EMX-A55E

AMD G-Series™ APU with A55E Controller Hub(FCH)
Mini-ITX Motherboard

User's Manual

1st Ed –29 June , 2011

Part No. E2047XA5500R

FCC Statement

THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

(2) 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 EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Notice

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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Contents

1. Getting Started

1.1 Safety Precautions

Warning!

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

Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

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

- ✓ 1 x EMX-A55E Mini ITX Main board
- ✓ 1 x CD-ROM contains the followings:
  - User's manual (this manual in PDF file)
  - Drivers
- ✓ 1 x I/O Shield
- ✓ 1 x Startup Manual
- ✓ 1 x CPU Cooler
- ✓ 1 x SATA cable

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

1.3 Document Amendment History

Revision	Date	Comment
1st	June 2011	Initial Release

1.4 Manual Objectives

This manual describes in detail the Avalue Technology EMX-A55E Motherboard.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to interface with EMX-A55E series or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.5 System Specifications

APU	G-Series
APU Type	AMD G-Series T56N 1.6GHz DC /T40N 1.0GHz DC
Processor Family	AMD G-Series
Long Life Processor List	TDP 5~18W, T shutdown 125℃
Package	FT1 (BGA) 413 balls p=0.8mm, 19x19 mm
L2 Cache	L1: 32KB+32KB per core, L2: 512KB cache per core
UMI	4-Lane(x4) PCIe gen2
Power Management	C6 supported
PCIE	4-Lane(x4) PCIe gen2
CPU Process	40 nm
System Memory	
Memory Type	One DDR3 1066 SODIMM
DIMM #	1x SODIMM 204Pin/ Single Channel
Max. Capacity	4 GB
Chipset	
FCH	
Fusion Controller Hub	AMD A55E Controller Hub (Hudson-E1)
PCIe	x4 Gen 2
USB	8 USB 2.0 (4 Rear, 4 Internal)
SMBus	Yes
LPC	Yes
SATA	5 SATA 3.0 (One support SATADOM)
PCI	N/A
HD Audio	support 4 channel, Power Saving, 4 codec
Clock Gen.	Integrated
Package	FCBGA 23x23mm, 605 balls
Environment	TDP 2.7~5.7W, T case 105℃
Display	
Integrated Graphic Controller	ATI Radeon™ HD 6320 (T56N)/ HD 6290 (T40N) Graphics Engine supports
HW decoder	H.264, VC-1, MPEG-2 and DivX decode
3D feature	DirectX 11, OpenGL 4.0, dedicated hardware (UVD 3.0)
LVDS	1, 18bpp (Single link LVDS up to 1400 x 1050)
VGA	T56N (18W) supports up to 2560 x 1600 T40N (9W) supports up to 1920 x 1200

HDMI	1 support HDMI 1.3a & 1080p up to 1920 x 1080
Dual Display	VGA+LVDS, VGA+HDMI, HDMI+LVDS
Gigabit Ethernet	
Chipset	LAN1 RTL 8111DL Gigabit LAN LAN2 RTL 8111DL Gigabit LAN
LAN LED	Left: Link (Off)/ Active (Flash Yellow)
	Right: 1Gbps(Green) / 100Mbps (Orange) / 10Mbps (Off)
Disable LAN through BIOS	Yes
WOL	Yes
Boot from LAN	Yes
ASF	N/A
Audio	
Codec	7.1 Channel HD Audio
Chipset	Realtek ALC892
Audio output header	Yes, Front Audio Pin Header
Front IO Connector	Stack Phone Jack (Mic In, Line-out, Line-in)
SPDI/F	Yes
Amplifier	TI TPA3005
RS232 COM	
LPC to COM	2 COM for Rear I/O D-Sub 2 COM with headers
Super I/O	
Chipset	Winbond W83627DHG-P
Fan speed monitor & control	FAN Speed Control by Thermal Sensor
Temperature	Yes
Voltage	3.3V, +5V, 5Vsb, +12V, -12V
Buzzer	
Onboard buzzer	Yes
WDT	
Watchdog Timer	Programmable 1~255 sec/min
TPM	
TPM	Onboard TPM1.1/1.2 By Infineon SLB9635 (Optional)
BIOS	
BIOS Core	AMI EFI
BIOS Flash	
BIOS Flash	16Mb SPI

SW RAID	
SW RAID	None
Bootup Device	
Serial ATA	Yes (CFast)
IDE device	N/A
USB device	Yes
Boot from LAN	Yes
Power Management	
ACPI	ACPI 3.0
APM	NA
Sleep State	S3, S4, S5
Other Feature	
PC Health	YES
CMOS backup	BIOS CMOS automatic backup and restore setup data
SmartFAN	CPU, SYS FAN, Smart Fan III+
Graphics memory mode	Shared Memory up to 2GB
Power Play	380, 200MHz, configure Power to 2.7~5.7W
SATA	Support SATA III(6Gbps)
Internal Connector	
Debug Port	
CPU	HDT header
SPI	1
Display	
LVDS	1
eDP	1, (optional)
Inverter	
LVDS INV	3.3 V
Audio	
Front Panel	1
Amplifier	1
SPDI/F	1
USB	
USB	4
Serial	
COM	2
IDE	
IDE	NA

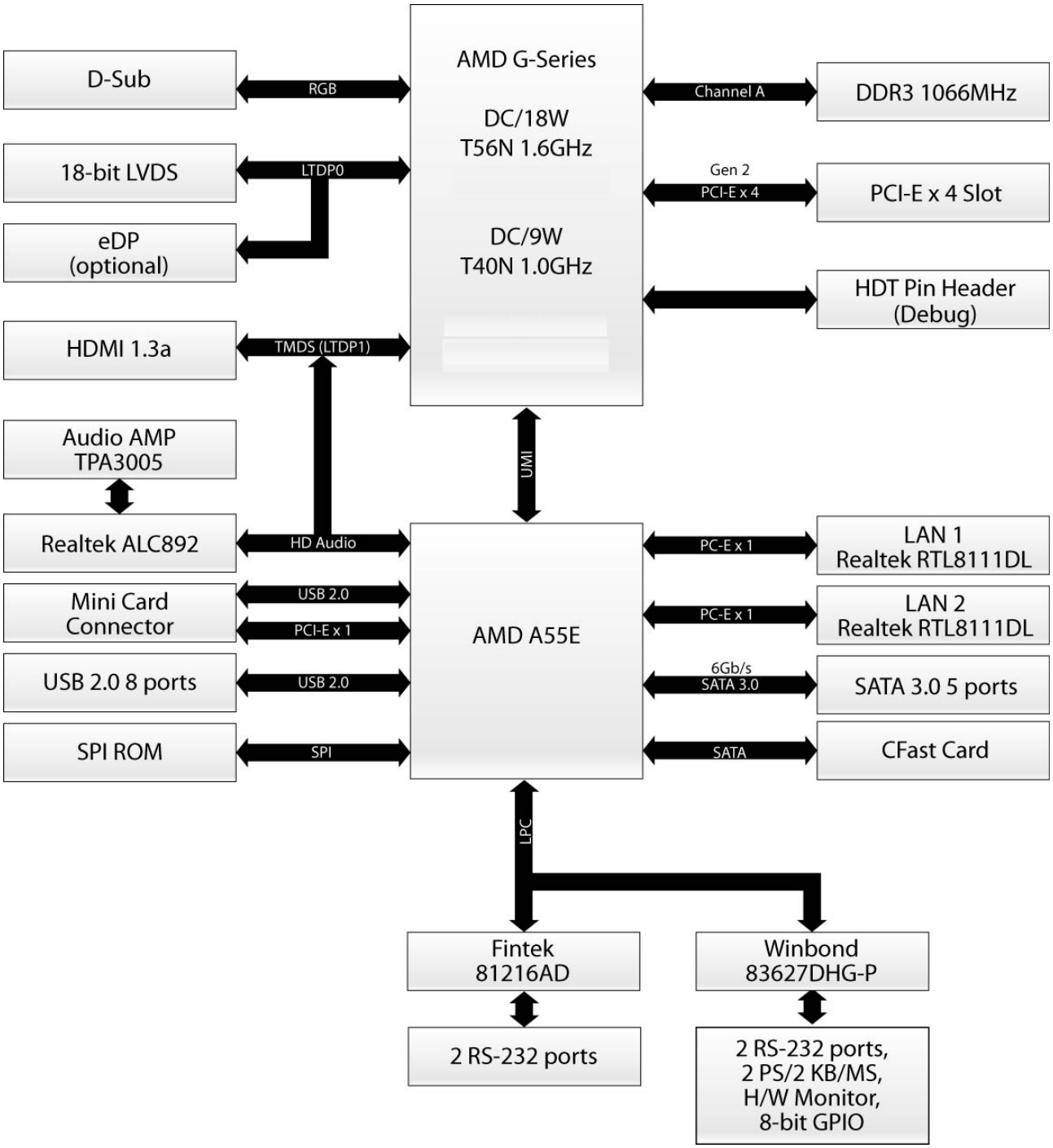
SATA	
SATA	5 (SATA III 6 Gb/s)
SATA power	NA
Fan connector	
System fan connector	1 system fan(3pin for system with smart fan control)
CPU fan connector	1 CPU fan(3pin for system with smart fan control)
GPIO	
General	8bit
Front I/O	
Display	
HDMI	1
VGA	1, co-layout with header
DVI	NA
Ethernet	
RJ-45	2, stack with USB
USB	
USB	4 (USB 2.0 port)
COM	
Serial port	2* RS-232
PS/2	
KB/MS	2, co-lay single DIN
Audio	
Phone Jack	1 Line-in 1 Line-out 1 MIC co-lay 1 jack connector
Power Connector	
Power Type	AT/ATX
Power Requirement	+3.3V, +5V, +12V, -12V, 5Vsb
LED Indicator	
LED	
HDD Status	4; access, flash yellow
Power on rear IO	1; Blue
Expansion Slot	
Mini-PCI Express	1
PCIex 4	1

EMX-A55E

PCB Physical Feature	
Dimension	170x 170mm
Layer	6 Layer
Power Consumption	< 45W
Operating Temperature	0℃-60℃
Heat Sink	Cooler FAN (T56N) Heatsink (T40N)
Storage Temperature	-20℃ ~ 80℃
Vibration (non OP)	3.5 Grms, heat sink backplane TBD
PCB Printing	
Model name in silkscreen	None
Revision in silkscreen	No
PCB Color	Blue
CE mark on PCB	Yes
WEEE	Yes
Advansus PCB part number	Yes
Version	No
FCC mark on PCB	Yes
Cert. Compliance	
CE	Pre-scan for Class B, EN-55022/24
FCC	Pre-scan for FCC PART 15, Class B
IEC-60601	compliance
Accessory	
Accessory List	
FP_USB cable	None
SATA cable Kit	1 data and 1 power
Serial Port	2
I/O Shield	1
Driver CD	1
Startup Manual	None
FP_Power button, power LED, HDD LED kit	None
AVL	
OS Support List	Windows XP SP3, Windows 7 Pro, Linux Fedora 14

1.6 Architecture Overview – Block Diagram

The following block diagram shows the architecture and main components of EMX-A55E.



