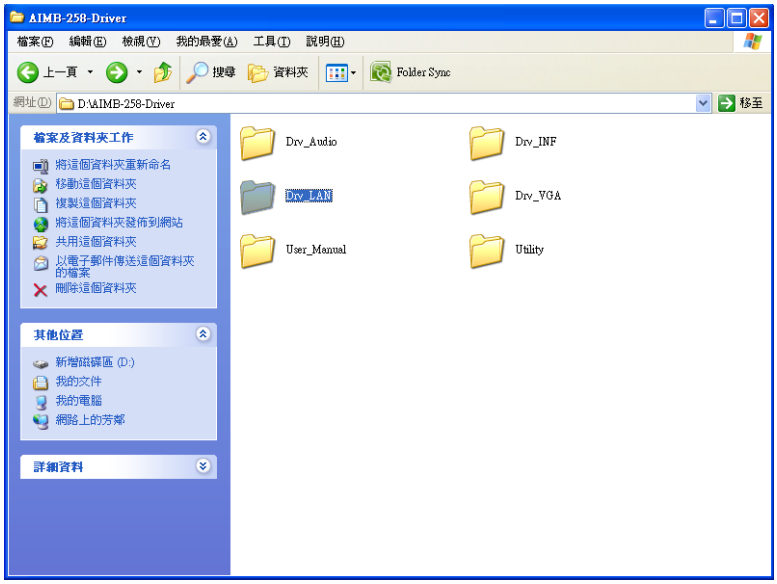
5.3 Installation

Note! *Before installing the LAN drivers, make sure the CSI utility has been installed on your system. See Chapter 3 for information on installing the CSI utility.*

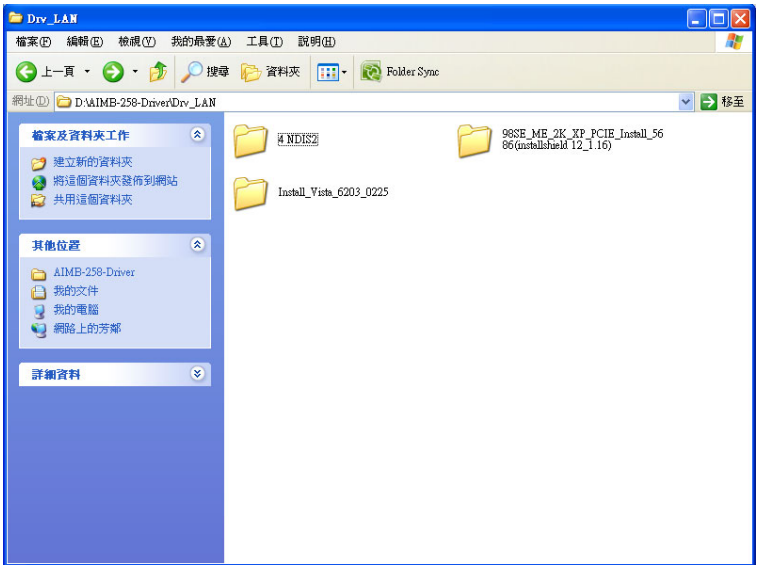
The AIMB-258's Realtek RTL8111C Gigabit integrated controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides driver setup procedure for the operating system you are using.

5.4 Windows Vista/XP Driver Setup (Realtek RTL8111C)

Insert the driver CD into your system's CD-ROM drive. Select the Drv_LAN folder.



Select the subdirectory based OS version; install the appropriate LAN driver.



Appendix A

Programming the Watchdog Timer

A.1 Programming the Watchdog Timer

The AIMB-258's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function after 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 W83627UHG. It provides the following functions for user programming:

- Can be enabled and disabled by user's program.
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes.
- Generates an interrupt or resets signal if the software fails to reset the timer after 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 address value into address port 2E(hex), then write/read data to/from the assigned register through data port 2F (hex).

