华北工控®

MITX-6852

Mini-ITX Industrial Motherboard

USER' Manual V1.0

USER'Manual

Industrial & Communication Computer

MITX-6852

Mini-ITX Industrial Motherboard

USER' Manual V1.0

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Declaration of conformity

CE

ShenZhen NORCO Intelligent Technology Co.,Ltd.

declares that the product

MITX-6852 Mini-ITX Industrial Motherboard

(reference to the specification under which conformity is declared in accordance with 89/336 EEC-EMC Directive)

☑	EN 55022	Limits and methods of measurements of radio disturbance Characteristics of information technology equipment
☑	EN 50081-1	Generic emission standard Part 1: Residential, commercial and light industry
☑	EN 50082-1	Generic immunity standard Part 1: Ressidential, commercial and light industry

European Representative:

ShenZhen NORCO Intelligent Technology Co.,Ltd.

Signature: _____ Place/Data: HONG KONG/2008

Printed Name: Anders Cheung Position/Title: President

Declaration of conformity

Trade Name：ShenZhen NORCO Intelligent Technology Co.,Ltd.

Model Name：MITX-6852

Responsible Party：ShenZhen NORCO Intelligent Technology Co.,Ltd.

Equipment Classification：FCC Class B Subassembly

Type of Product：Mini-ITX Industrial Motherboard

Manufacturer：ShenZhen NORCO Intelligent Technology Co.,Ltd.

Supplementary Information:

This device complies with Part 15 of the FCC Rules.Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Signature: _____

Data: 2008

Copyright

With the exception of showing the accessories of product configuration,This manual do not create any commitment of our company. We retained the rights to change it without prior notice. We will not be responsible for any installation, the result of improper use of direct, indirect, intentional or unintentional damage or hidden dangers.

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Common Sense in Safety Application

1. Before using this product, be sure to read carefully this user's manual;
2. Any plate cards not ready to be installed shall be kept in the anti-static protective bags;
3. Before taking out the plate cards from the anti-static protective bags, first place hands on the grounding metal object for a while (e.g. 10 seconds) so as to release static electricity in body and hands;
4. While fetching plate cards, you should wear static protective gloves and have the habit of contacting brims of them;
5. In order to prevent bodily electric shock or damage to products, first turn off the AC power or unplug the power cord out of power sockets while inserting main boards or plate cards or configuring again;
6. Before it is necessary to move plate cards or the unit, be sure to unplug the AC power cords out of the power sockets;
7. Be sure to unplug AC power cords when there is an increase/decrease in plate cards for this product;
8. Before you connect or unplug any equipment, be sure to determine whether all power cords are unplugged in advance;
9. To prevent any unnecessary injuries to products due to frequent power on/off to the products, after the unit is shut down, you must wait at least 30 seconds before you restart up the unit.
10: If anything unexpected exists during Equipment used, please contact the professionals.

Content

Chapter General Information 1
1.1 Introduction 1
1.2 Specifications 1
Chapter2 H/W Installation 5
2.1 Connector Locations and Dimensions 5
2.2 Installation Steps 7
2.3 CPU & Cooling Fan Installation 7
2.4 Installing SO-DIMM 8
2.5 Setting Jumpers 9
2.5.1 Clear CMOS (JCC) 9
2.5.2 BIOS-protect Jumper (JAV) 10
2.5.3 COM2 setting（J16、J17、J18） 10
2.5.4 CF Card Master/Slave Selection（JCF） 12
2.6 External Connector 13
2.6.1 IDE Connector（IDE1） 13
2.6.2 SATA（SATA1 - SATA6，J5） 14
2.6.3 CF Card Socket（Compact Flash） 16
2.6.4 Serial ports（COM1，COM2） 16
2.6.6 Display interfaces（VGA，DVI，LVDS，TV-OUT） 18
2.6.7 LVDS PANEL BACKLIGHT（J11） 20
2.6.8 USB Ports and Ethernet Connectors（LU1，LU2，USB_12） 21
2.6.9 Keyboard/Mouse connector（KBM） 22
2.6.10 IRDA interface（IRDA） 23
2.6.11GPIO（General Purpose Input Output）（J10） 24
2.6.12 Power Connectors(J2，JP1) 25
2.6.13 CPUFAN connector（CPUFAN） 26
2.6.14 AUDIO(JA3，CD-IN) 27
2.6.15 Front Panel connector（J4） 28
2.6.16 RAM Slot（SODIMM1） 30
2.6.17 PCIE_16x Slot（PCIE_16x） 31
2.6.18 Mini PCI slot 31

Chapter3 BIOS Setup 32
3.1 Main Menu 33
3.2 Advanced Menu 34
3.2.1 CPU Configuration 35
3.2.2 IDE Configuration 36
3.2.3 SupperIO Configuration 38
3.2.4 Hardware Health Configuration 40
3.2.5 ACPI Configuration 41
3.2.6 APM Configuration 45
3.2.7 MPS Configuration 47
3.2.8 PCI Express Configuration 48
3.2.9 Smbios Configuration 49
3.2.10 USB Configuration 50
3.3 PCI PnP Menu 52
3.4 Boot Menu 54
3.5 Security Menu 57
3.6 Chipset Menu 59
3.6.1 North Bridge Configuration 59
3.6.2 South Bridge Configuration 62
3.6.3 Video Function Configuration 63
3.7 Exit Menu 65
Appendix 67
Appendix 1: Driver Installation 67
Appendix 2：RAID Setup 68
Appendix 3：Watchdog programmer guide 72
Appendix 4: Glossary 74

Packing List

Thank you very much for choosing our products. Please check your package completely as the following item checklist first, if you find any components lost or damaged, please contact your retailer.

■ MITX-6852 Motherboard	1pcs
■User's Manual	1pcs
■Drive Disk	1pcs
■SATA Data Cable	1pcs
■SATA HD Power Cable (optional)	1pcs
■IDE Data Cable	1pcs
■Serial port convert cable	1pcs
■Jumpers	1bag

Chapter 1
General Information

Chapter1 General Information

1.1 Introduction

MITX-6852 Mini-ITX motherboard, based on 945GME+ICH7R chipset, 533/667MHz FSB, support Socket 479 Intel Core 2 Duo Processors with FSB667MHz, support Socket 479 Intel Core Duo/ Core Solo Processors with FSB533/667MHz, support Socket 479 Intel Celeron M (Yonah Core) Processor with FSB533 MHz. onboard one 200Pin SO-DIMM DDRⅡ 533/667 SDRAM slot, capacity max. upto 2GB. Intel945GME integration Internal graphic controller (Intel GMA 950), provide VGA、DVI、LVDS、TV-OUT connector(DVI and LVDS can't be used at the same time) support VGA +LVDS (DVI)/TV_OUT independent dual-displaying. Rich connectors is extended: one IDE, six SATAⅡ ports(SATA5,SATA6 optional), support six USB2.0， two COM(COM2support RS-232/422/485 mode), two 10/100/1000Mbit/s LAN ports and one PCIE 16X and Mini-PCI slot.

MITX-6852 also provides other advanced functions. For example: Intel Matrix Storage Technology. Through RAID 0, 1, 5 and 10, the data access speed, safety and efficiencies is improved; Programmable Input/Output interface, IrDA, Watchdog Timer, and virus protection for BIOS etc. MITX-6852 is entitled by its low-power and high-performance to most applications including automobile, communication, pharmacy, tobacco and other more demanding jobs.

1.2 Specifications

Configuration Standard

●Low consume Mini-ITX Standard motherboard

Dimensions

●170mm X 170mm（L×W）

Processor

——Intel® Core™2Duo 65nm Processor supported at Front Side Bus(FSB) 667MHz，4MB L2 Cache，frequency Upto2.33GHz

——Intel® Intel® Core Duo 65nm Processor supported at Front Side Bus(FSB)

533/667MHz，2MB L2 Cache，frequency Upto2.33GHz

——Intel® Intel® Core Solo 65nm Processor supported at Front Side Bus(FSB) 533/667MHz，2MB L2 Cache，frequency Upto1.86GHz

——Intel® Celeron M (Yonah Core) Processor supported at Front Side Bus(FSB) 533MHz，1MB L2 Cache，frequency Upto1.83GHz

Chipset：

●North Bridge：Intel®945GME

●South Bridge：Intel ®ICH7R，Support RAID 0/1/5/10

●FSB: support front side bus (FSB) with 533/667MHz

●The DMI interface connected the South and North Bridge, and support upto 2GB/s data transmission speed. This interface has increased the data transmission speed of the system.

Display

●**Display chip**：Intel® 82945GME GMCH integrated GMA950

●**VGA**：1×DB15，support uXGA and resolution up to 2048 × 1536

●**LCD**：Support DVI（converted by LVDS）、Support 18BitLVDS LCD，support resolution up to 1600x1200(DVI and LVDS can't be used at the same time).

●**TV_OUT**：2x3 Header，Support HDTV graphic resolution，support multi-lines output port：Composite Video、S-Video、Component Video（YprPb）etc.