2. Hardware Configuration

2.1 Product 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.

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.

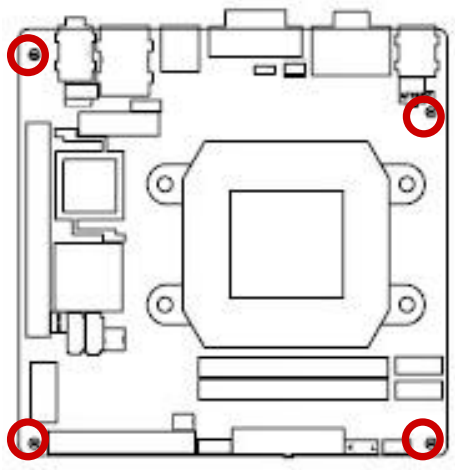
2.1.1 Placement Direction

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 as indicated in the image below.

2.1.2 Screw Holes

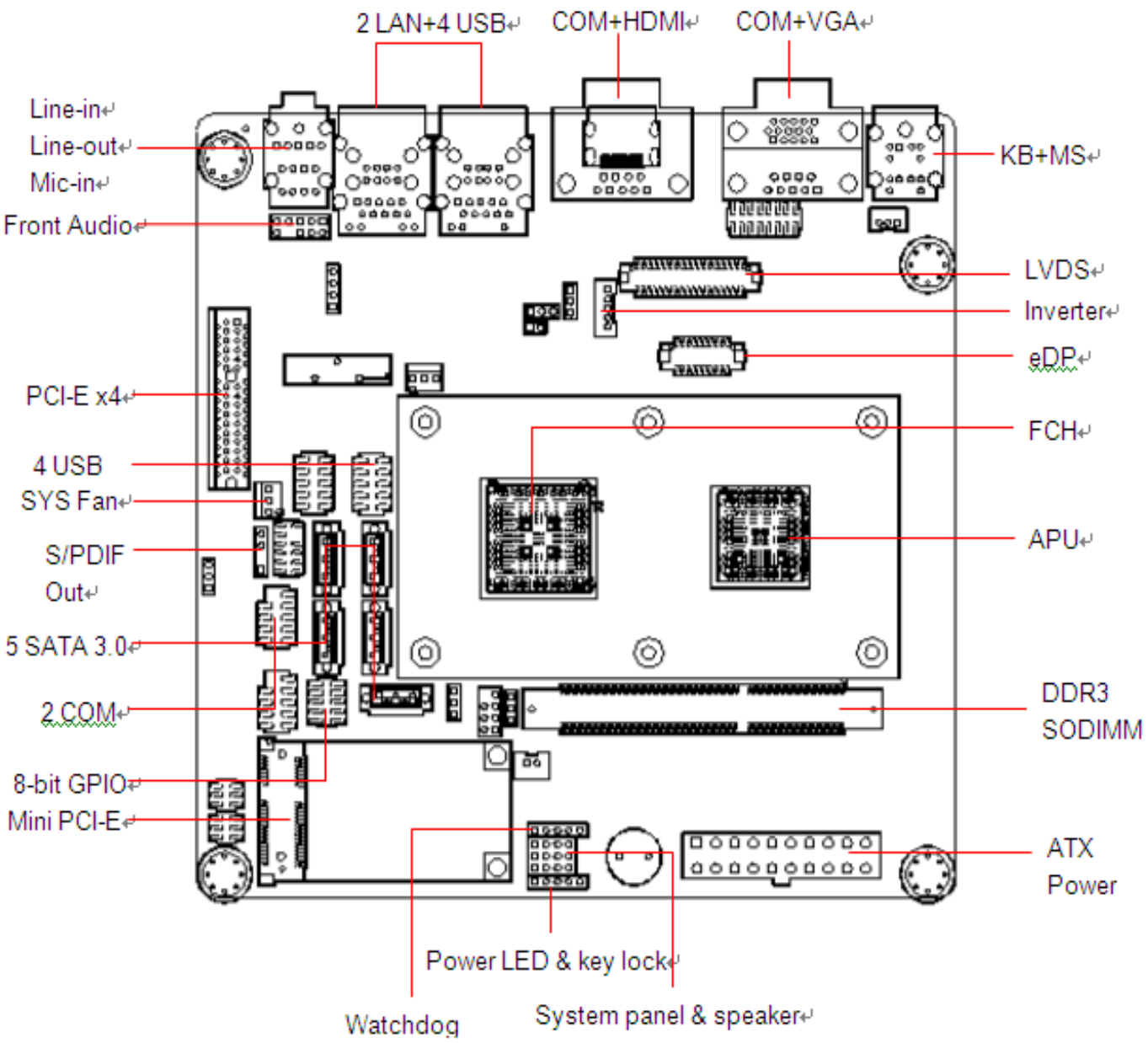
Place four (4) screws into the holes indicated by circles to secure the motherboard to the chassis.

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



Place this side towards the rear of the chassis

2.2 Product Layout



2.2.1 Layout Content List

Slots		
Label	**Function**	**Note**
CFast	Compact Flash socket	Rear side
MINI_PCIE	Mini PCI-E slot	52PIN
PCIE	PCI Eslot	64PIN
SODIMM_A1	204-PIN SODIMM slot 1	204-PIN

Jumpers		
Label	**Function**	**Note**
CLRTC	Clear CMOS	3 x 1 header, pitch 2.54mm
JCOMPWR1	COM1 RI/+5V/+12V Selection	3 x 2 header, pitch 2.0mm
JCOMPWR2	COM2 RI/+5V/+12V Selection	3 x 2 header, pitch 2.0mm

Rear IO		
Label	**Function**	**Note**
KBMS	PS/2 keyboard and mouse	6-pin Mini-Din
COM12	Serial Port Connector	D-sub 9-pin, male
VGA_DVI	VGA Connector	D-sub 15-pin, female
USB3,4,5,6	USB Connector x 4	2 x 5 Header, pitch 2.54mm
LAN1,2	RJ-45 Ethernet Connector x 2	
AUDIO	Line-in Port, Line-out Port, Microphone Port,	7.1 Channel Audio I/O (3 jacks)

2.3 Installation Procedure

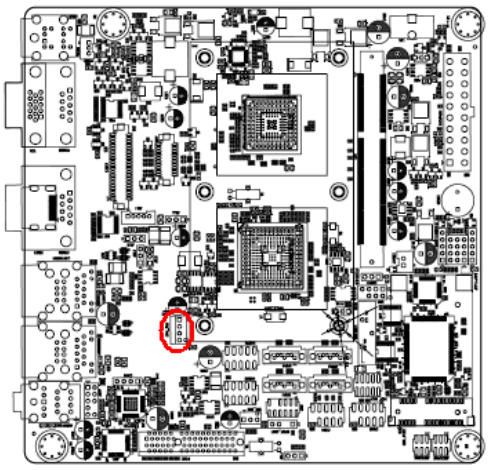
This chapter explains you the instructions of how to setup your system.

1. Turn off the power supply.
2. Insert the SODIMM module (be careful with the orientation).
3. Insert all external cables for hard disk, floppy, keyboard, mouse, USB etc. except for flat panel. A CRT monitor must be connected in order to change CMOS settings to support flat panel.
4. Connect power supply to the board via the ATXPWR.
5. Turn on the power.
6. Enter the BIOS setup by pressing the delete key during boot up. Use the “LOAD BIOS DEFAULTS” feature. The ***Integrated Peripheral Setup*** and the ***Standard CMOS Setup*** Window must be entered and configured correctly to match the particular system configuration.
7. If TFT panel display is to be utilized, make sure the panel voltage is correctly set before connecting the display cable and turning on the power.

Note: Make sure the heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause the system to hang or unstable

2.3.1 Central Processing Unit (CPU)

Connect the CPU fan cable to the CPU_FAN connector on the motherboard.



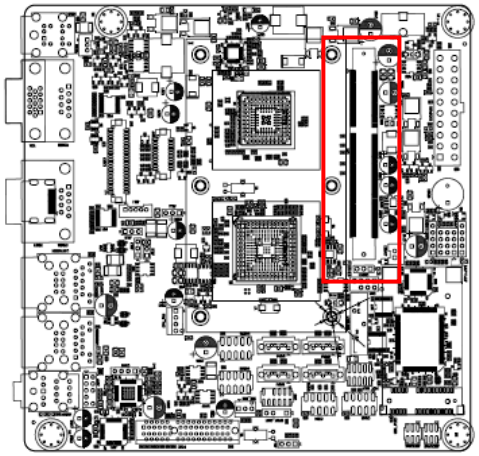
- Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components, and hardware monitoring errors can occur if you fail to plug this connector.
- These are not jumpers! DO NOT place jumper caps on the fan connectors.

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

2.3.2 System Memory

The motherboard comes with one 204-pin Double Data Rate 3 (DDR3) SODIMM sockets.