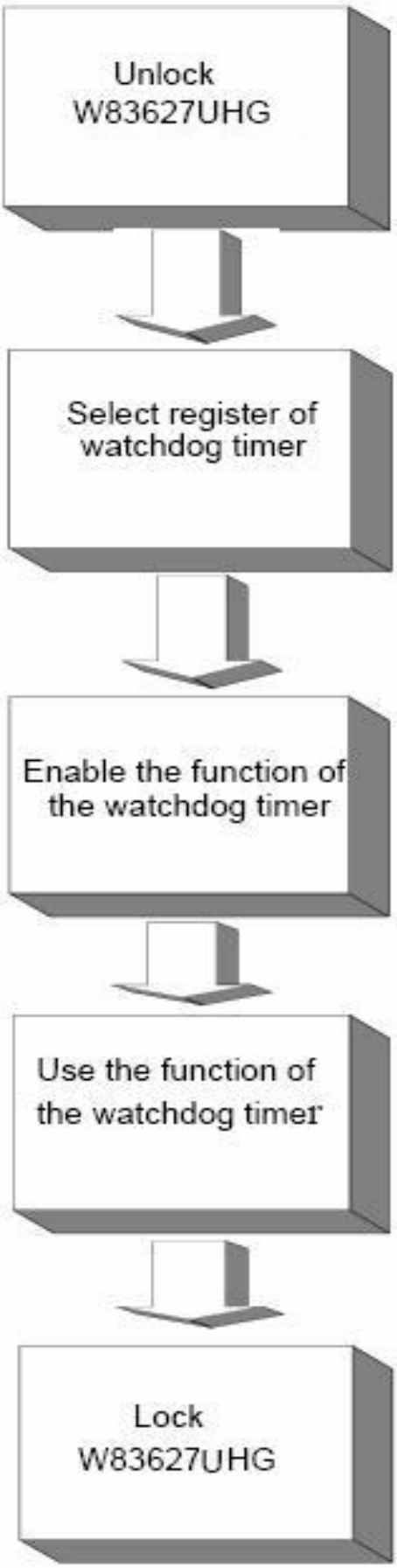

Unlock
W83627UHG
Select register of
watchdog timer
Enable the function of
the watchdog timer
Use the function of
the watchdog timer
Lock
W83627UHG

Table A.1: Watchdog Timer Registers

Address of register (2E)	**Attribute**	
Read/Write	**Value (2F) and description**	
87 (hex)	-	Write this address to I/O address port 2E (hex) twice to unlock the W83627UHG
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 minute 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 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 ""time out"".
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 W83627UHG
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 W83627UHG
Mov al,0aah
Out dx,al
```

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

```
;----------------------------------------------------------
Mov dx,2eh ; unlock W83627UHG
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 W83627UHG
Mov al,0aah
Out dx,al
```

3. Enable watchdog timer to be reset by mouse

```
;-------------------------------------------------------
Mov dx,2eh ; unlock W83627UHG
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 W83627UHG
Mov al,0aah
Out dx,al
```

4. Enable watchdog timer to be reset by keyboard