●**Dual Independent Display**:：Supports VGA+LVDS/VGA+DVI/VGA+TV_OUT

RAM

●Support Dual channel DDRⅡ400/533/667MHz SDRAM up to 2GB,，No support ECC function

Storage

●6xSerial ATAⅡ interfaces（SATA5、SATA6 optional）, the transfer speed is up to 300MB/s

●Support one U1tra ATA100/66/33 standard IDE interfaces, capable of increasing the information transmission rate up to 100MB/s maximum.

●Compact Flash：50Pin Socket（Support DMA mode），share IDE channels

Ethernet

●This motherboard is the integration of two Intel® 82573V 10/100/1000Mb Ethernet interfaces.

●Standard RJ45 interface

AUDIO

●Chip: Realtek ALC262

●provide 2 channel（L+R）Speak out，MIC-IN port

●Provide 1xCD-IN port

USB Port

●6x USB2.0 ports：Four on back panel, other two as groups of 2×5 Header

I/0 Functions

●Winbond W83627HG I/O Chip

●2 group 2X5 Header serial interfaces，COM1support RS-232，COM2 support RS-232/485/422(optional)

●2xPS/2 KB/MS ports

●1xIrDA port

●8 bit digital I/O, 4 for output and other 4 for input

Power supply

●single power supply input（+12V）/standard ATX power supply

Watchdog Timer

●Support hardware reset function

BIOS

●4MB SPI Flash BIOS

●Support ACPI Power Manage

Environmental

●Operate Temp：0-60℃

- Storage Temp.：-40-85℃
- Operating Humidity:：5%-95%

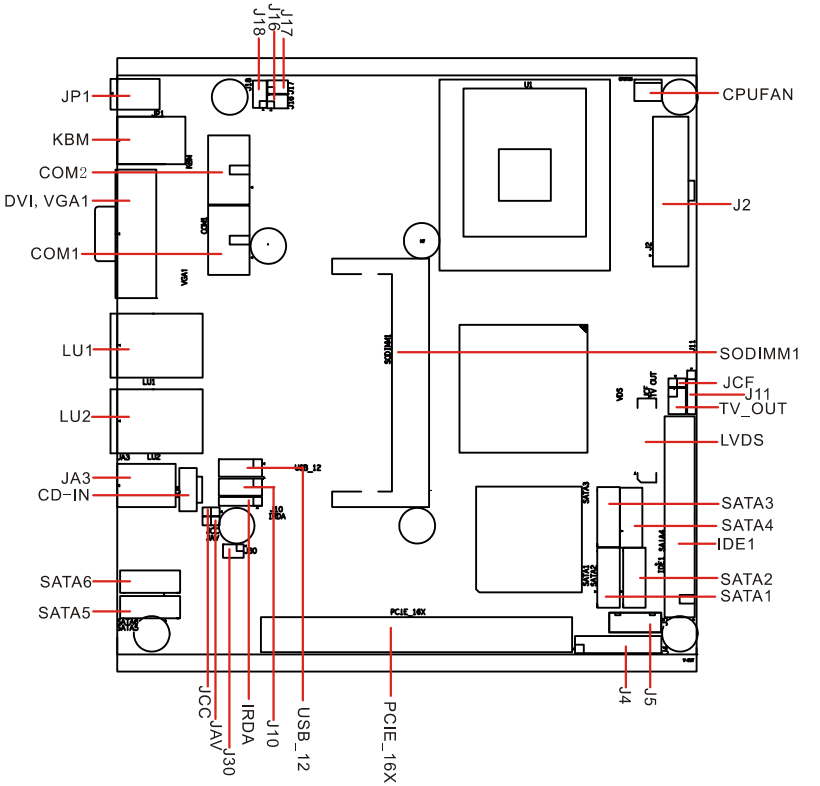
Chapter 2
H/W Installation

Chapter2 H/W Installation

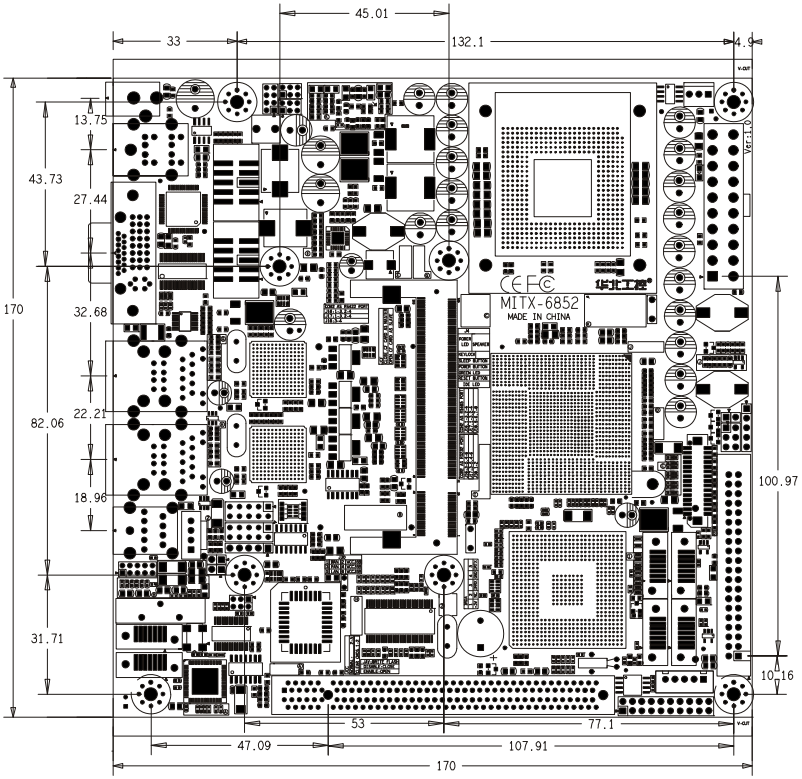
2.1 Connector Locations and Dimensions

The following picture is interface index for MITX-6852, when you install your devices, please consult it and read the following guide. During installation please care: for some devices, if incorrectly install, it will not work normally.

Notice：During installation, in order to protect the part of board, please put on antistatic gloves.



MITX-6852 Connectors Locations



MITX-6852 Dimensions

2.2 Installation Steps

Please refer to the following steps to install your computer:

1. Adjust all Jumpers on the MITX-6852 per this manual.
2. Installing CPU and Cooling FAN
3. Installing system memory
4. Installing Expansion card
5. Connect all of the signal line, cable, panel-control circuitry and power supply
6. Finish BIOS setup

Notice：

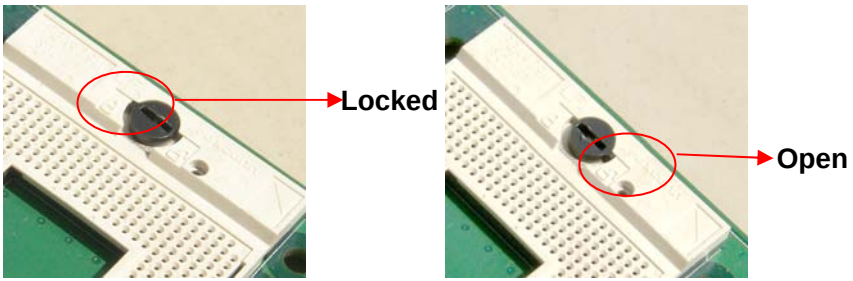
Key components of this motherboard are Integrated circuit, and these components will be easily damaged by electrostatic influence. So, before installing motherboard, you should always follow the following precautions:

1. Disconnect your Computer from the power supply before handling it.
2. Hold side by the edges; don't touch any component or pins on the board
3. Use a grounded wrist strap while getting in touch with integrated circuit component (like as CPU, RAM).
4. Place components on a grounded antistatic bag that came with the Single Board Computer, when these components are separated from the system.

2.3 CPU & Cooling Fan Installation

Installing CPU complied following steps：

1: Twist the screws above the CPU socket with a screwdriver, and turn this pointer on screw aimed at "Open" from the "Locked" position.



2: Hold the CPU by both sides, adjust the 1st pin(Marked as golden triangle) to be

align with the "missing" pin, then put the CPU in place. Check and adjust the CPU until it lays on the socket paralleled, then twist the pointer on screw aimed at "Locked" from the "Open" position.。

Notice：Ensure this motherboard support the CPU you choose, if the direction you inserted was wrong, CPU may be damaged. After system boot, BIOS will examine CPU type and frequency automatically, BIOS setting won't allow you change the CPU frequency, in order to make system work steadily, please set your CPU exterior frequency by its specification, and we don't suggest you over clock your CPU. At present most Intel ® CPU frequency multiplication have been set when them leave factory, can not be changed.

Install CPU cooling fan complied steps following：

1. Fix the heat sink go with fan on motherboard, keep heat sink & CPU wafer tangent.
2. Connect fan cable with on-board CPUFAN socket.

Notice：

Before fixing, daub coolant on the surface of the heat sink connect CPU first to swell the cooling function, check CPU work on or not regularity, to insure the CPU in good ventilate situation.

2.4 Installing SO-DIMM

The procedures for installing SODIMM are described below. Please follow these steps carefully. You can install SDRAM memory modules using 200-pin SODIMM (Small Outline Dual In-line Memory Modules).

1：Ensure that all power supplies to the system are switched off.

2：Tilt the SODIMM card approximately 25° above the board, and move it in the direction of the housing card slot. Make sure that the key in the module and the key in the housing are aligned.