A DDR3 module has the same physical dimensions as a DDR DIMM but has a 204-pin footprint. DDR3 DIMMs are notched differently to prevent installation on a DDR DIMM socket. The following figure illustrates the location of the sockets:



2.3.2.1 Memory Configurations

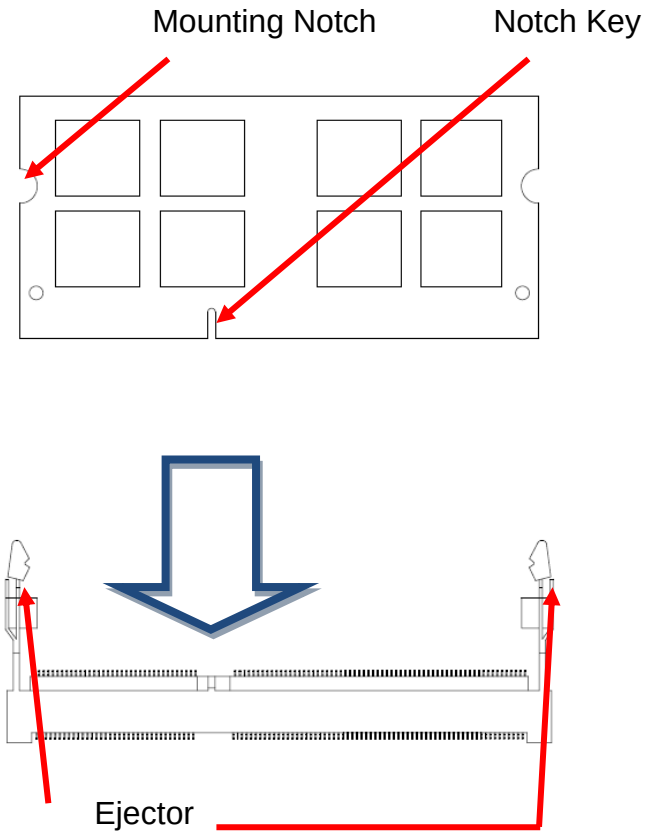
You can install 1GB, 2GB and 4GB DDR3 DIMMs into the SODIMM sockets using the memory configurations in this section.

- Installing DDR3 DIMM other than the recommended configurations may cause memory sizing error or system boot failure. Use any of the recommended configurations.
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- This motherboard does not support memory modules made up of 128 Mb chips or double-sided x16 memory modules.
  Make sure that the memory frequency matches the CPU FSB (Front Side Bus). Refer to the Memory frequency/CPU FSB synchronization table.

2.3.2.2 Installing a DDR3 DIMM

Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Locate the DIMM socket on the board.
2. Hold two edges of the DIMM module carefully, and keep away of touching its connectors.
3. Align the notch key on the module with the rib on the slot.
4. Firmly press the modules into the socket automatically snaps into the mounting notch. Do not force the DIMM module in with extra force as the DIMM module only fit in one direction.

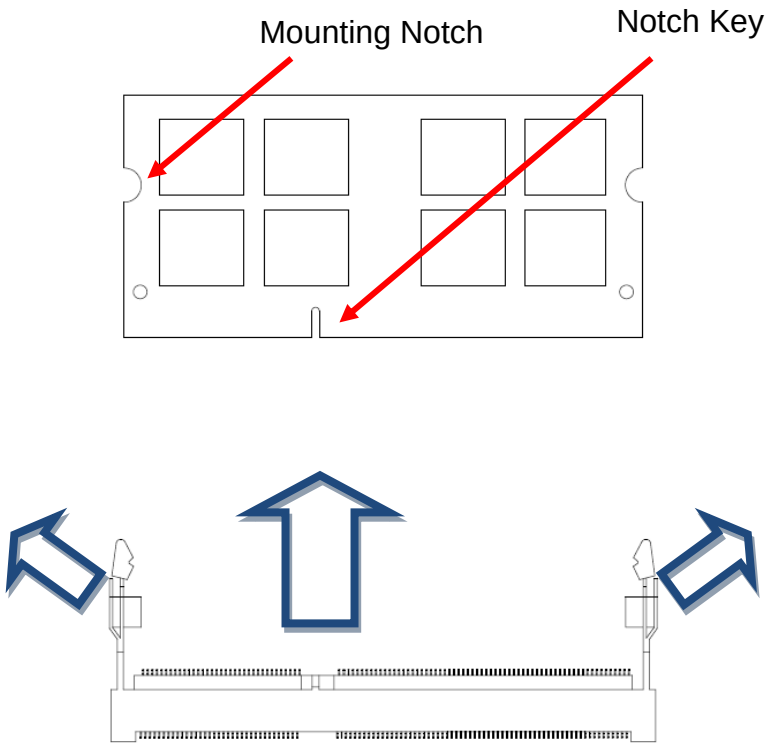


204-pin DDR3 SODIMM

- A DDR3 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.
- The DDR3 DIMM sockets do not support DDR DIMMs. DO NOT install DDR DIMMs to the DDR3 DIMM socket.

2.3.2.3 Removing a DDR3 DIMM

Press the two ejector tabs on the slot outward simultaneously, and then pull out the DIMM module.



Support the DIMM lightly with your fingers when pressing the ejector tabs. The DIMM might get damaged when it flips out with extra force.

2.3.3 Expansion Slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.

Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.3.3.1 Installing an Expansion Card

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.3.3.2 Configuring an Expansion Card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings if any.
2. Assign an IRQ to the card if needed. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.

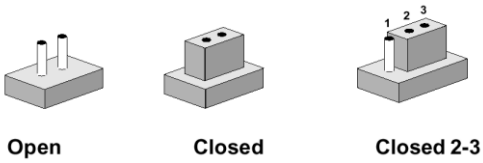
2.3.3.3 Standard Interrupt Assignments

IRQ	Priority	Standard Function
0	1	System Timer
1	2	Keyboard Controller
2	-	Redirect to IRQ#9
3	11	IRQ holder for PCI streering*
4	12	Communications Port (COM1)*
5	13	IRQ holder for PCI streering*
6	14	Floppy Disk Controller
7	15	Printer Port (LPT)*
8	3	System CMOS/Rear Time
9	4	IRQ holder for PCI streeing*
10	5	IRQ holder for PCI streeing*
11	6	IRQ holder for PCI streeing*
12	7	PS/2 Compatible Mouse Port*
13	8	Numeric Data Processor
14	9	Primary IDE Channel
15	10	Secondary IDE Channel

* There IRQs are usually available for ISA or PCI device.

2.4 Setting Jumpers & Connectors

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.
It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip. To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



The jumper settings are schematically depicted in this manual as follows:

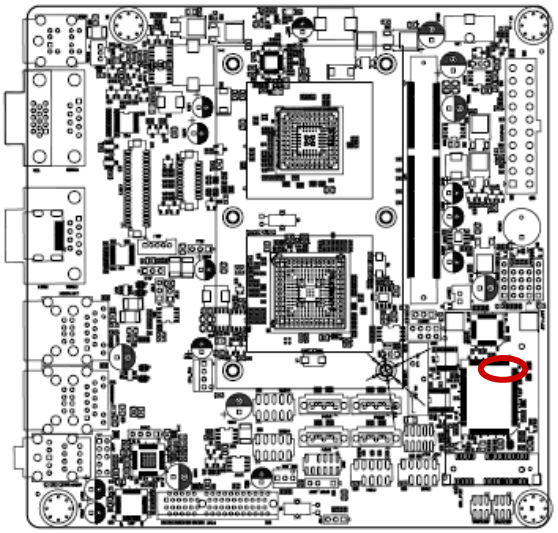
A pair of needle-nose pliers may be helpful when working with jumpers.
Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

2.4.1 Clear CMOS (CMOS1)

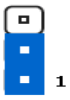
This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords. To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the CMOS, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

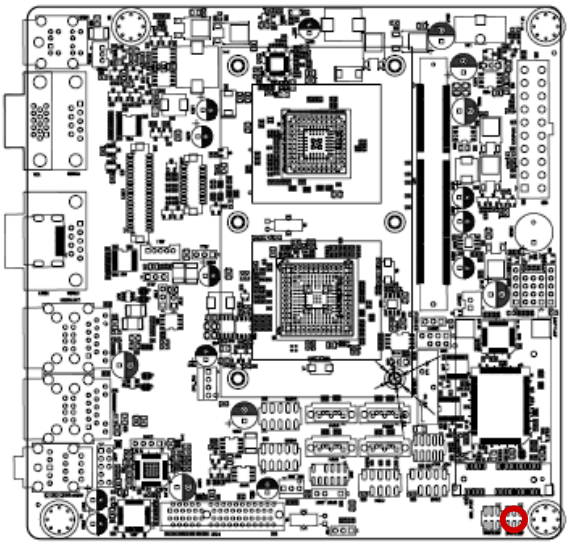


Normal (Default)

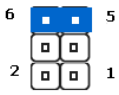


Clear CMOS

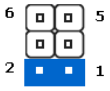
2.4.2 COM3 RI/+5V/+12V Selection (JSETCOM3)



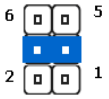
+12V



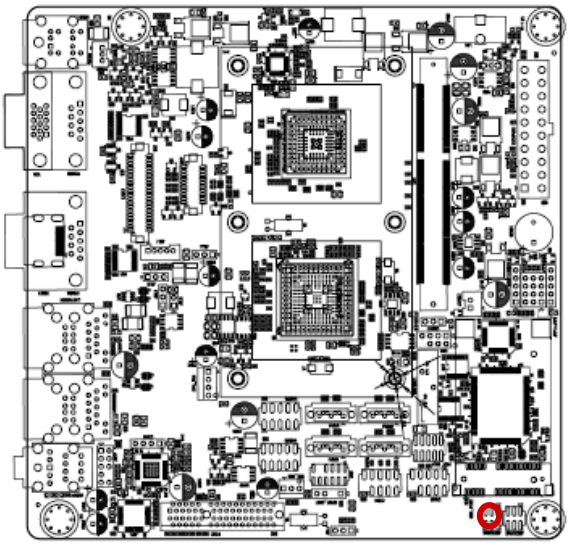
Ring



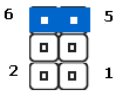
+5V (Default)



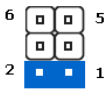
2.4.3 COM4 RI/+5V/+12V Selection (JSETCOM4)