```
;--------------------------------------------------------
Mov dx,2eh ; unlock W83627UHG
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 W83627UHG
Mov al,0aah
Out dx,al
5. Generate a time-out signal without timer counting
;--------------------------------------------------------
Mov dx,2eh ; unlock W83627UHG
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 W83627UHG
Mov al,0aah
Out dx,al
```

Appendix B

Pin Assignments

B.1 USB Connector (USB56,USB78)

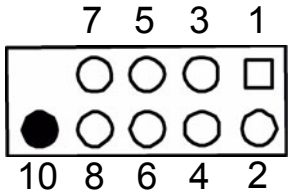


Table B.1: USB5/USB6 Connector (USB56)			
Pin	**USB1 Signal**	**Pin**	**USB2 Signal**
1	+5 V	2	+5 V
3	LP5-	4	LP5+
5	LP5+	6	LP5-
7	GND	8	GND
9	NC	10	GND

B.2 VGA Connector (VGA1A)

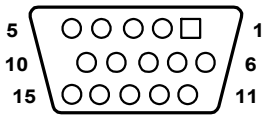


Table B.2: VGA Connector (VGA1A)			
Pin	**Signal**	**Pin**	**Signal**
1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	SDAT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	SCLK
8	GND		

B.3 DVI Connector (VGA1B)

Table B.3: DVI Connector (VGA1B)			
Pin	**Signal**	**Pin**	**Signal**
1	RED	11	NC
2	GREEN	12	VGADATA
3	BLUE	13	VHSYNC
4	N/C	14	VVSYNC
5	GND	15	VGACLK

Table B.3: DVI Connector (VGA1B)			
6	GND	16	GND
7	GND	17	GND
8	GND		
9	+5V_VGA		
10	GND		

B.4 RS-232 Serial Port (COM1~COM2)

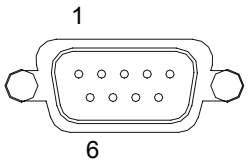


Table B.4: RS-232 Serial Port (COM1~COM2)	
Pin	**Signal**
1	DCD/TX_422N/TX_485N
2	RXD/TX_422P/TX_485P
3	TXD/RX_422P
4	DTR/RX_422N
5	GND
6	DSR
7	RTS
8	CTS
9	RRI

B.5 RS-232 Serial Port (COM3 ~ COM6)

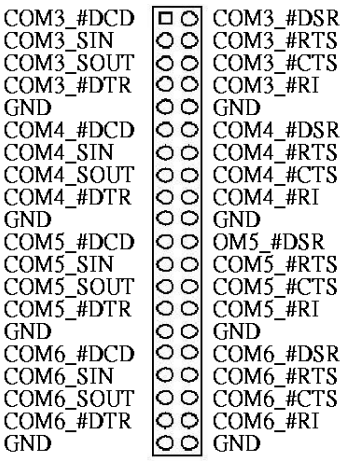


Table B.5: RS-232 Serial Port (COM23)

Pin	Signal	Pin	Signal
1	COM3_#DCD	2	COM3_#DSR
3	COM3_SIN	4	COM3_#RTS
5	COM3_SOUT	6	COM3_#CTS
7	COM3_#DTR	8	COM3_#RI
9	GND	10	GND
11	COM4_#DCD	12	COM4_#DSR
13	COM4_SIN	14	COM4_#RTS
15	COM4_SOUT	16	COM4_#CTS
17	COM4_#DTR	18	COM4_#RI
19	GND	20	GND
21	COM5_#DCD	22	COM5_#DSR
23	COM5_SIN	24	COM5_#RTS
25	COM5_SOUT	26	COM5_#CTS
27	COM5_#DTR	28	COM5_#RI
29	GND	30	GND
31	COM6_#DCD	32	COM6_#DSR
33	COM6_SIN	34	COM6_#RTS
35	COM6_SOUT	36	COM6_#CTS
37	COM6_#DTR	38	COM6_#RI
39	GND	40	GND

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

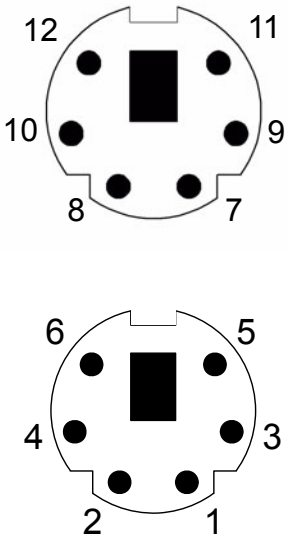


Table B.6: PS/2 Keyboard/ Mouse Connector (KBMS1)

Pin	Signal	Pin	Signal
1	KB DATA	2	NC
7	MS DATA	6	NC
3	GND	8	NC
4	VCC	9	GND
5	KB CLOCK	10	VCC
11	MS CLOCK	12	NC

B.7 CPU Fan Power Connector (CPUFAN1)

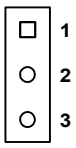


Table B.7: CPU Fan Power Connector (CPUFAN1)

Pin	Signal
1	GND
2	+12 V
3	DEC

B.8 Power LED & Keyboard Lock Connector (JFP3)

You can use an LED to indicate when the single board computer is on. Pin 1 of JFP3 supplies the LED's power, and Pin 3 is the ground.

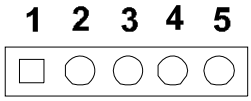


Table B.8: Power LED and Keylock Connector (JFP3)

Pin	Function
1	LED power (+5 V)
2	NC
3	GND
4	KEYLOCK#
5	GND

B.9 HDD LED and External Speaker Connector(JFP2/HDD LED and SPEAKER)

The single board computer has its own buzzer. You can also connect it to the external speaker on your computer chassis.

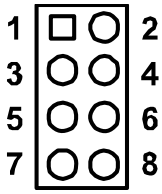


