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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

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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.

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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.

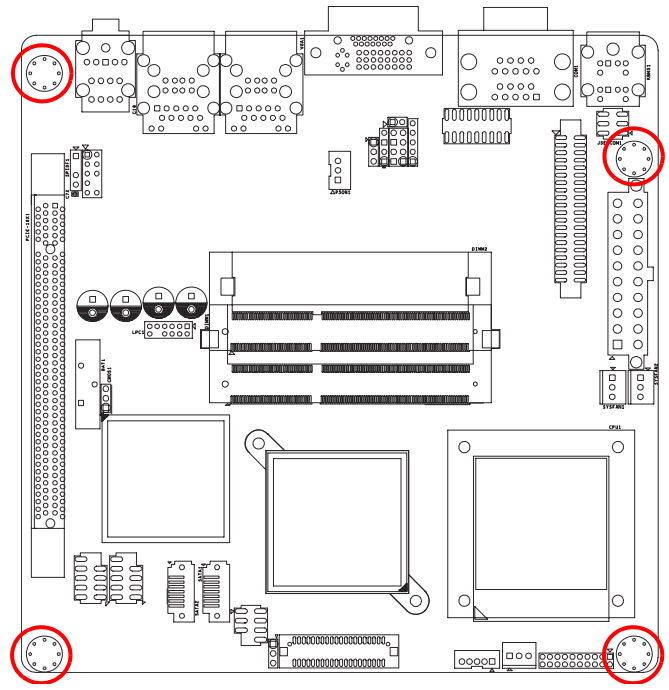
1.2.1 Placement Direction