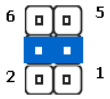
+12V



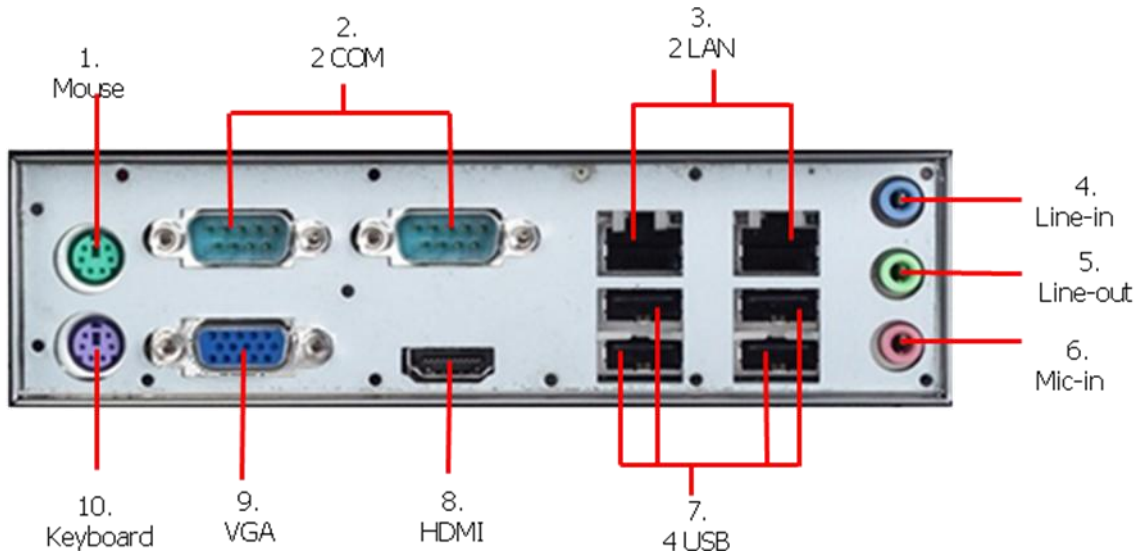
Ring

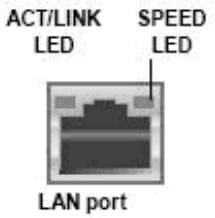


+5V (Default)



2.4.4 Rear Panel Connectors



No	Label	Function	Description
1	KBMS	PS/2 mouse connector	The standard PS/2 mouse DIN connector is for a PS/2 mouse.
2	COM12	Serial port connector	*D-Sub 9-pin, male*
3	LAN_USB12	*LAN (RJ-45) connector* 	This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below 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.
4	AUDIO	Line-In port (Light Blue).	*This port connects a tape, CD, DVD player, or other audio sources.*
5	AUDIO	Line-Out port (Lime)	*This port connects a headphone or a speaker. In 4-channel, 6-channel, and 8-channel configuration, the function of this port becomes Front Speaker Out.*

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

6	AUDIO	Microphone port (Pink)	*This port connects a microphone.*

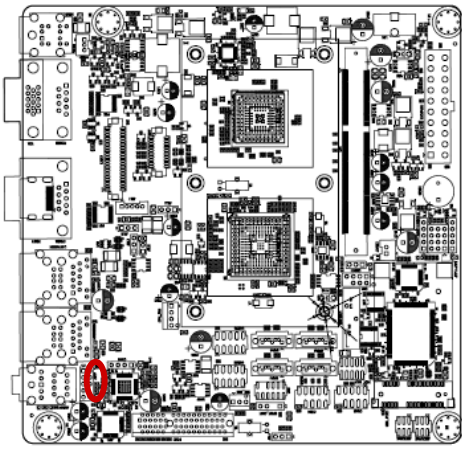
Refer to the audio configuration table below for the function of the audio ports in 2, 4, 6, or 8-channel configuration.

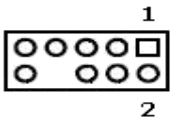
Port	Headset			
	2-channel	4-channel	6-channel	8-channel
Light Blue	Line in	Line in	Line in	Line in
Lime	Line out	Front speaker out	Front speaker out	Front speaker out
Pink	Mic In	Mic In	Mic In	Mic In

7	LAN_USB3,4,5,6	USB 2.0 connector	*These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.*
8	HDMI		
9	VGA_DVI	VGA port	*This 15-pin port is for a VGA monitor or other VGA-compatible devices.*
10	KBMS	PS/2 KB connector	This port is for a PS/2 keyboard

2.4.5 Front Panel Audio Connector (AAFP)

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



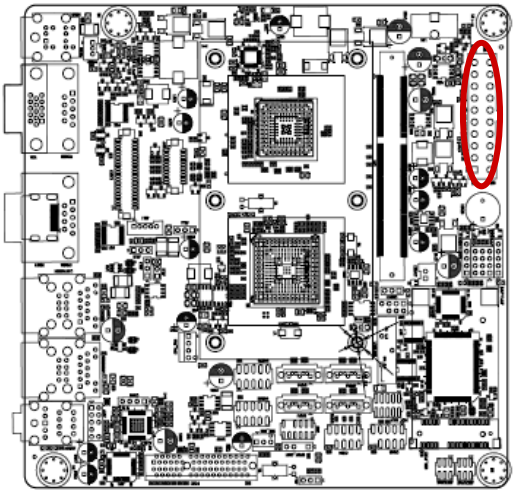


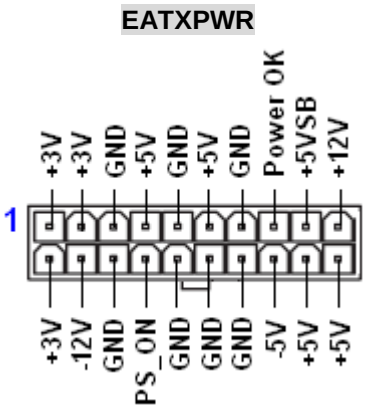
10. SENSE2_RTN	9. LIN2_L
8. NC	7. SENSE_B
6. SENSE1_RTN	5. LIN2_R
4. PRESENSE	3. MIC2_R
2. GND	1. MIC2_L

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

2.4.6 ATX Power Connector (ATXPWR)

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

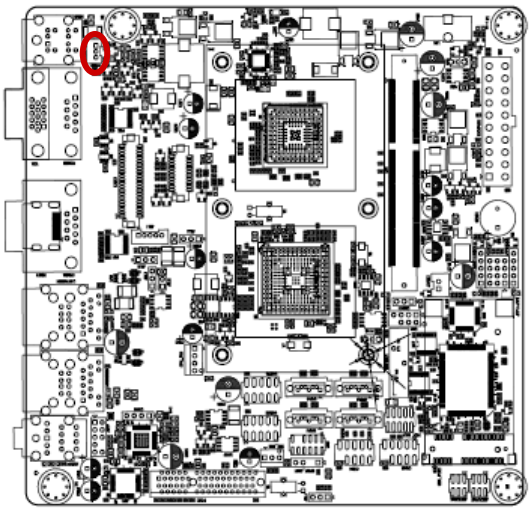


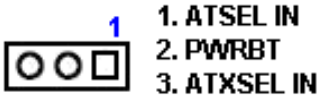


Important notes on the Motherboard Power Requirements

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

2.4.7 AT/ATX Mode Select (PSON1)

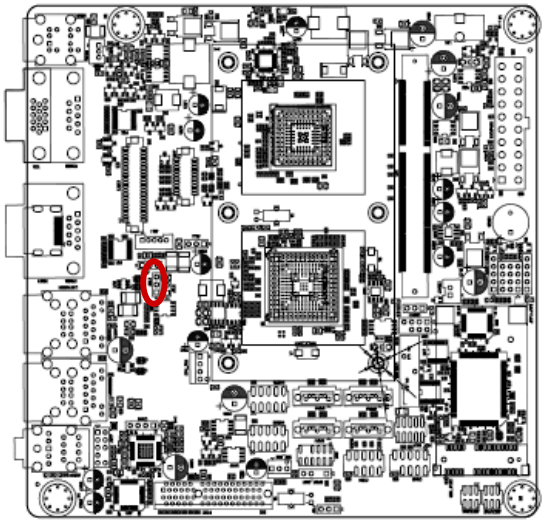




ATX MODE (Default)

AT MODE

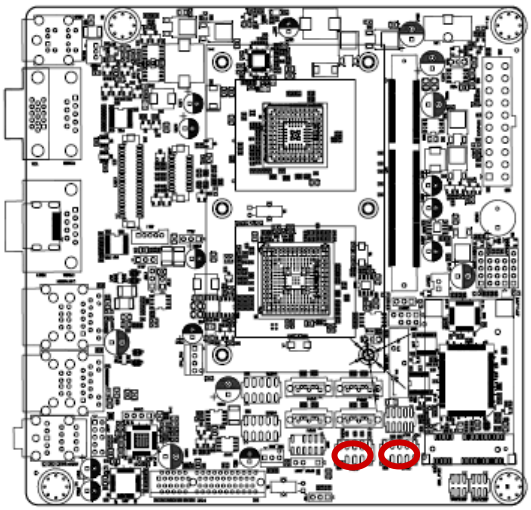
2.4.8 LCD POWER (VDDSAFE) (JBL3)



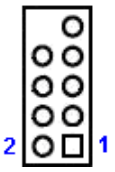
3.3V (Default)

5V

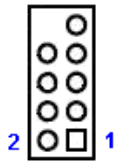
2.4.9 Serial Port Connector (COM3, COM4)



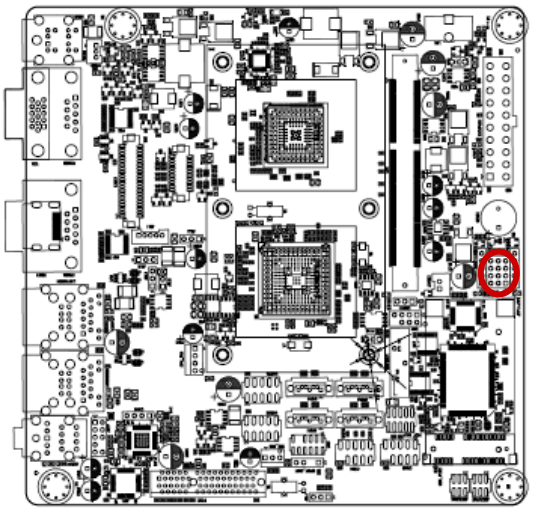
COM3

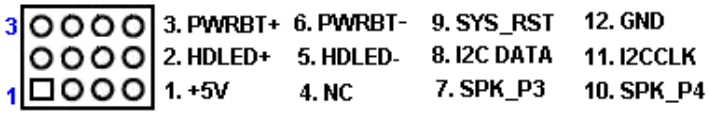


COM4



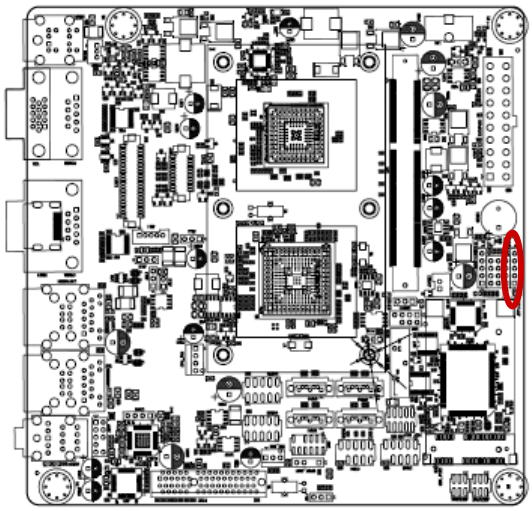
2.4.10 System Panel & Speaker (JFP1 + JFP2)