Table B.9: External Speaker Connector (JFP2/SPEAKER)

Pin	Signal	Pin	Signal
1	SPK+	2	HDDLED+
3	NC	4	HDDLED-
5	SPK_IN	6	SMB_DAATA
7	SPK-	8	SMB_CLK

B.10 ATX Soft Power Switch and Reset Connector (JFP1/ PWR-SW and RESET)

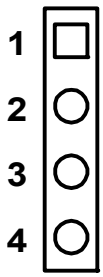


Table B.10: Audio Front Panel Connector (JFP1/ RESET)	
Pin	**Signal**
1	PWR_BTN#
2	GND
3	RESET
4	GND

B.11 Audio Front Panel Connector (FPAUD1)

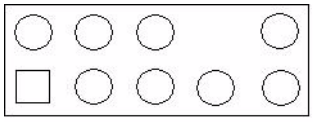


Table B.11: Audio front panel connector (FPAUD1)	
1 MIC-IN	2 GND
3 MIC_VCC	4 VCC
5 LRR	6 LOUT_R
7 JDO	8 NC
9 LRL	10 LOUT_L

B.12 GPIO Pin Header (GPIO1)

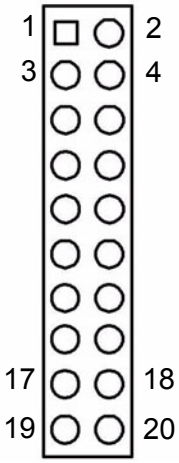


Table B.12: GPIO Pin Header (GPIO1)

Pin	Signal	Pin	Signal
1	DIO_GP20	2	DIO_GP10
3	DIO_GP21	4	DIO_GP11
5	DIO_GP22	6	DIO_GP12
7	DIO_GP23	8	DIO_GP13
9	DIO_GP24	10	DIO_GP14
11	DIO_GP25	12	DIO_GP15
13	DIO_GP26	14	DIO_GP16
15	DIO_GP27	16	DIO_GP17
17	SMBCLK_PCI	18	SMBDATA_PCI
19	GND	20	VCC5_DIO

B.13 LVDS Connector (LVDS1)

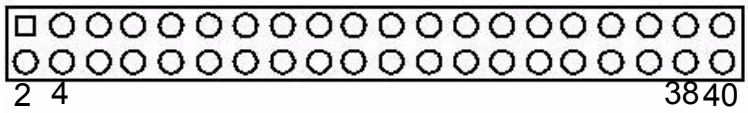
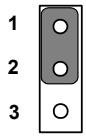
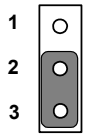


Table B.13: LVDS Connector (LVDS1)

Pin	Signal	Pin	Signal
1	VDDSAFE_1	2	VDDSAFE_2
3	GND_1	4	GND_7
5	VDDSAFE_3	6	VDDSAFE_4
7	OD0-	8	ED0-
9	OD0+	10	ED0+
11	GND_2	12	GND_8
13	OD1-	14	ED1-
15	OD1+	16	ED1+
17	GND_3	18	GND_9
19	OD2-	20	ED2-
21	OD2+	22	ED2+
23	GND_4	24	GND_10
25	OCK-	26	ECK-
27	OCK+	28	ECK+
29	GND_5	30	GND_11
31	DDC_CLK	32	DDC_DAT
33	GND_6	34	GND_12
35	OD3-	36	ED3-
37	OD3+	38	ED3+
39	HPLG	40	VCON

B.14 LVDS Power Jumper (J1)

Voltage	Jumper Setting
*3.3V	
5V	

*default setting

Table B.14: LVDS Power Jumper (J1)

Pin	Signal
1	VCC3
2	VDD_LCD
3	VCC

B.15 LVDS Invert (VP1)

Table B.15: LVDS Invert (VP1)

Pin	Signal
1	VCC12
2	GND
3	BKLTEN
4	VBR
5	VCC

B.16 System I/O Ports

Table B.16: System I/O Ports

Addr. range (Hex)	Device
000-01F	DMA controller
020-021	Interrupt controller 1, master
022-023	Chipset address
040-05F	8254 timer
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI)
	mask
080-09F	DMA page register
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F8	Fixed disk
200-207	Game I/O
290-29F	On-board hardware monitor
2F8-2FF	Serial port 2
300-31F	Prototype card
360-36F	Reserved
380-38F	SDLCm bisynchronous 2
3A0-3AF	Bisynchronous 1
3C0-3CF	Reserved
3D0-3DF	Color/graphics monitor adapter
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1
3E8-3EF	Serial port3
2E8-2EF	Serial port4
4F8-4FF	Serial port5
4E8-4EF	Serial port6

B.17 DMA Channel Assignments

Table B.17: DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

B.18 Interrupt Assignments

Table B.18: 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	Available
7	IRQ11	Available
8	IRQ12	PS/2 mouse
9	IRQ13	INT from co-processor
10	IRQ14	Primary IDE Channel
12	IRQ3	Serial communication port 2/4
13	IRQ4	Serial communication port 1/3
14	IRQ5	Serial communication port 5
15	IRQ6	Diskette controller (FDC)
16	IRQ7	Serial communication port 6

B.19 1st MB Memory Map

Table B.19: 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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