3：Push the module into the socket until the module bottoms. There should be a slight insertion force to engage the module into the contacts.

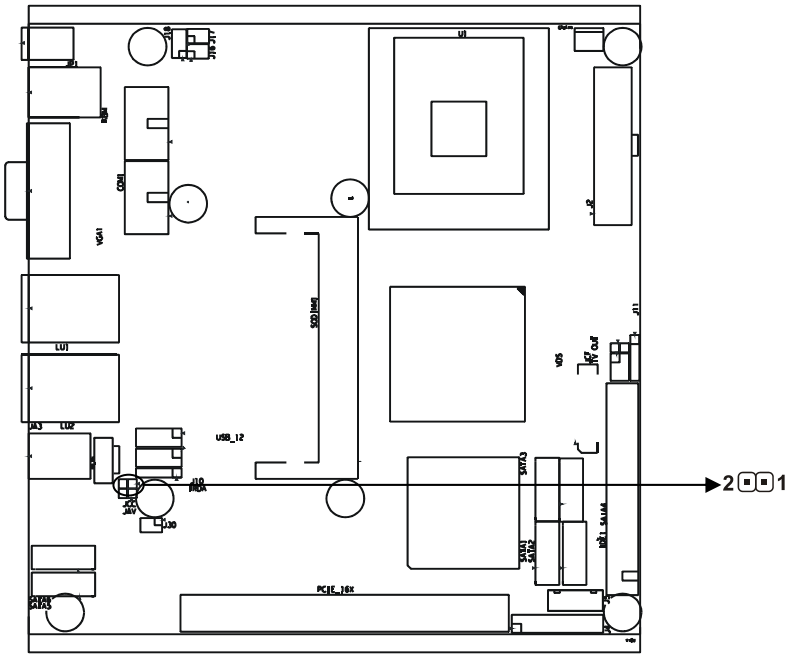
2.5 Setting Jumpers

Notice:

Jumpers are located on the motherboard, they represent clear CMOS jumper JCC etc. pin1 for all jumpers are located on the side with a thick white line refer to the motherboard's silkscreen , jumpers with three pins will be shown as 1-2 to represent pin1&pin2 connected and 2-3 to represent pin2&pin3 connected.

2.5.1 Clear CMOS (JCC)

The MITX-6852 motherboard contains a jumper that can erase CMOS data and reset the system BIOS information. Normally this jumper should be set with pins open. If you want to reset the CMOS data, set JCC closed for just a few seconds. This procedure will reset the CMOS to its default setting.

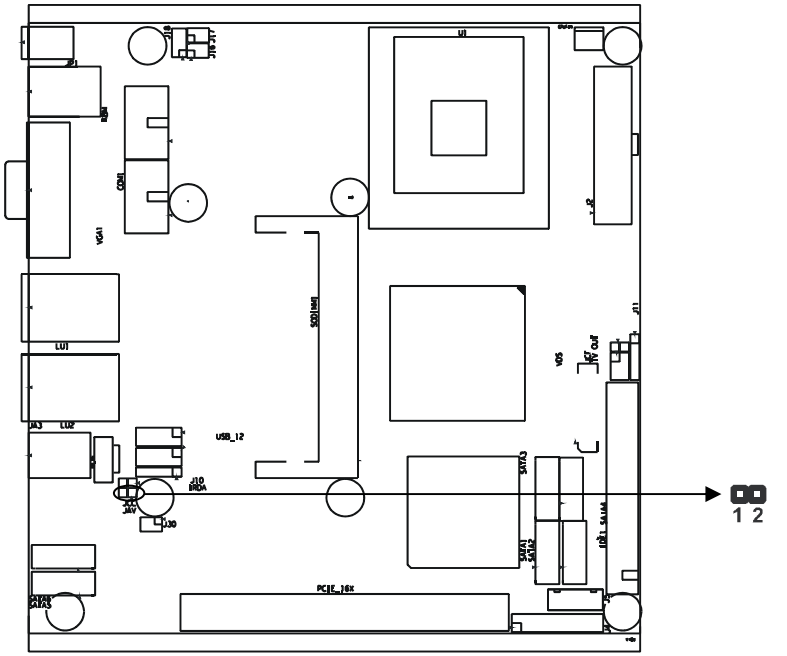


setting	JCC
Close	Clear CMOS(BIOS renew to initialization)
Open	Nomal status(default)

⚠Do not clear CMOS when power switch on, or it harm to the motherboard.

2.5.2 BIOS-protect Jumper (JAV)

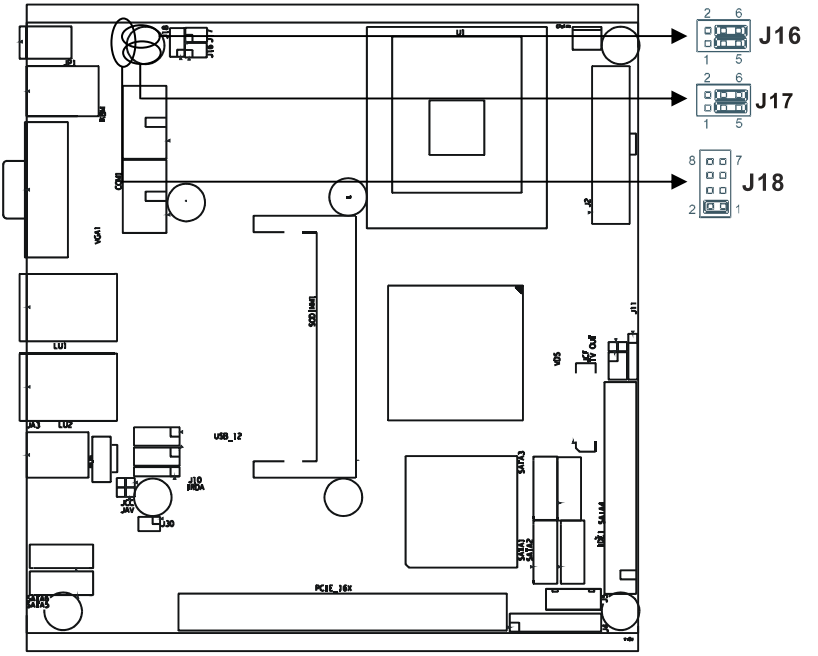
The BIOS of the CPU card is contained in the Flash ROM. If the jumper JAV1 is set as dosed, you will be unable to flash the BIOS. However in this status, the system BIOS is protected from being attacked by serious virus such CIH virus.



Setting	JAV
Open	Enable to flash BIOS
Close	Disable to flash BIOS(default)

2.5.3 COM2 setting（J16、J17、J18）

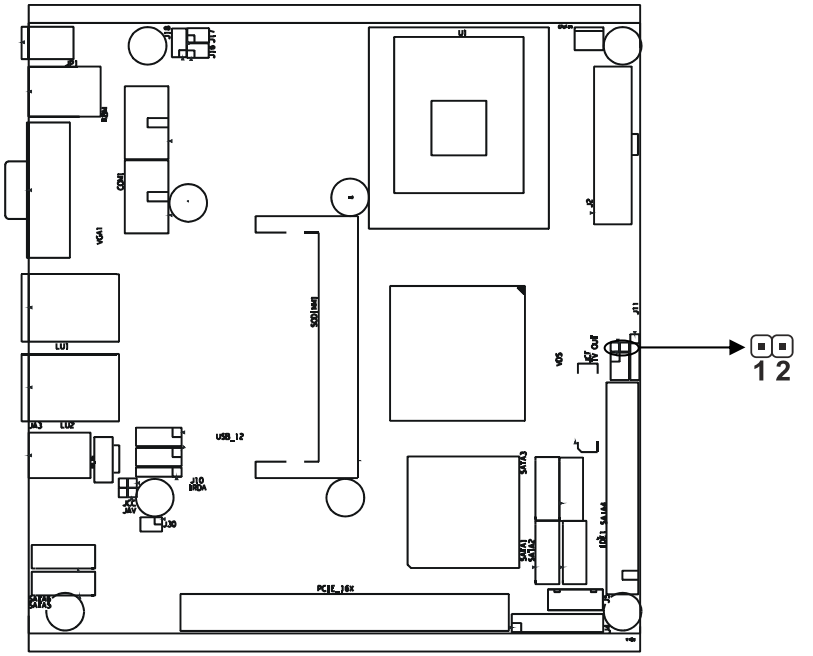
COM2 can be configured to operate in RS-232, RS-422, or RS-485 mode (RS232 for default.). This is done via J16、J17 and J18.



COM2 RS232（default）		COM2 RS422		COM2 RS485	
J16	3-5 4-6	J16	1-3 2-4	J16	1-3 2-4
J17	3-5 4-6	J17	1-3 2-4	J17	1-3 2-4
J18	1-2	J18	3-4	J18	5-6 7-8

2.5.4 CF Card Master/Slave Selection（JCF）

This jumper for setting CF card as master or slave, close JCF jumper (plug JCF cover), CF card is set as master. When you need to set it as slave, open the cover please! Master for default.