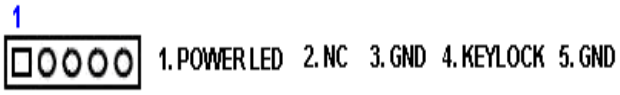




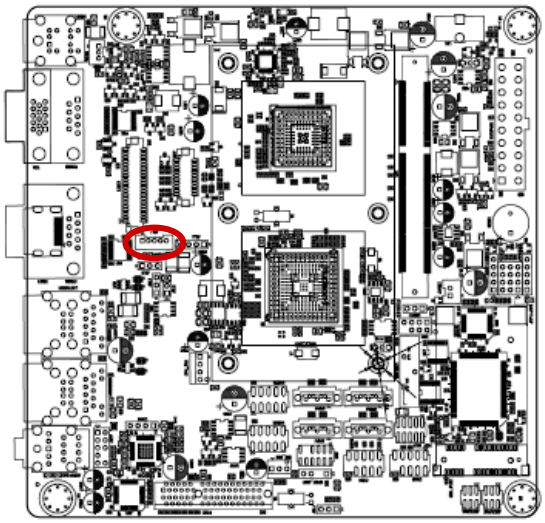
PIN7-10	Internal SPK	PIN3-6	POWER BT
PIN1-10	External SPK	PIN9-12	SYS_RESET

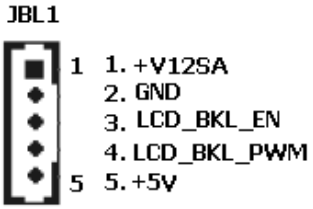
2.4.11 Power LED & Keylock (JFP3)



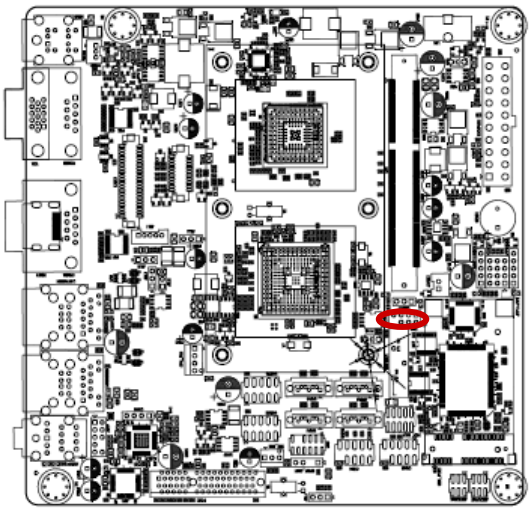


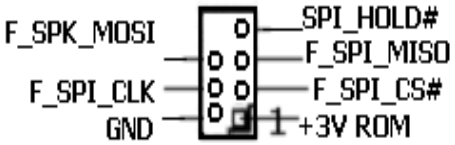
2.4.12 Inverter PWR (JBL1)



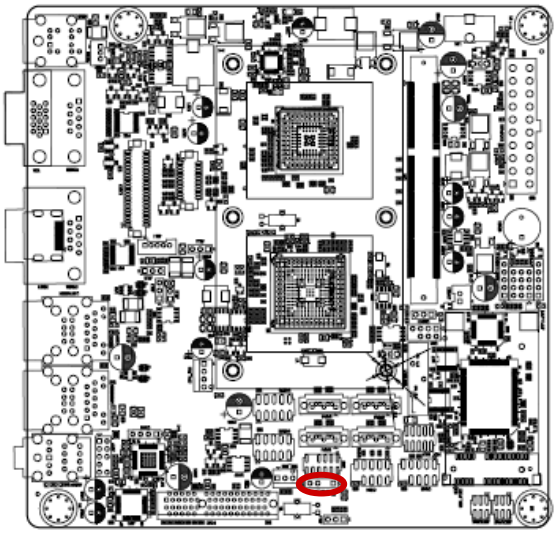


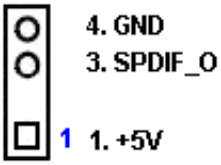
2.4.13 SPI connector (CN4)



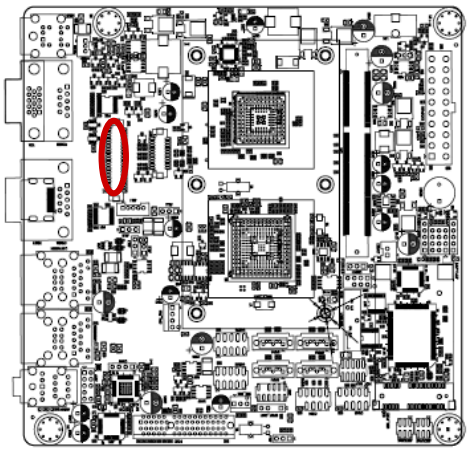


2.4.14 SPDIF OUT (SPDIF_OUT1)



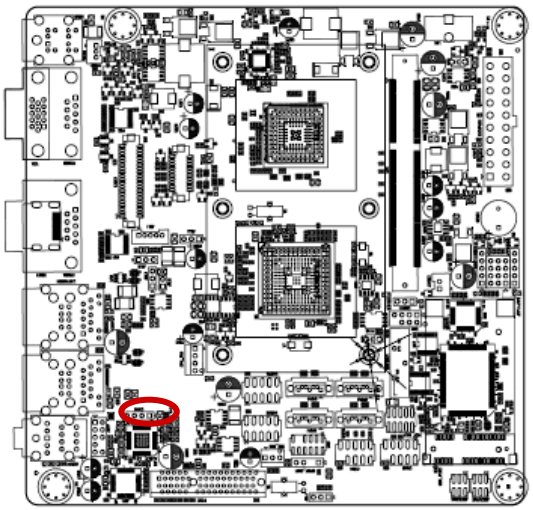


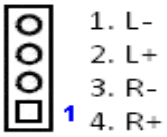
2.4.15 18-bit LVDS Connector (LVDS1)



1.VDDSAFE	11.GND	21.LVDS_L2_P	31.LVDS_DDC_CLK
2.VDDSAFE	12.GND	22.NC	32.LVDS_DDC_DATA
3.GND	13.LVDS_L1_N	23.GND	33.GND
4.GND	14.NC	24.GND	34.GND
5.VDDSAFE	15.LVDS_L1_P	25.LVDS_CLK_N	35.NC
6.VDDSAFE	16.NC	26.NC	36.NC
7.LVDS_L0_N	17.GND	27.LVDS_CLK_P	37.NC
8.NC	18.GND	28.NC	38.NC
9.LVDS_L0_P	19.LVDS_L2_N	29.GND	39.LCD_BLK_EN
10.NC	20.NC	30.GND	40.VCON

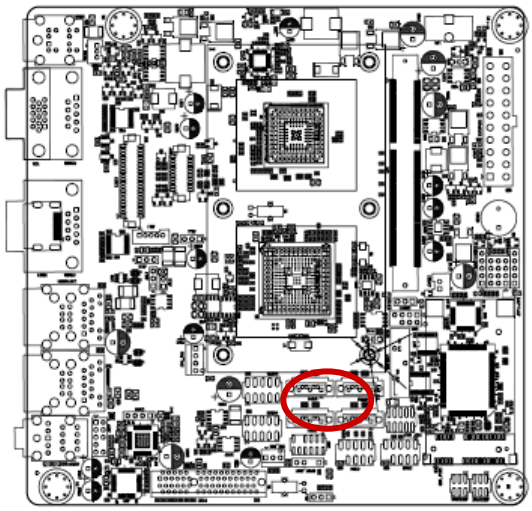
2.4.16 AMP_R+R-/AMP_L+L- (CN10)

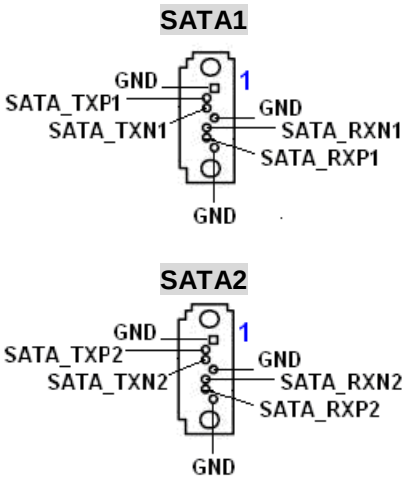




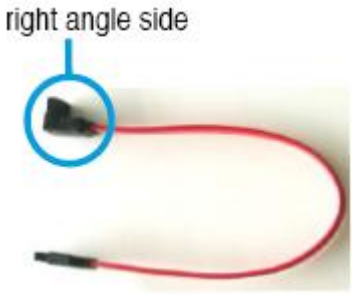
2.4.17 Serial ATA Connector (SATA1, SATA2)

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.





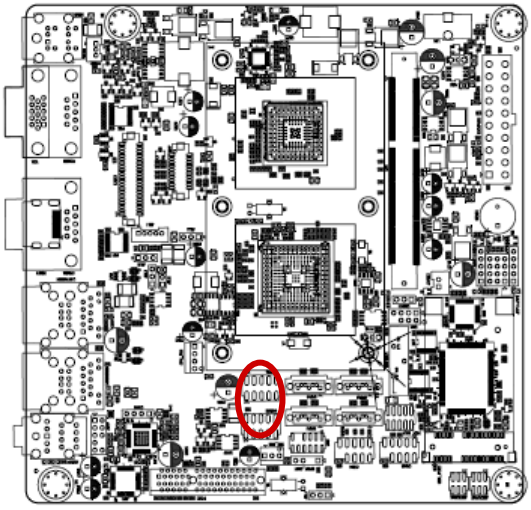
Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

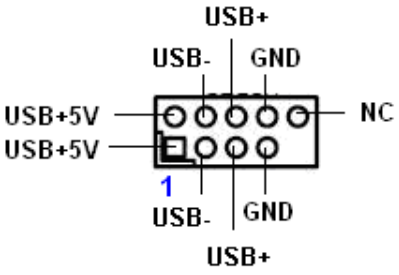


- Install the Windows® 2000 Service Pack 4 or the Windows® XP Service Pack1 before using Serial ATA.
- When using the connectors in Standard IDE mode, connect the primary (boot) hard disk drive to the SATA1 connector.