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

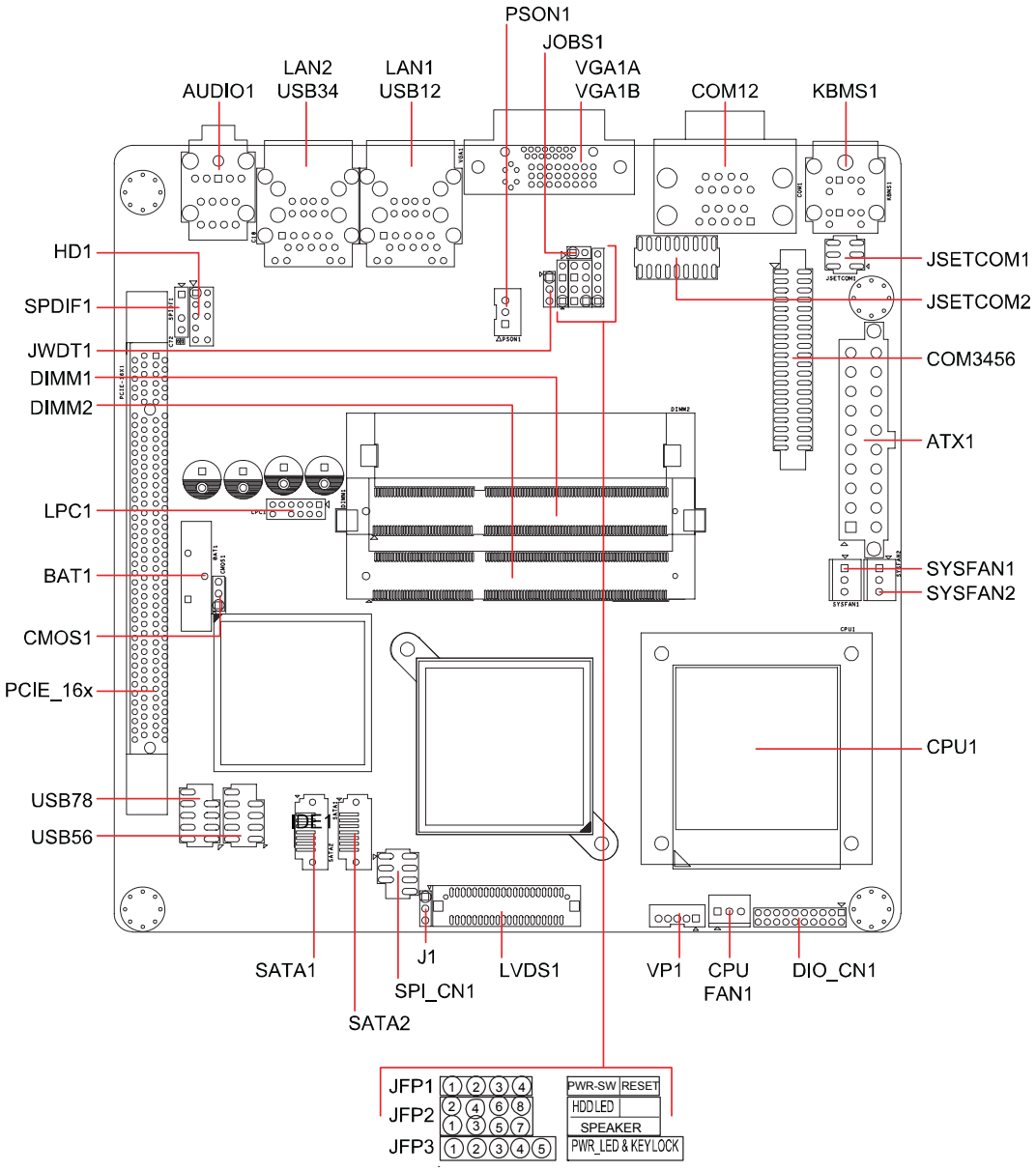


Figure 1.1 Motherboard Layout

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.

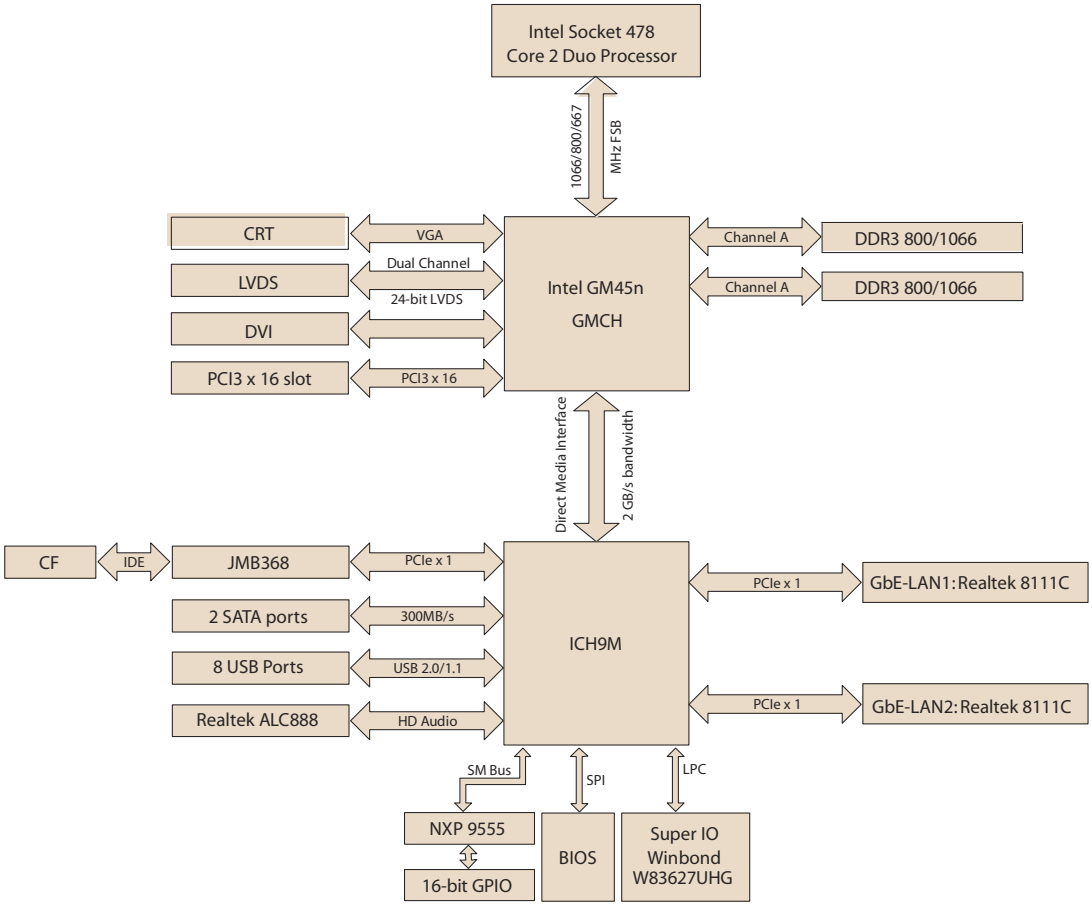
Dual Display Twin uses one of the display pipes to drive the same content, at the same resolution, color depth, and refresh rates to two different displays.