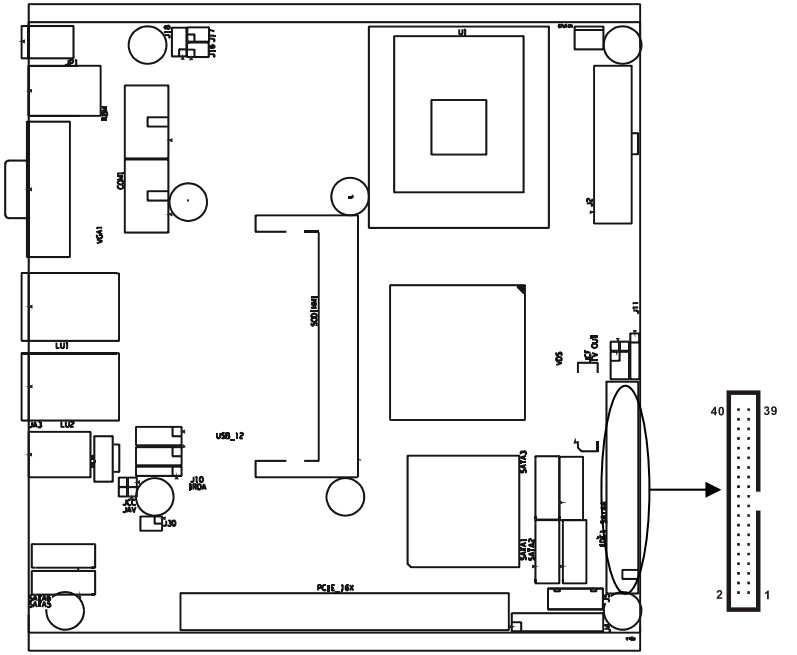
Setting	JCF
close	Set CF card as master(default)
open	Set CF card as slaver

2.6 External Connector

⚠ Please carefully read this manual when connecting external connector, so as to avoid damage to the motherboard!

2.6.1 IDE Connector（IDE1）

This IDE connector is for 2 IDE devices. If you have two IDE hard disks in system, the second disk must be set as slave disk by jumper setting.

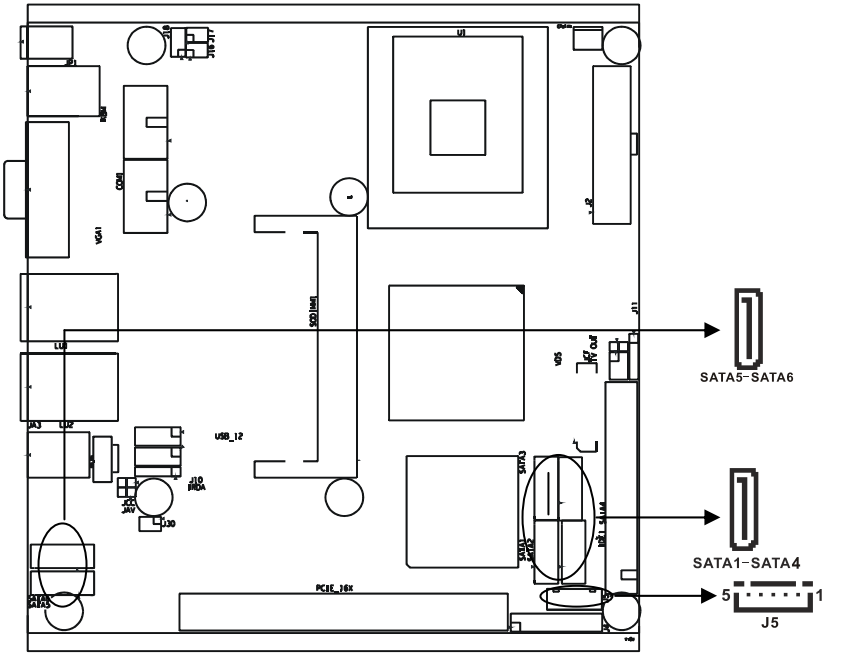


Pin Name	Pin		Pin Name
IDERST#	1	2	GND
DDP 7	3	4	DDP 8
DDP 6	5	6	DDP 9
DDP 5	7	8	DDP 10
DDP 4	9	10	DDP 11
DDP 3	11	12	DDP 12
DDP 2	13	14	DDP 13
DDP 1	15	16	DDP 14

DDP 0	17	18	DDP 15
GND	19	20	VCC
IDE_PDDREQ#	21	22	GND
IDE_PDIOW	23	24	GND
IDE_PDIOR	25	26	GND
IDE_PIORDY	27	28	ALE
IDE_PDDACK#	29	30	GND
INT_RQR14	31	32	NC
IDE_PDA1	33	34	P66DET#
IDE_PDA0	35	36	IDE_PDA2
IDE_PDCS1#	37	38	IDE_PDCS3
ACTP#	39	40	GND

2.6.2 SATA（SATA1 - SATA6，J5）

If MITX-6852 is powered by single voltage powersupply, the board provides 4 SATA, and speed can be upto 300MB/s. In this case, the SATA HDDs are powered by the power connector on board. If MITX-6852 is powered by ATX; another 2 SATA connectors are available by expansion. That's to say, if powered by ATX, MITX-6852 can provide 6 SATA connectors on board.



Pin	Pin Name
1	GND
2	SATA_TXP
3	SATA_TXN
4	GND
5	SATA_RXN
6	SATA_RXP
7	GND

J5: SATA power connector (When powered by single voltage）

Pin	Pin Name
1	+12V
2	GND
3	VCC
4	GND

5	VCC3

2.6.3 CF Card Socket（Compact Flash）

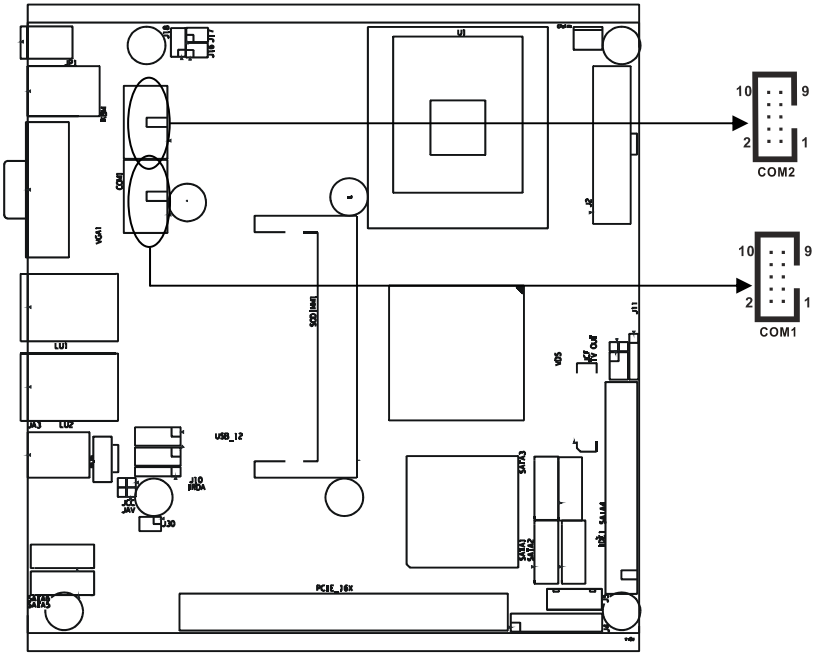
Standard Compact Flash Socket，support Type Ⅰ and Type Ⅱ CF card. (The picture unavailable).

Notice:

The CF card socket share the resource of IDE channel, IDE channel can be connected 2 IDE devices, when Compact Flash card was install, only 1 IDE device can be connected.

2.6.4 Serial ports（COM1，COM2）

This board provides 2 group 2×5Pin box type communication interfaces. Which are needed to use conversion cables (IDC10 via DB9) to fix on the machine box before connected to the exterior devices. You can open or close serial port in bios setting options. COM1, COM2 both support RS232, COM2 even support RS422 /485, you can select COM2 transmission mode by jumper setting, particular setting please consult “2.5.3 COM2 RS-232/422/485 setting”



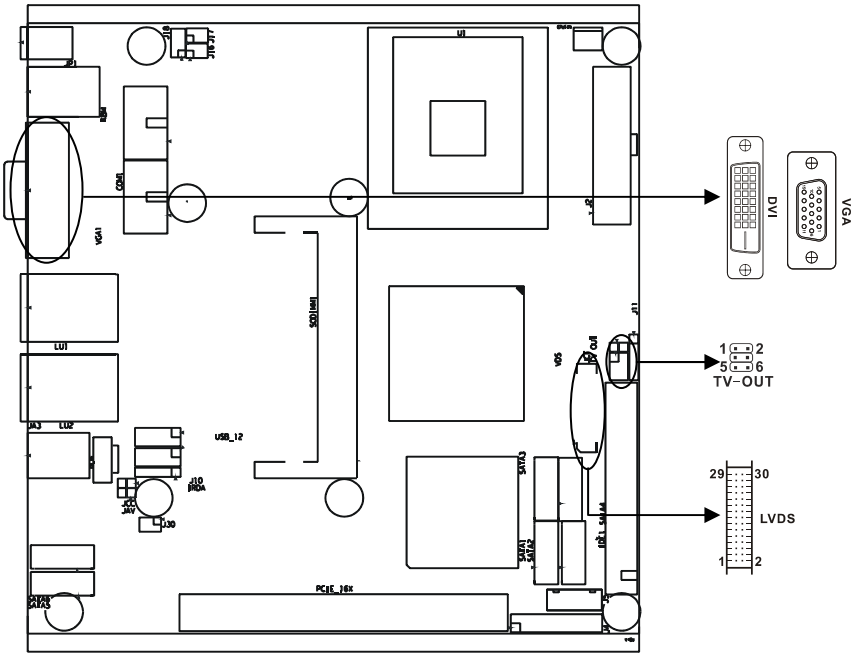
COM1：

Pin Name	Pin		Pin Name
DCD	1	2	DSR
RXD	3	4	RTS
TXD	5	6	CTS
DTR	7	8	RI
GND	9	10	GND