2.4.18 USB 2.0 Connector (USB56)

These connectors are for USB 2.0 ports. Connect the USB/GAME 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.





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

The USB module is purchased separately.

3. BIOS Setup

3.1 Introduction

This motherboard supports a programmable firmware chip that you can update using the provided utility. Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to “Run Setup.” This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware hub.

The firmware hub on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl + Alt + Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** from the BIOS menu screen.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the system builder’s website to download the latest BIOS file for this motherboard

3.1.1 Legend Box

The keys in the legend bar allow you to navigate through the various setup menus

Key(s)	Function Description
←	Select Screen
↑ ↓	Select Item
+ -	Change Option / Field
Enter	Go to Sub Screen
PGDN	Next Page
PGUP	Previous Page
HOME	Go to Top of Screen
END	Go to Bottom of Screen
F2/F3	Change Colors
F7	Discard Changes
F8	Load Failsafe Defaults
F9	Load Optimal Defaults
F10	Save and Exit
ESC	Exit

3.1.2 List Box

This box appears only in the opening screen. The box displays an initial list of configurable items in the menu you selected.

3.1.3 Sub-menu

Note that a right pointer symbol  appears to the left of certain fields. This pointer indicates that you can display a sub-menu from this field. A sub-menu contains additional options for a field parameter. To display a sub-menu, move the highlight to the field and press <Enter>. The sub‐menu appears. Use the legend keys to enter values and move from field to field within a sub-menu as you would within a menu. Use the <Esc> key to return to the main menu.

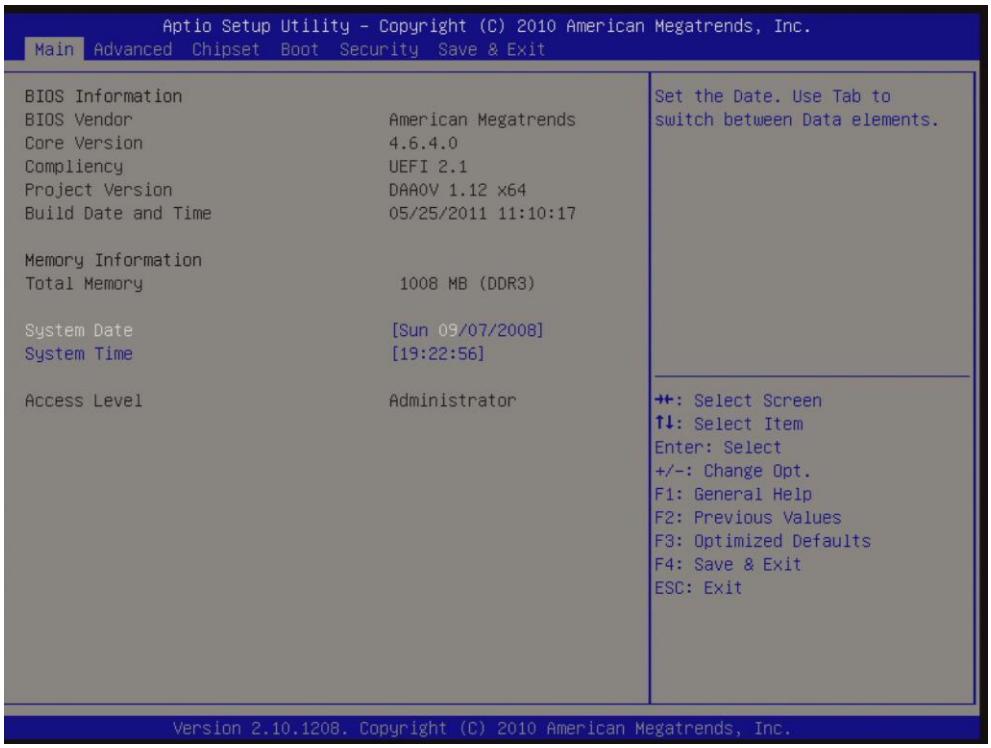
Take some time to familiarize yourself with the legend keys and their corresponding functions. Practice navigating through the various menus and submenus. If you accidentally make unwanted changes to any of the fields, press <F6> to load the fail-safe default values. While moving around through the Setup program, note that explanations appear in the Item Specific Help window located to the right of each menu. This window displays the help text for the currently highlighted field.

3.2 BIOS setup

When you enter the BIOS, the following screen appears. The BIOS menu screen displays the items that allow you to make changes to the system configuration. To access the menu items, press the up/down/right/left arrow key on the keyboard until the desired item is highlighted, then press [Enter] to open the specific menu.

3.2.1 Main

This section allows you to record some basic hardware configurations in your computer and set the system clock.



Date [Day, xx/ xx/ xxxx]

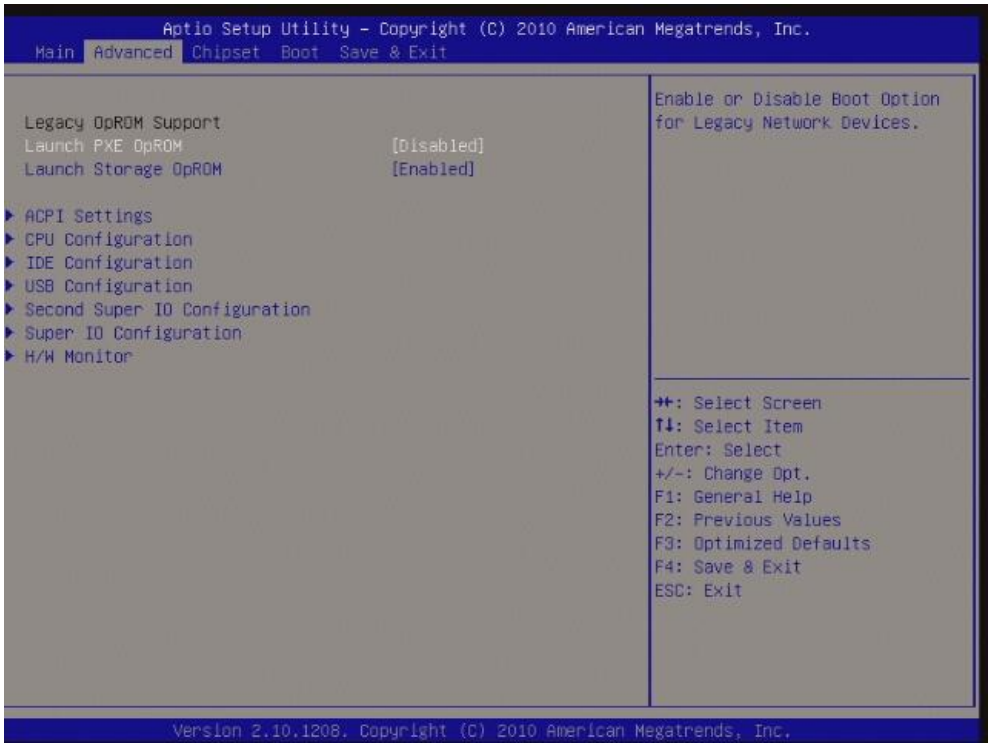
The date format is <week>, <month>, <day>, <year>.

Time [xx : xx : xx]

The time format is <hour><minute><second>, based on the 24-hour clock.

3.2.2 Advanced

This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.



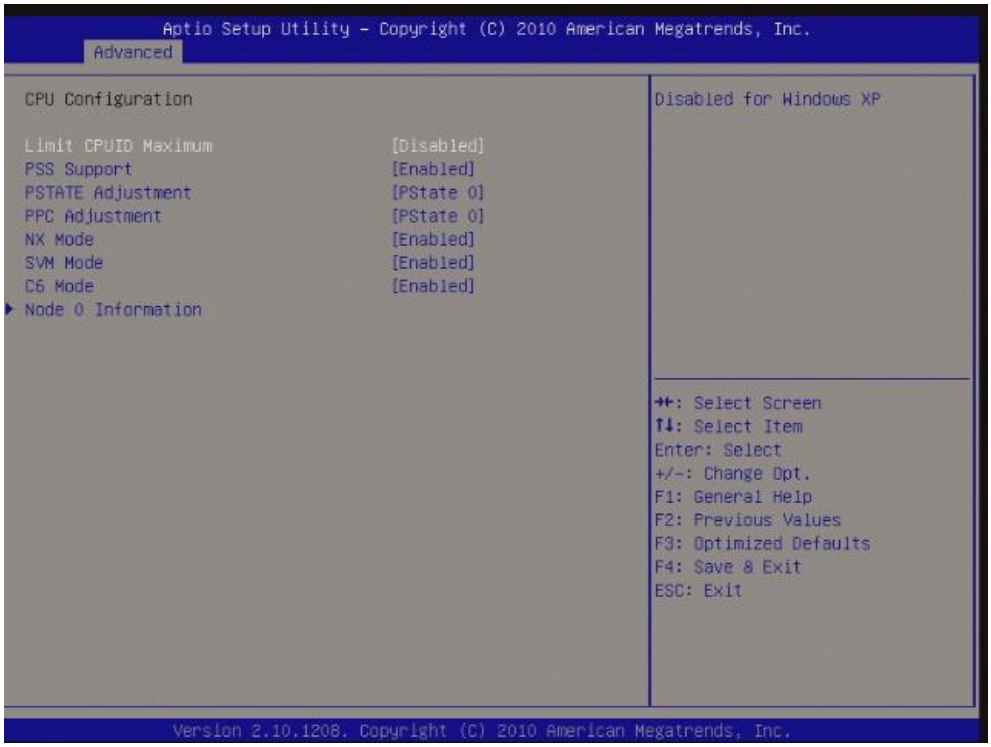
Item	Options	Description
Launch PXE OpROM	Enabled Disabled	Enable or Disable Boot Option for Legacy Network Devices
Launch Storage OpROM	Enabled Disabled	Enable or Disable Boot Option for Legacy Mass Storage Devices with Option ROM

3.2.2.1 ACPI Setting

Defines interfaces for hardware discovery, configuration, power management and monitoring.