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

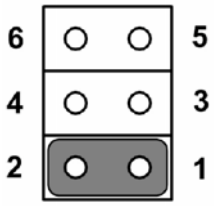
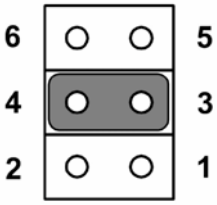
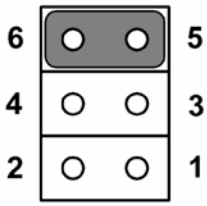
Table 1.2: JSETCOM1: COM1/+5 V/+12 V Selection	
COM1 (Default)	
+5 V	
+12 V	

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

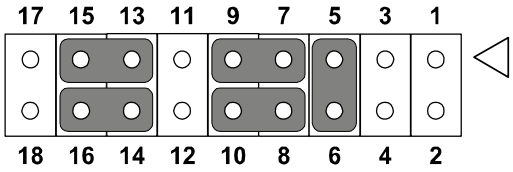
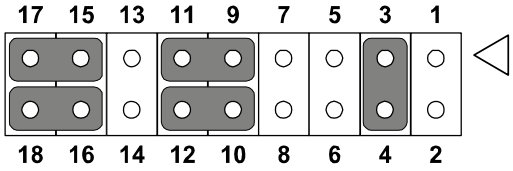
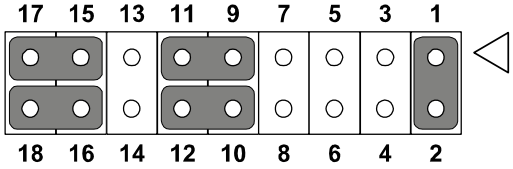
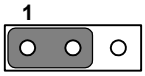
RS-232 Configuration (default)	
RS-422 Configuration	
RS-485 Configuration	

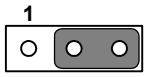
Table 1.4: CMOS1: Clear CMOS

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

*Default



Keep CMOS data

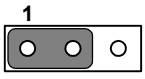


Clear CMOS

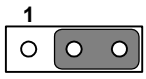
Table 1.5: J1:LCD Power 3.3 V/5.5 V Selection

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

*Default



3.3 V, 1-2 closed

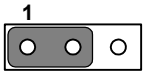


5 V, 2-3 closed

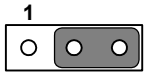
Table 1.6: PSON1: ATX, AT Mode Selection

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

*Default

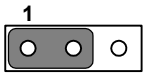


AT Mode, 1-2 closed

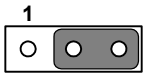


ATX Mode, 2-3 closed

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	

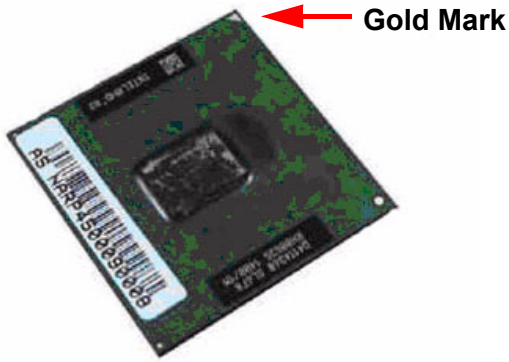
Close

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!