COM2:

RS485	RS422	RS232	Pin		RS232	RS422	RS485
DATA-	TX-	DCD	1	2	DSR	NC	NC
DATA+	TX+	RXD	3	4	RTS	NC	NC
NC	RX+	TXD	5	6	CTS	NC	NC
NC	RX-	DTR	7	8	RI	NC	NC
GND	GND	GND	9	10	GND	GND	GND

2.6.6 Display interfaces（VGA，DVI，LVDS，TV-OUT）



VGA：

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
1	RED	6	GND	11	NC
2	GREEN	7	GND	12	SDA
3	BLUE	8	GND	13	HSYNC
4	NC	9	+5V	14	VSYNC
5	GND	10	GND	15	5VDDCK

DVI（Optional）：

Pin Name	Pin		Pin Name
TDC2#	1	2	TDC2
GND	3	4	NC
NC	5	6	SC-DDC
SD-DDC	7	8	NC

TDC1#	9	10	TDC1
GND	11	12	NC
NC	13	14	VCC
GND	15	16	HP-DETECT
TDC0#	17	18	TDC0
GND	19	20	NC
NC	21	22	GND
TLC	23	24	TLC#
GND	25	26	GND
NC	27	28	NC

TV-OUT

Pin Name	Pin		Pin Name
TV-DACA-OUT	1	2	GND
TV-DACB-OUT	3	4	GND
TV-DACC-OUT	5	6	GND

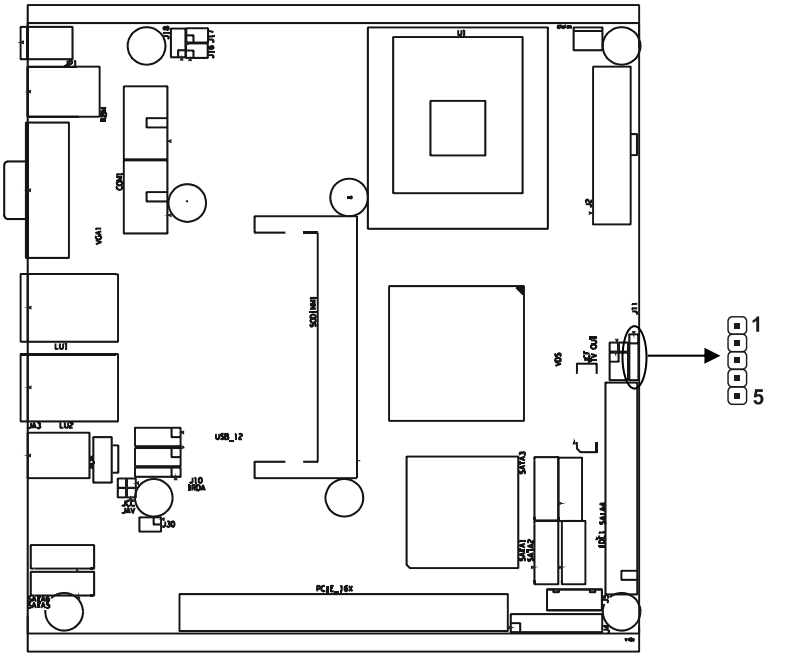
LVDS（Optional）:

Pin Name	Pin		Pin Name
VDD	1	2	VDD
GND	3	4	GND
YAM0	5	6	YBM0
YAP0	7	8	YBP0
GND	9	10	GND
YAM1	11	12	YBM1
YAP1	13	14	YBP1
GND	15	16	GND
YAM2	17	18	YBM2
YAP2	19	20	YBP2
GND	21	22	GND
CLKAM	23	24	CLKBM
CLKAP	25	26	CLKBP

GND	27	28	GND
DDCPDATA	29	30	DDCPCLK

2.6.7 LVDS PANEL BACKLIGHT（J11）

This connector is for LVDS back light control.



J11：

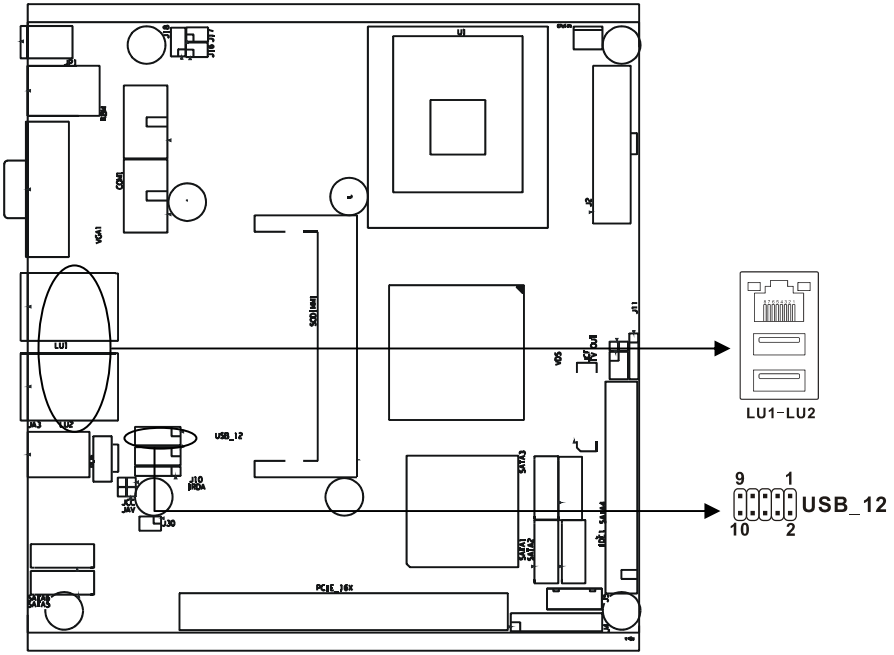
Pin	Pin Name
1	+12V
2	L_BKLTEN
3	GND
4	L_BKLTCTL
5	VCC

Note: J11 is a optional interface. If the motherboard MITX-6852 is powered by ATX, LVDS is enabled along with LVDS backlight controller.

If the motherboard MITX-6852 is powered by single voltage powersupply, this interface is disabled.

2.6.8 USB Ports and Ethernet Connectors（LU1，LU2，USB_12）

6x USB2.0 ports provided. 2xRJ-45 Ethernet connector's thereinto, other four gathered in two port stacks LU1 and LU2, and they also gathered 1x 10/100/1000Mb RJ45 Ethernet connector each, USB_12 need to make its 2×5Pin converted to standard USB socket and it for two USB devices. Two LEDs beside RJ-45, Ethernet LAN port LED status：



RJ45 PORT LED state description：

LILED(Green)	Network link status	ACTLED(Orange)	Message transfer status
on	effective	on	transfering
off	noneffective	off	No message transfering

Standard USB ports：

Pin Name	Pin
+5V	1

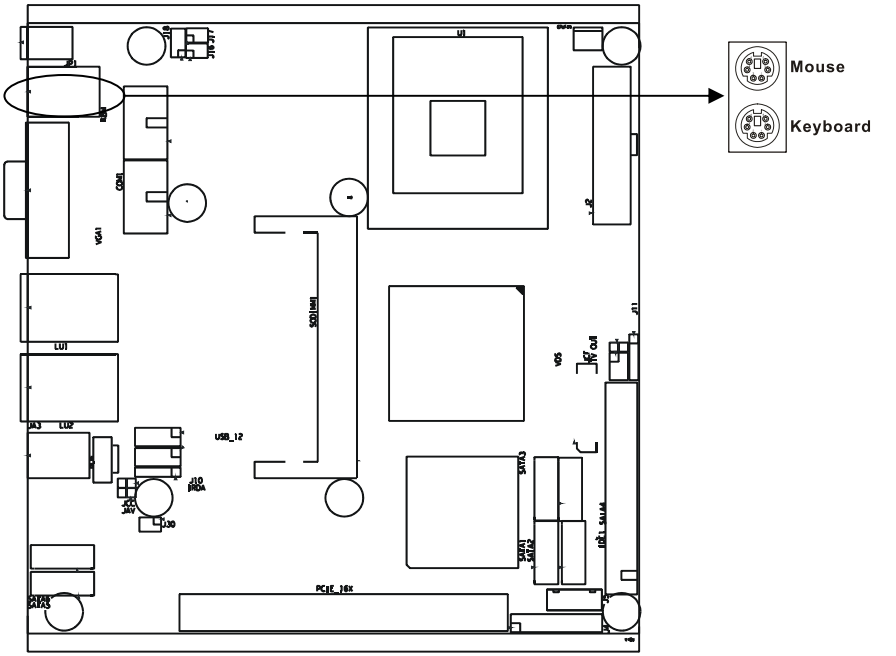
USB DATA-	2
USB DATA+	3
GND	4

USB_12：

Pin Name	Pin		Pin Name
+5V	1	2	GND
USB DATA-	3	4	GND
USB DATA+	5	6	USB DATA+
GND	7	8	USB DATA-
GND	9	10	+5V

2.6.9 Keyboard/Mouse connector（KBM）

Tow PS/2 ports for KB/MS: Green for Mouse and Purple for Keyboard.