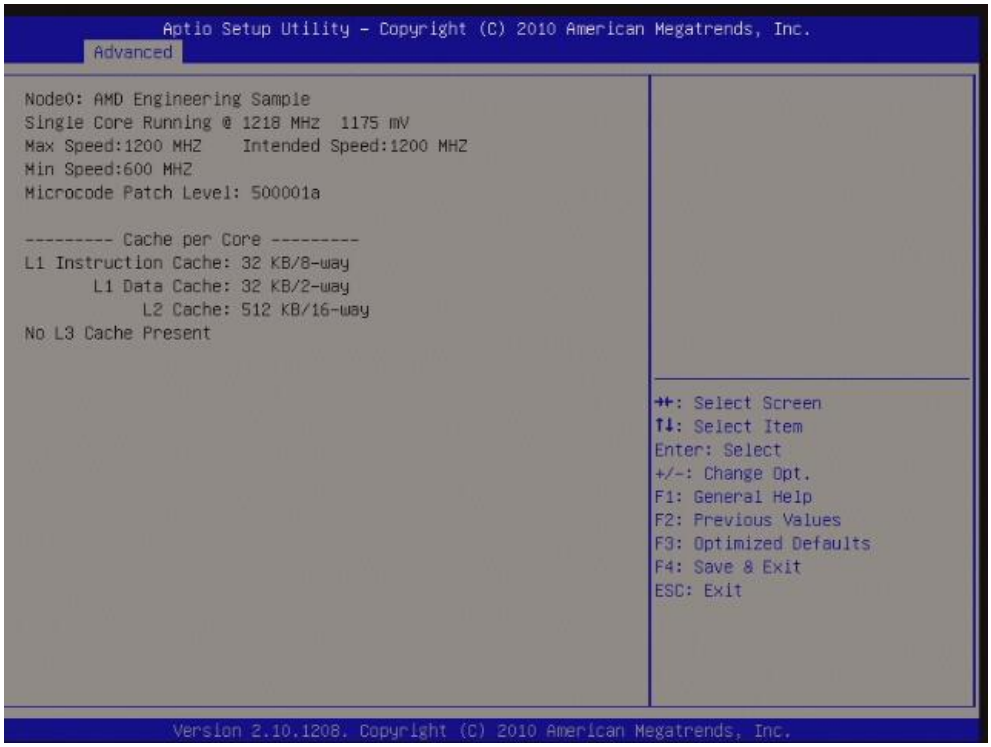
Item	Options	Description
ACPI Sleep State	S3 (Suspend to RAM)	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
S3 Video Repost	Enabled Disabled	Enables or Disables S3 Video Repost
PS2 Keyboard Wake up	Enabled Disabled	Enables or Disables PS2 Keyboard Wake up
PS2 Mouse Wake up	Enabled Disabled	Enables or Disables PS2 Mouse Wake up

3.2.2.2 CPU Configuration



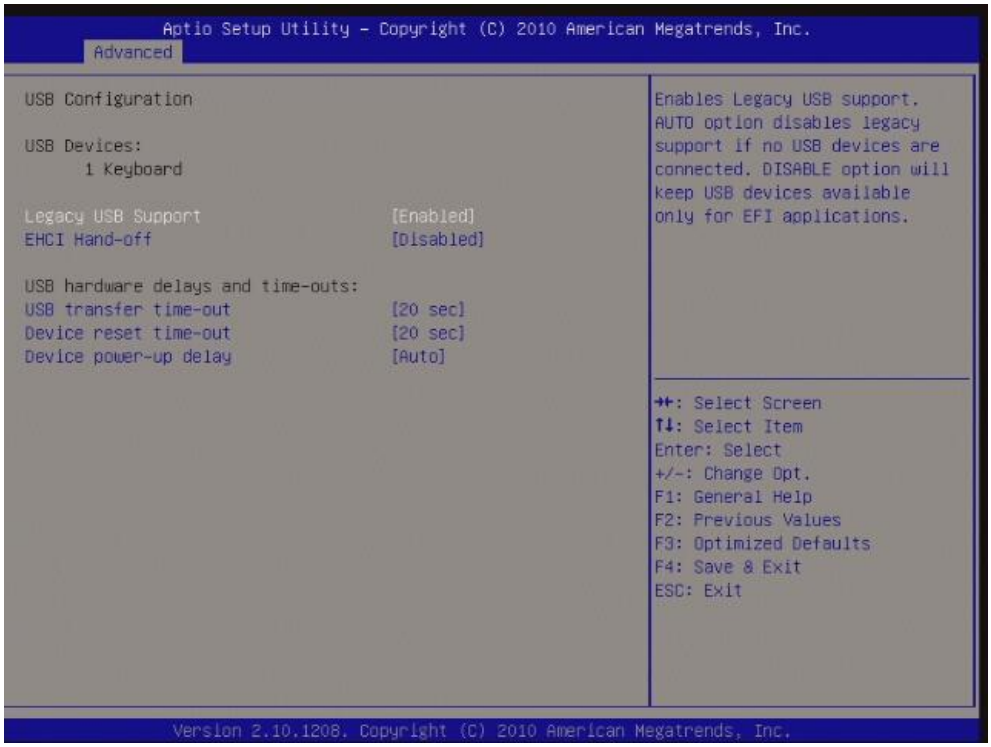
Item	Options	Description
PSS Support	Enabled Disabled	Enable or disable the generation of ACPI_PPC, _PSS, and _PCT objects.
PSTATE Adjustment	PState 0/1/2/3/4/5/6/7	Adjust startup P-state level
PPC Adjustment	PState 0/1/2/3/4/5/6/7	Adjust _PPC object
NX Mode	Enabled Disabled	Enable or Disable No-Execute page protection Function
SVM Mode	Enabled Disabled	Enable or Disable CPU Virtualization
C6 Mode	Enabled Disabled	Enable or Disable C6

3.2.2.2.1 Node 0 Information



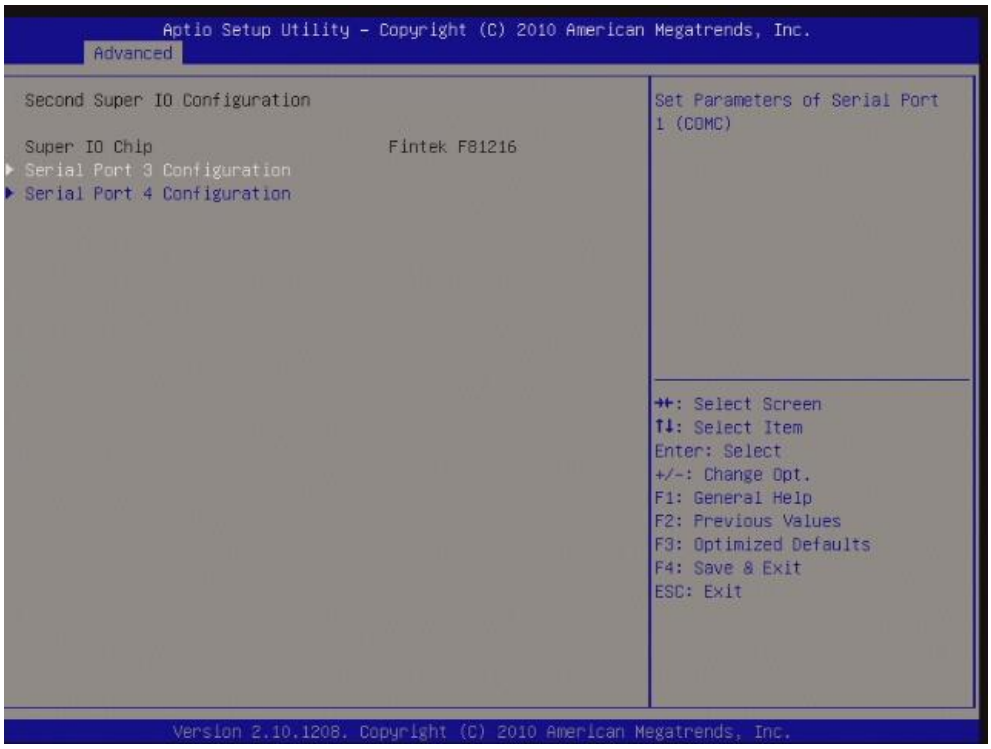
3.2.2.3 IDE Configuration

3.2.2.4 USB Configuration



Item	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB device is connected. DISABLED option will keep USB devices available only for EFI applications.
EHCI Hand-off	Disabled Enabled	This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
USB transfer time-out	1sec 5sec 10sec 20sec	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10sec 20sec 30sec 40sec	USB mass storage device Start Unit command time-out
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the host Controller. "Auto" uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub.

3.2.2.5 Second Super IO Configuration



3.2.2.5.1 Serial Port 3 Configuration

Item	Options	Description
Serial Port	Enabled Disabled	Enables or Disabled Serial Port (COM)
Change settings	Auto IO=3E8h; IRQ=7 IO=3F8h;IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h;IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h;IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h;IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device
Device Mode	Serial port function Mode IR Mode, Pulse 1,6us, Full Duplex IR Mode, Pulse 1,6us, Half Duplex IR Mode, Pulse 3/16 Bit Time, Full Duplex IR Mode, Pulse 3/16 Bit Time, half Duplex	Change the serial Port mode

3.2.2.5.2 Serial Port 4 Configuration

Item	Options	Description
Serial Port	Enabled Disabled	Enables or Disabled Serial Port (COM)
Change settings	Auto IO=2E8h; IRQ=7 IO=3F8h;IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h;IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h;IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h;IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device.