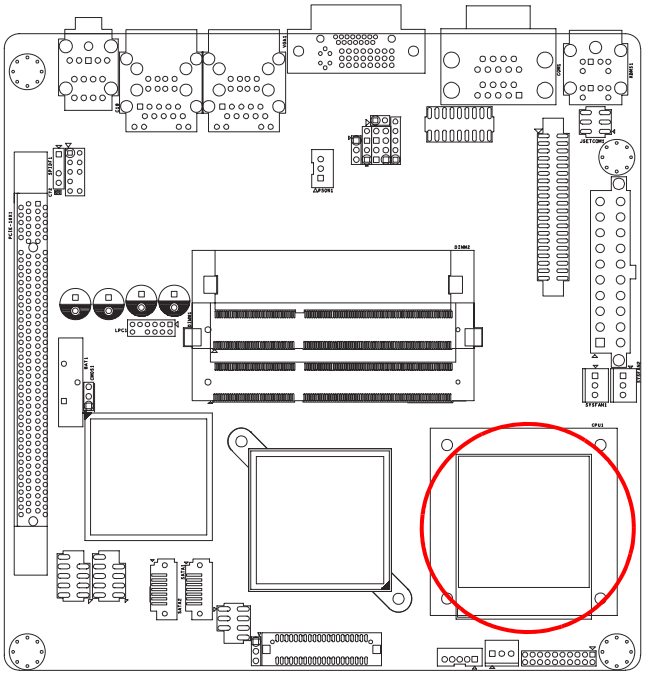
- *Make sure the AC power is off before you install the CPU.*
- *If installing a dual-core CPU, connect the CPU fan cable to the CPUFAN1 connector to ensure system stability.*