Mouse:

Pin Name	Pin
+5V	1

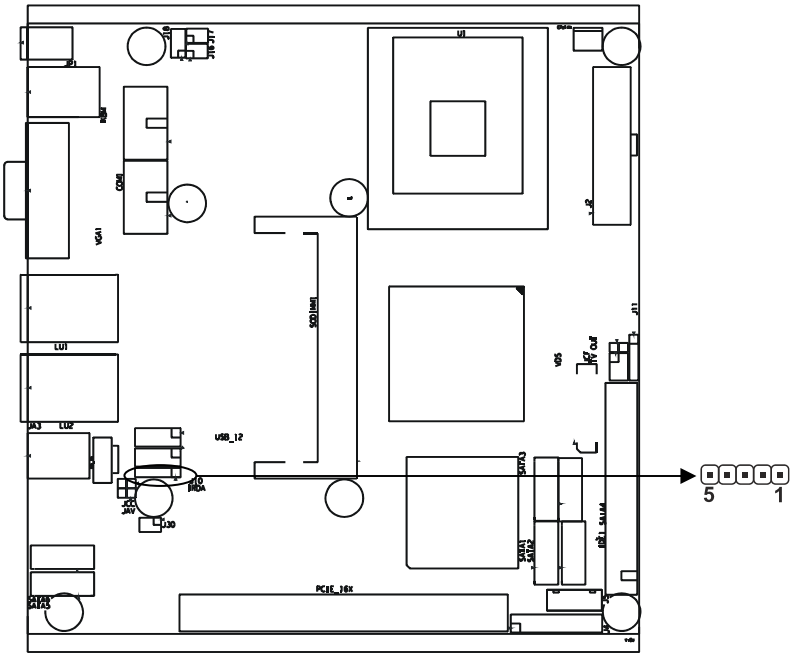
GND	2
NC	3
MS_DATA	4
MS_CLK	5

Keyboard:

Pin Name	Pin
+5V	1
GND	2
NC	3
KB_DATA	4
KB_CLK	5

2.6.10 IRDA interface（IRDA）

This board provides a group of IrDA pins, supports IrDA version1.0 SIR or SHARP ASK-IR protocol infrared ray data transmission function.

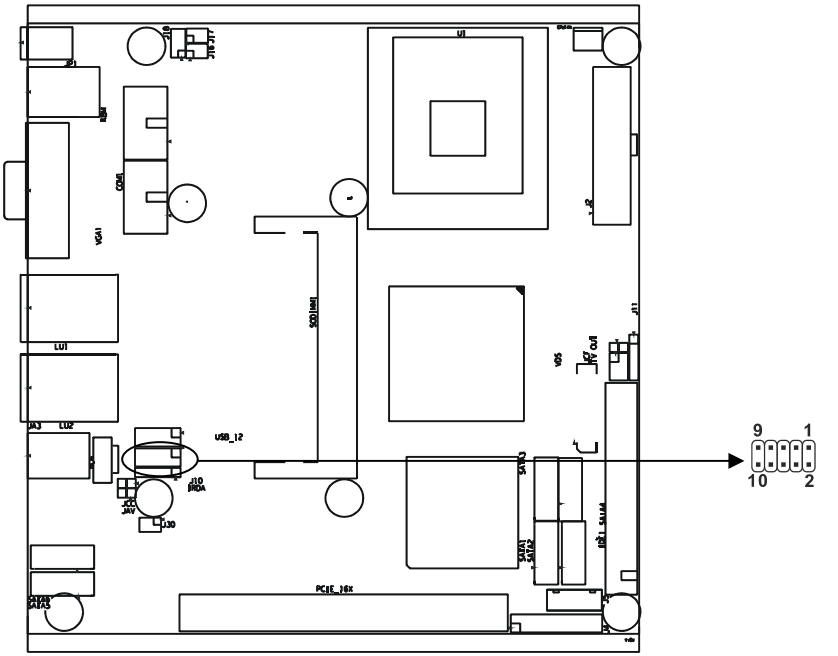


Pin	Pin Name

1	+5V
2	NC
3	IRRX
4	GND
5	IRTX

2.6.11GPIO（General Purpose Input Output）（J10）

The board supports 8-bit GPIO through the GPIO connector. The 8 digital input/outputs can be programmed to read or control devices, with input or output defined. The default setting is 4 bits input and 4 bits output.



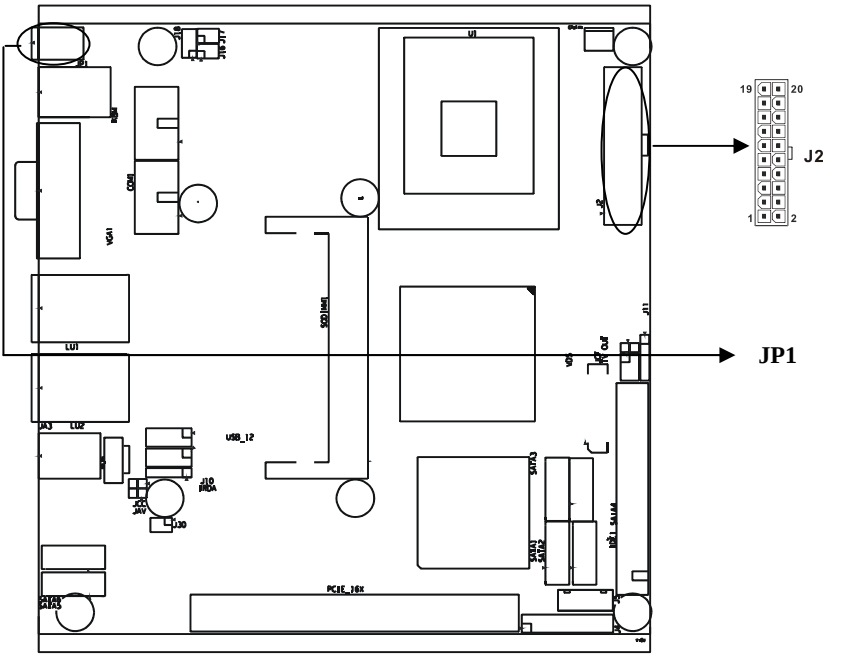
Pin Name	Pin		Pin Name
SIO_GP1	1	2	VCC
SIO_GP3	3	4	SIO_GP2
SIO_GP5	5	6	SIO_GP4
SIO_GP7	7	8	SIO_GP6
GND	9	10	SIO_GP8

2.6.12 Power Connectors(J2，JP1)

MITX-6852 provides two optional power supplies, but can't be used at the same time, users can choose on their own needs:

1：ATX（J2）：ATX power supply

2：Single power supply（JP1）：+12V input



J2：

Pin Name	Pin		Pin Name
+3.3V	11	1	+3.3V
-12V	12	2	+3.3V
GND	13	3	GND
PS-ON	14	4	+5V
GND	15	5	GND
GND	16	6	+5V
GND	17	7	GND
-5V	18	8	PW-OK

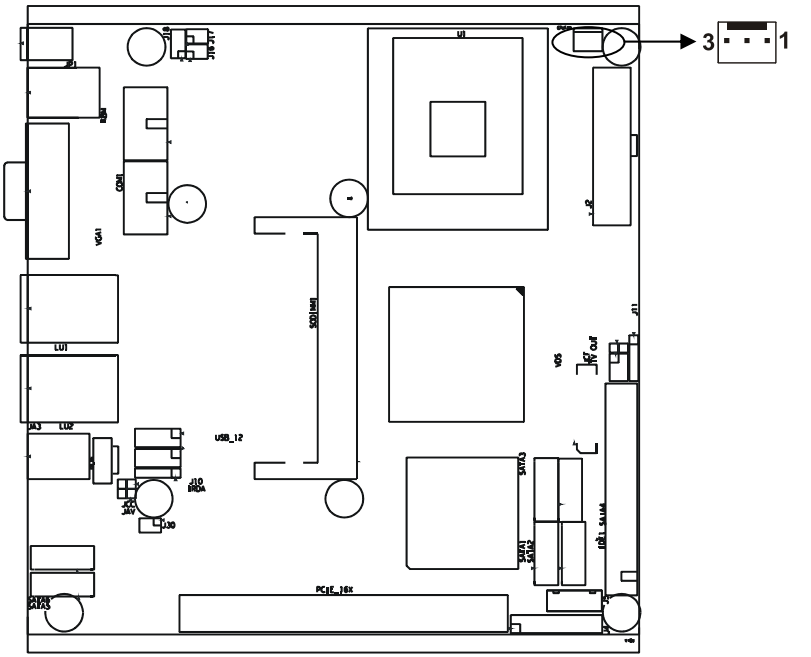
+5V	19	9	+5V SB
+5V	20	10	+12V

2.6.13 CPUFAN connector（CPUFAN）

This board provide a 3Pin CPU fan socket, attention：

(1) Electric current for fan≤350mA (4.2W, 12V).