3.2.2.6 H/W Monitor

3.2.2.6.1 Smart Fan Mode Configuration

Item	Options	Description
SYS Smart Fan Mode	Manual Mode Thermal Cruise Mode	SYS Smart Fan Mode selection
CPU Smart Fan 0 Mode	Manual Mode Thermal Cruise Mode	CPU Smart Fan 0 Mode selection

SYS temperature:	+34C
CPU temperature:	+31C
SYS Fan Speed:	4963 RPM
CPU Fan speed:	N/A
CPUVCORE:	+0.520V
+12V:	+12.480V
AVCC:	+3.456V
+5V:	+5.248V
5VSB:	+5.152V
3VSB:	+3.568V
VBAT:	+3.328V

3.2.2.7 Super IO Configuration

Item	Options	Description
Restore on AC Power Loss	Power Off Power On Last State	Set AC Power Loss function
Watchdog Mode	Minute Second	Set watchdog Timer
Watchdog Timer	0 – 255	Input value (Range: 0 – 255)
Case Open warning	Enabled Disabled	Enabled or Disable Case Open warning

3.2.2.7.1 Serial Port 0 Configuration

Item	Options	Description
Serial Port	Enabled Disabled	Enables or Disabled Serial Port (COM)
Change settings	Auto IO=3F8h; IRQ=4 IO=3F8h;IRQ=3,4,5,6,7,10,11,12; IO=2F8h;IRQ=3,4,5,6,7,10,11,12; IO=3E8h;IRQ=3,4,5,6,7,10,11,12; IO=2E8h;IRQ=3,4,5,6,7,10,11,12;	Select an optimal setting for Super IO device.

3.2.2.7.1 Serial Port 1 Configuration

Item	Options	Description
Serial Port	Enabled Disabled	Enables or Disabled Serial Port (COM)
Change settings	Auto IO=2F8h; IRQ=3 IO=3F8h;IRQ=3,4,5,6,7,10,11,12; IO=2F8h;IRQ=3,4,5,6,7,10,11,12; IO=3E8h;IRQ=3,4,5,6,7,10,11,12; IO=2E8h;IRQ=3,4,5,6,7,10,11,12;	Select an optimal setting for Super IO device.

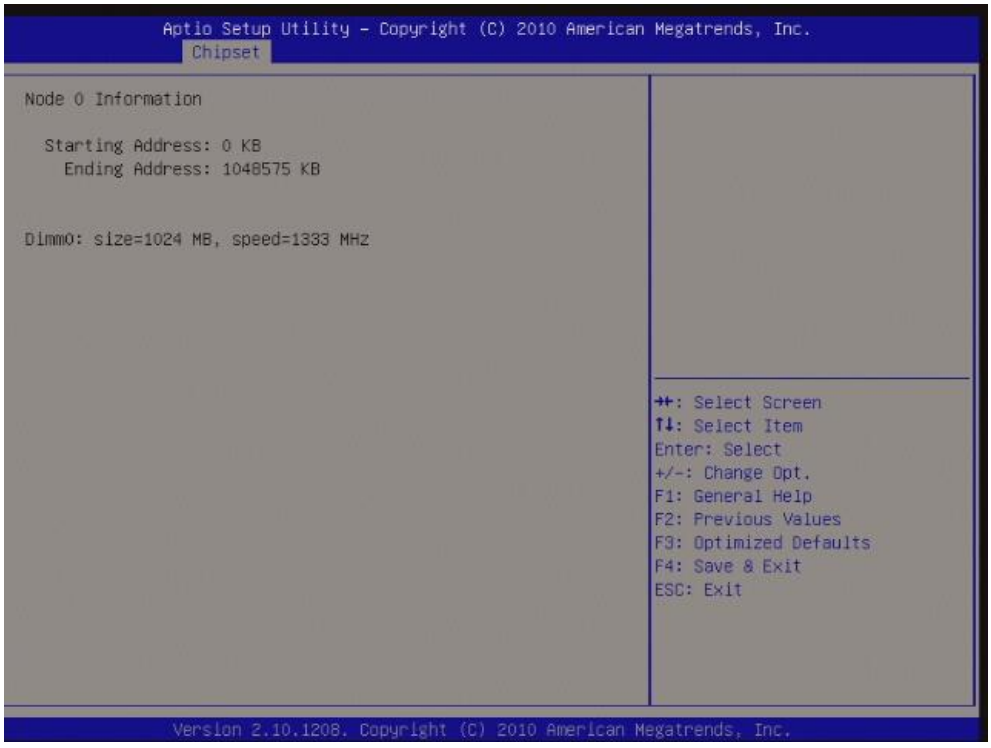
3.2.3 Chipset

This category displays base memory, extended memory, and total memory detected during POST (Power On Self Test).

3.2.3.1 North Bridge

Item	Options	Description
IOMMU Mode	Disabled 32MB 64MB 128MB 256MB 512MB 1G 2G	IOMMU is supported on LINUX based systems to convert 32bit I/O to 64bit MMIO.
Memory Clear	Disabled Enabled	Memory Clear functionality control

3.2.3.1.1 Node 0 Information



3.2.3.1.2 Memory Configuration

Item	Options	Description
Integrated Graphics	Force Disabled	Enable Integrated Graphics controller
UMA Frame buffer Size	32MB 64MB 128MB 256MB 512MB 1G 2G	Set UMA FB size

3.2.3.2 North Bridge LVDS Config Select

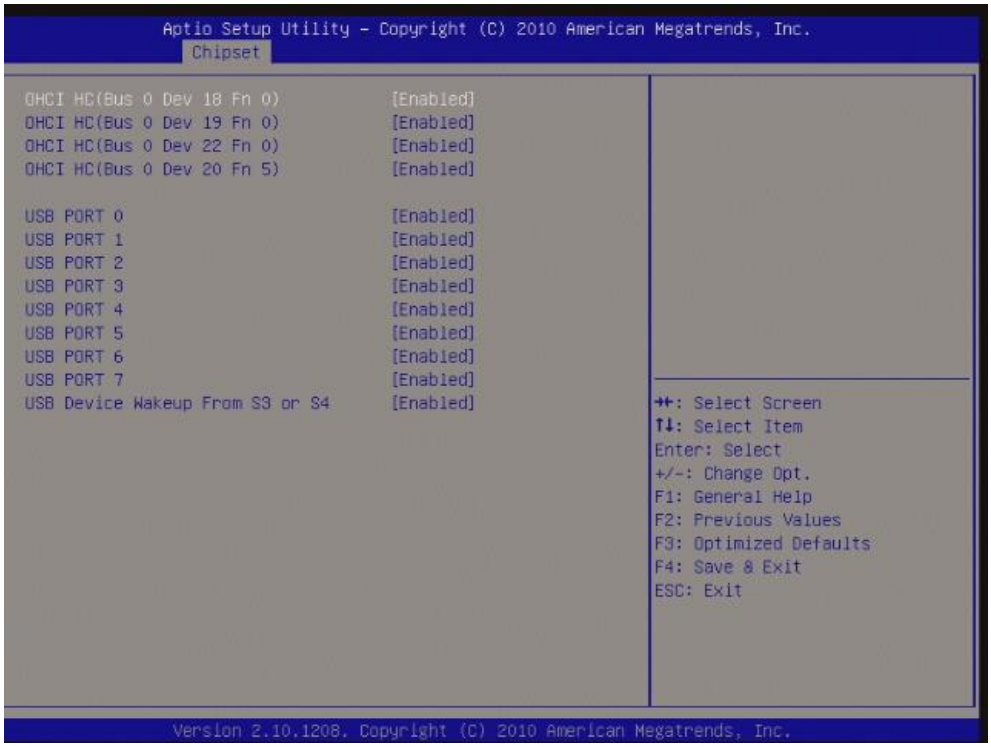
Item	Options	Description
DP0 Output mode	DP LVDS Disabled	NB PCIE Connect Type (Display device)
DP1 Output Mode	HDMI Disabled	
LVDS Panel Config Select	800x600 1024x768 1280x720 1280x800 1280x1024 1366x768 1440x900 1600x900 1920x1024	Select LVDS panel configuration
Brightness Control Value	0 – 255	Input Brightness Value (Range: 0 – 255)
EDID Panel Option	Enabled Disabled	EDID Panel Option

3.2.3.3 South Bridge

3.2.3.3.1 SB SATA Configuration

Item	Options	Description
Onchip SATA Type	Native IDE RAID AHCI	Native IDE/n RAID/n AHCI/n Legacy IDE /n IDE→AHCI /n HyperFlash.

3.2.3.3.2 SB USB Configuration



Item	Options	Description
OHCI HC (Bus 0 DEV 18 Fn 0)	Enabled Disabled	Enable or Disable OHCI HC (Bus 0 DEV 18 Fn 0)
OHCI HC (Bus 0 DEV 19 Fn 0)	Enabled Disabled	Enable or Disable OHCI HC (Bus 0 DEV 19 Fn 0)
OHCI HC (Bus 0 DEV 22 Fn 0)	Enabled Disabled	Enable or Disable OHCI HC (Bus 0 DEV 22 Fn 0)
OHCI HC (Bus 0 DEV 20 Fn 5)	Enabled Disabled	Enable or Disable OHCI HC (Bus 0 DEV 20 Fn 5)
USB Port 0	Enabled Disabled	Enable or Disable USB Port 0
USB Port 1	Enabled Disabled	Enable or Disable USB Port 1
USB Port 2	Enabled Disabled	Enable or Disable USB Port 2
USB Port 3	Enabled Disabled	Enable or Disable USB Port 3
USB Port 4	Enabled Disabled	Enable or Disable USB Port 4
USB Port 5	Enabled Disabled	Enable or Disable USB Port 5
USB Port 6	Enabled Disabled	Enable or Disable USB Port 6
USB Port 7	Enabled Disabled	Enable or Disable USB Port 7
USB Device wakeup From S3 or S4	Enabled Disabled	Enable or Disable USB Device Wake up from S3 or S4

3.2.4 Boot

Item	Options	Description
Setup Prompt Timeout	1 - 65535	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting
Bootup Numlock State	On Off	Select the keyboard Numlock state
Quiet boot	Enabled Disabled	Enables or Disables Quiet Boot option
GateA20 Active	Upon request Always	UPON REQUEST- GA20 can be disabled using BIOS services. ALWAYS- do not allow disabling GA20; this option is useful when any RT code is executed above 1MB
Option ROM Messages	Force BIOS Keep current	Set display mode for Option ROM
Interrupt 19 Capture	Enabled Disabled	Enabled" allows Option ROMs to trap Int 19

3.2.5 Save & Exit

If you select this and press <Enter>, the values entered in the setup utilities will be recorded in the CMOS memory of the chipset. The processor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.