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.*

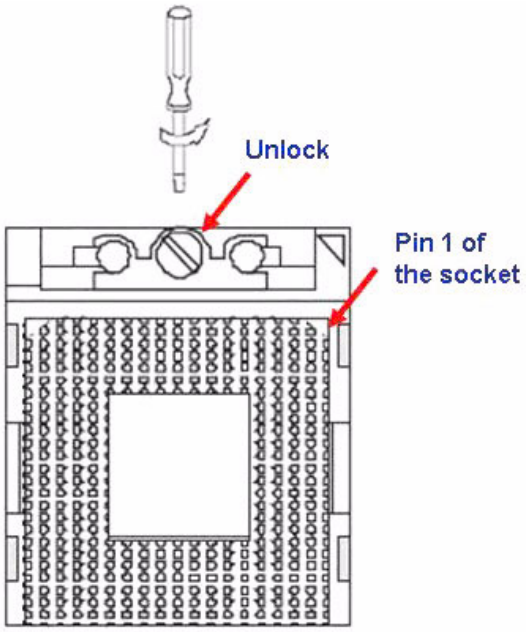
1.12.1 Installing the CPU

1. Locate the CPU socket on the motherboard.

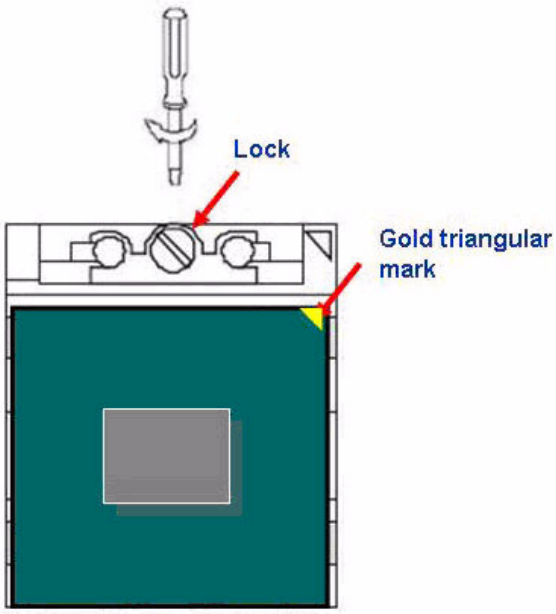


Note! *Before installing the CPU, make sure that the socket box is facing towards you.*

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.*

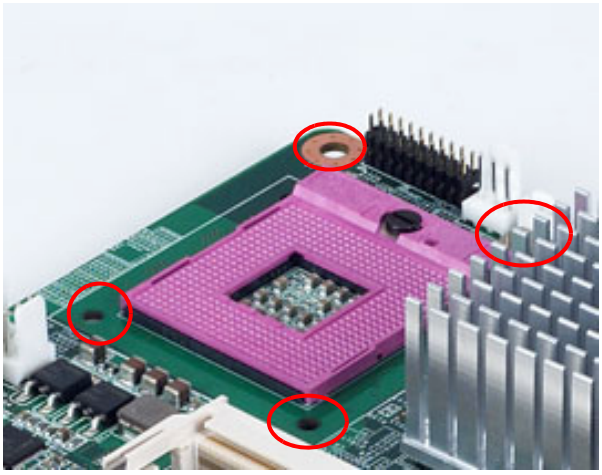
1.12.2 Installing the CPU Heatsink and Fan

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.*

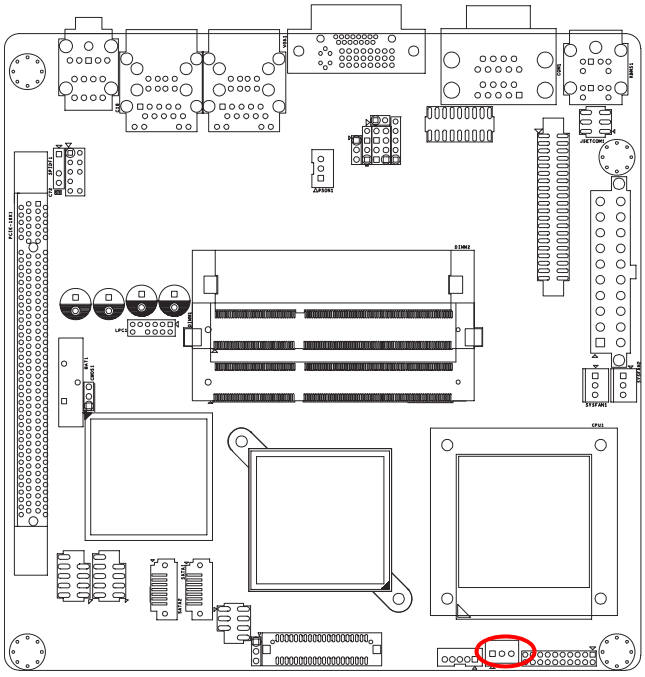
1. Place the heatsink on top of the installed CPU, making sure that the four screws match the holes on the motherboard.

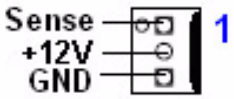
Motherboard Hole



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.



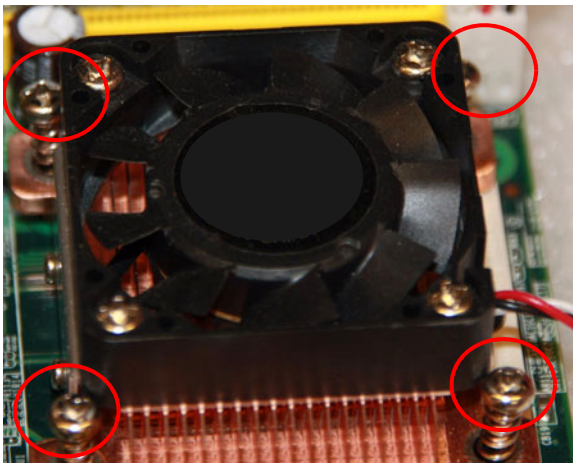


Caution!