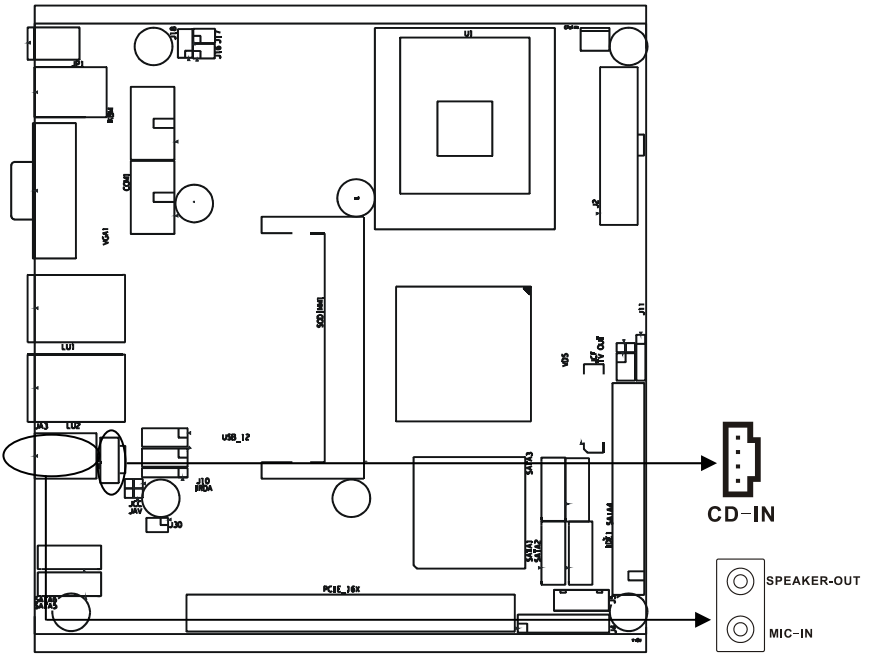
(2) Please ensure that the fan wire is consistent with the wire for this socket. The power cord must be in the middle position. In addition, ensure the GND cord wire (usually black) and fan rotation output pulse signal wire (in other color). It is recommended that the fan with rotary speed detection be used.



Pin	Pin Name
1	GND
2	+12V
3	Speed detect

2.6.14 AUDIO(JA3，CD-IN)

The onboard audio controller provides SPEAKER-OUT or MIC-IN function, and you can recognize them by location (The MIC-IN is the jack near PCB，and the SPEAKER-OUT is at the far end of PCB) or color (Red is MIC-IN, and green is SPEAKER-OUT). CD-IN jack is also provided by a 4-pin Connector.

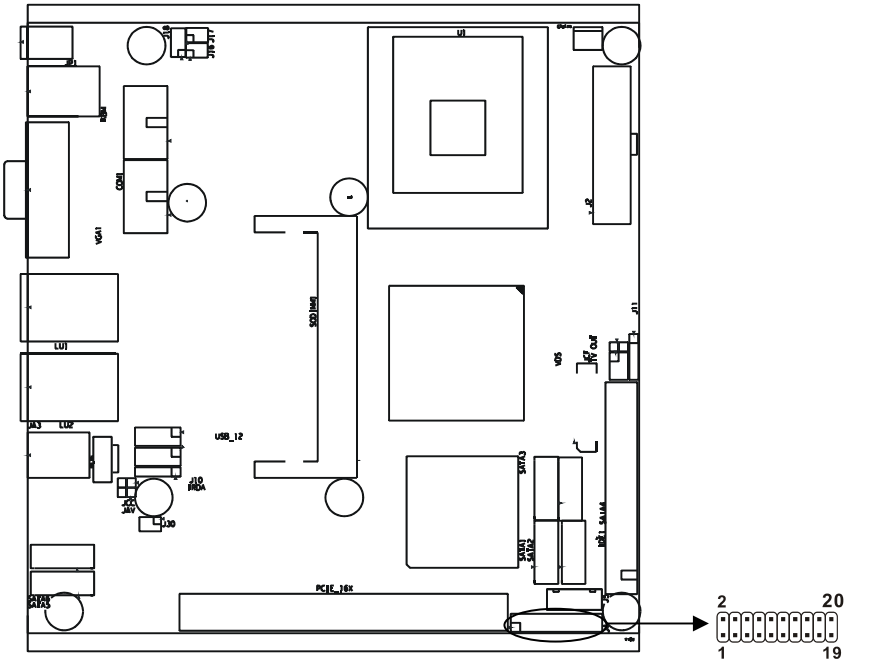


CD-IN：

Pin	Pin Name
1	CD-L
2	GND
3	GND
4	CD-R

2.6.15 Front Panel connector（J4）

J4 use to connect function button or LED on front panel.



Pin Name	Pin		Pin Name
PWRLED	1	2	VCC
GND	3	4	NC
GND	5	6	NC
KEYLOCK#	7	8	SPK-
GND	9	10	NC
GND	11	12	SLP-BTN-
GND	13	14	PWRBTSW-
GRELED+	15	16	GRELED-
GND	17	18	RSTBTN-
HDLED-	19	20	VCC

Particular connection as below, according to the table above, advert to their polarity；When relevant polarity connected wrong, relevant function won't work normally.

POWER LED	SPEAKER
KEYLOCK	
SLEEP BUTTON	
PWR BUTTON	
GREEN LED	
RESET BUTTON	
IDE LED	

1）System Power LED Pins (J4 pin1, pin3 for PWLED)

Connecting system power LED cable and these pins, (pin 1 is LED anode),when system power switch on, power LED on；When system power switches off, power LED off.

2）Buzzer Pins (J4 pin 2, pin 8 for SPEAKER)

External Buzzer Pins, for it have buzzer on this CPU card, users can choose to connect external buzzer or not by yourself.

3）KEYLOCK Pins (J4 pin7&pin9 for KEYLOCK)

Connecting keylock function-control cable and these pins, then it can carry out keylock function.

4）Sleep key Pins（J4 pin11,pin12 for SLEEP BUTTON）

Connecting sleep button with these pins, you can press button to achieve sleeping.

5）Power On/Off Control Pins (J4 pin13,pin14 for PWRSW)

Connect these two pins with bounce switch on panel of chassis, can switch-on or switch-off power.

6）Sleep LED Pins（J4 pin15,pin16 for GREEN LED）

Connect these two pins with power LED, when it is power-on, LED light on；power-off, LED light off；Winking means sleeping.

7）Reset Button Pins(J4 pin17,pin18 for RESET)

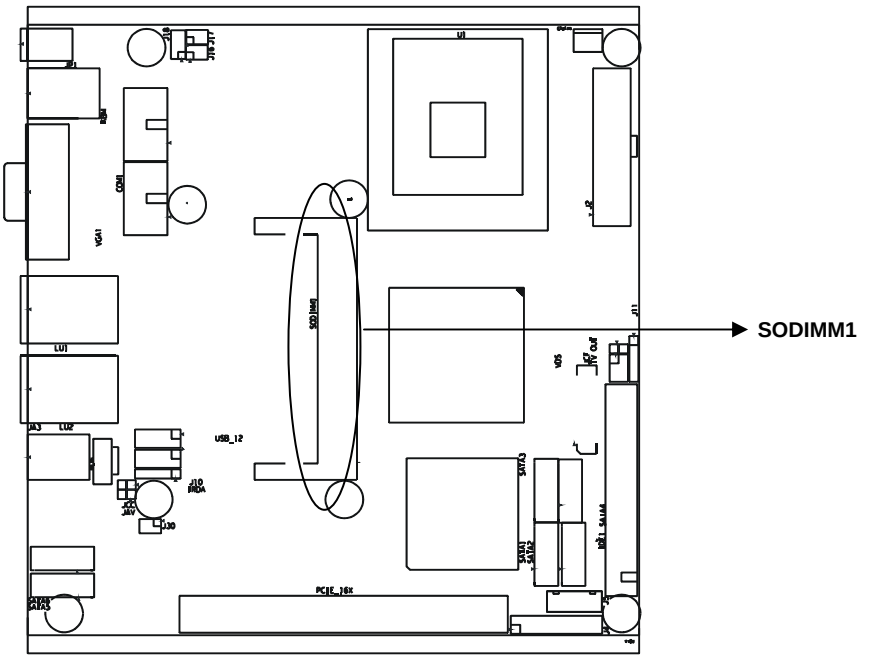
Connect this pins and RESET switch on panel of chassis with cable. When system can not work on, reset can make system restart, without turning on/off the power, thereby it can prolong system serviceable life.

8）IDE LED Pins (J4 pin19,pin20 for HDD LED)

As a rule, there is a IDE LED on the panel of chassis, while IDE device (like hard Disk) is reading or writing (no matter which IDE device), LED will flash, shows that IDE device is running. Connect IDE LED on chassis panel and these pins (pin19 is LED anode).