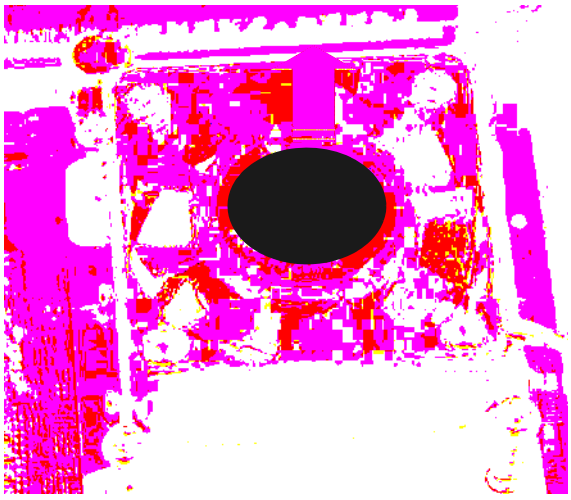
- *Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components, and hardware monitoring errors can occur if you fail to plug this connector.*
- *These are not jumpers! DO NOT place jumper caps on the fan connectors.*

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.

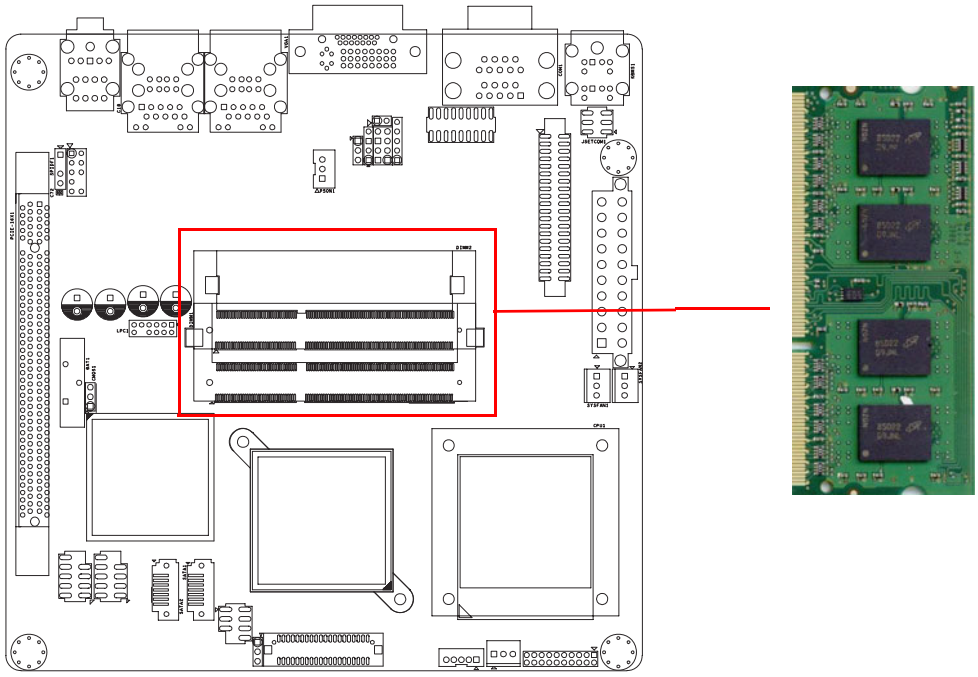


Note! *Refer to the documentation in the boxed or stand-alone CPU fan package for detailed information on CPU fan installation.*

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.