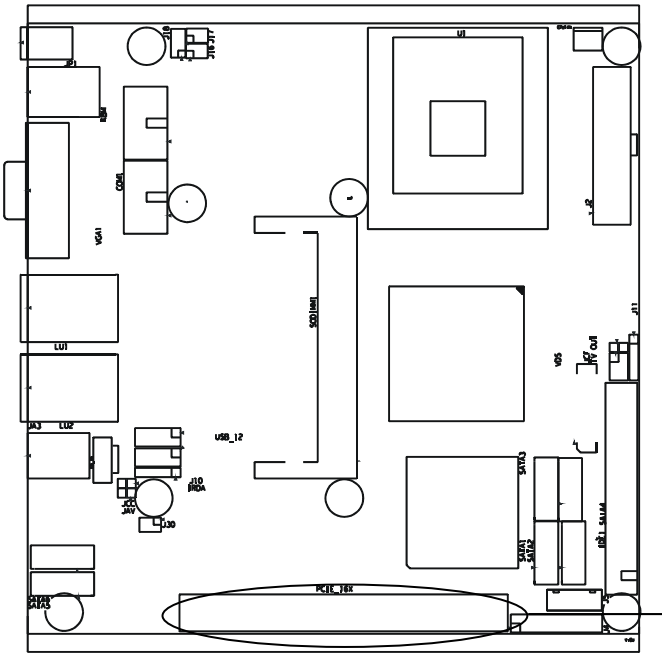
2.6.16 RAM Slot（SODIMM1）

Support Dual channel DDRⅡ400/533/667MHz SDRAM up to 2GB,，No support ECC function.



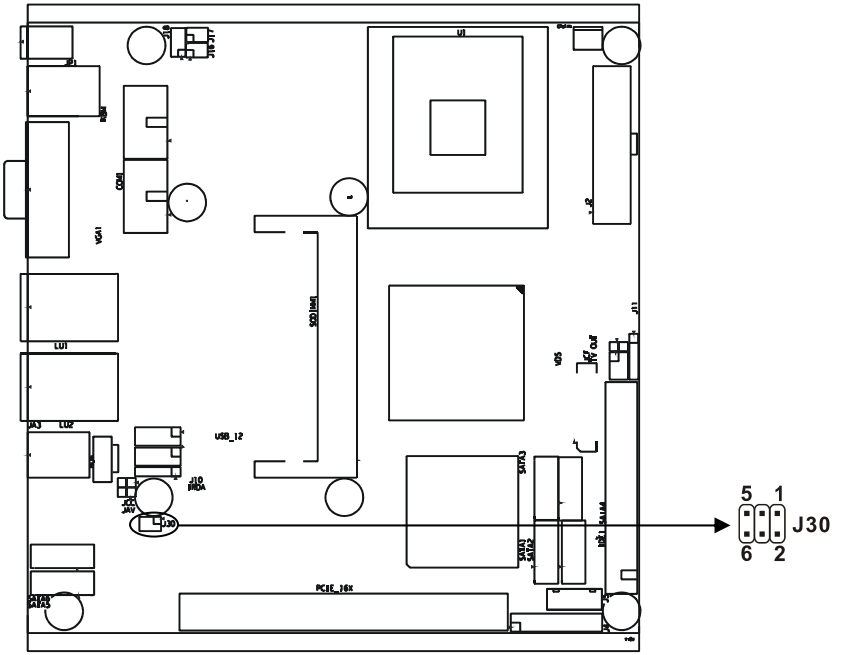
2.6.17 PCIE_16x Slot（PCIE_16x）

MITX-6852 provides an on-board PCIE_16x slot; users can expand their own equipments on their needs.



2.6.18 Mini PCI slot

The back device of motherboard provides a mini PCI slot (Image Omitted), the user can expand mini PCI according to own need. User can dispaly its status through caller identification when using Mini PCI card.



Pin Name	Pin		Pin Name
WAN	1	2	VCC3SB
PAN	3	4	VCC3SB
LAN	5	6	VCC3SB

Chapter 3
BIOS Setup

Chapter3 BIOS Setup

AMI BIOS upgrade:

It is true that hardware and software are upgrading all the time. When your IPC can not support the newest processor (for example), you should upgrade the BIOS to try to keep up with the latest technology. Upgrading (or flashing) the BIOS is not an easy attempt. To make sure upgrade succeed, please follow the instruction below:

Set jumper JAV as open

Afudos.exe is the program for BIOS to modify and upgrade，need to be run in DOS mode.

Step1: use boot disk load DOS, run Amiflash.exe and write the newest file: XXXX.ROM into the Flash IC.

Order format: A:\ Afudos XXXX.ROM

If you need to add other parameters, please add <space>/? after the order format.

Example：Afudos 6852I104.rom /P /B /C /N /X

Remarks:

1. Upgrading BISO may cause your system crash, so please operate carefully.
2. Please use the upgrading program in the CD-ROM provided by us
3. Please do not power off or reboot the system when upgrading, otherwise, the BIOS maybe be damaged.
4. Please backup your BIOS before upgrading

AMI BIOS information

Awards BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed memory (CMOS RAM) so that it retains the setup information when the power is turned off

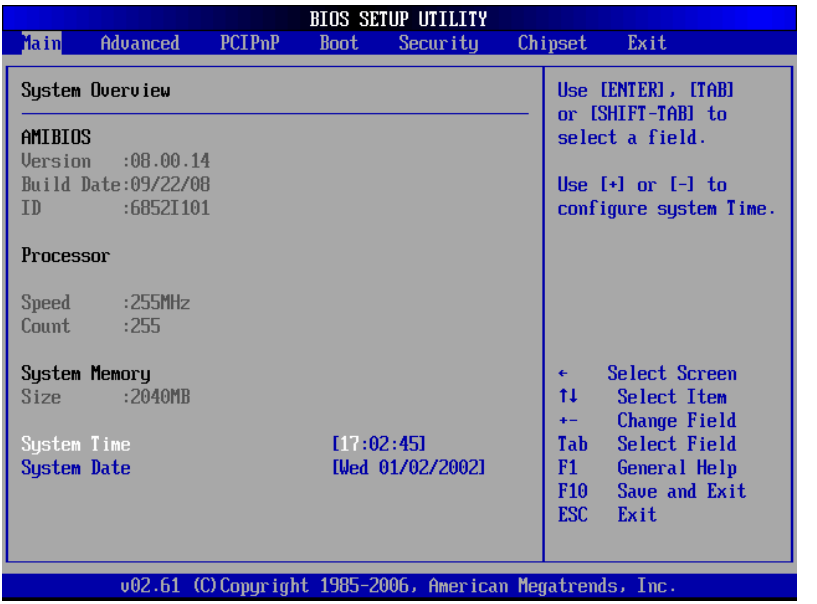
AMI BIOS Setup

Power on your computer, when this information display in your screen:

Del->SETUP please press “DEL”, then it will enter BIOS setup interface.

1. Power on or Reset computer；
2. When "Press <Del> to enter setup" in screen, please press <Del>
3. Use the “←↑→↓”to choose the option which your want to modify, press <Enter> and show the sub-menu.
4. Use the “←↑→↓”and <Enter> to modify the value.
5. At any time, press<Esc> can back to the father-menu.

3.1 Main Menu



AMI BIOS (Read only)

BIOS information: such as Version, BIOS ID and Manufactory Day.

Processor (Read only)

CPU information: such as processor type and frequency.

System Memory (Read only)

Memory size

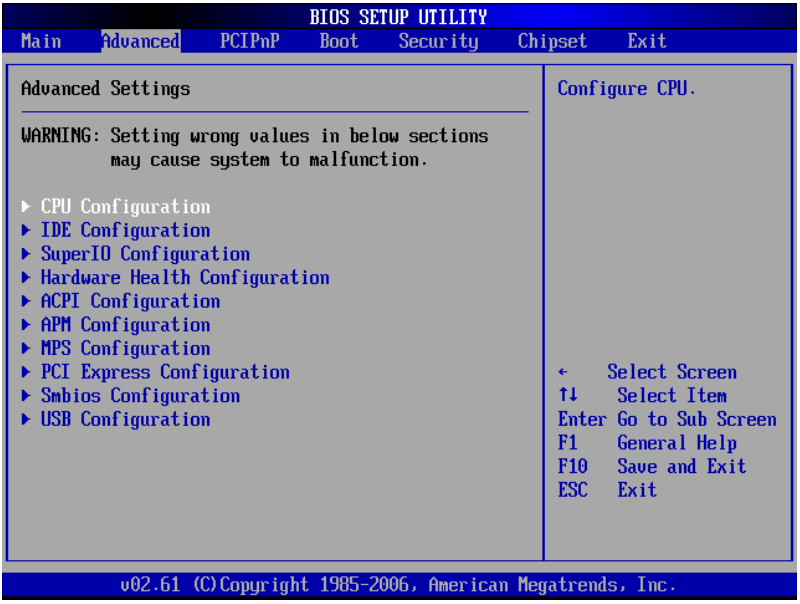
System Time

Format: Hour/Minute/Second

System Date

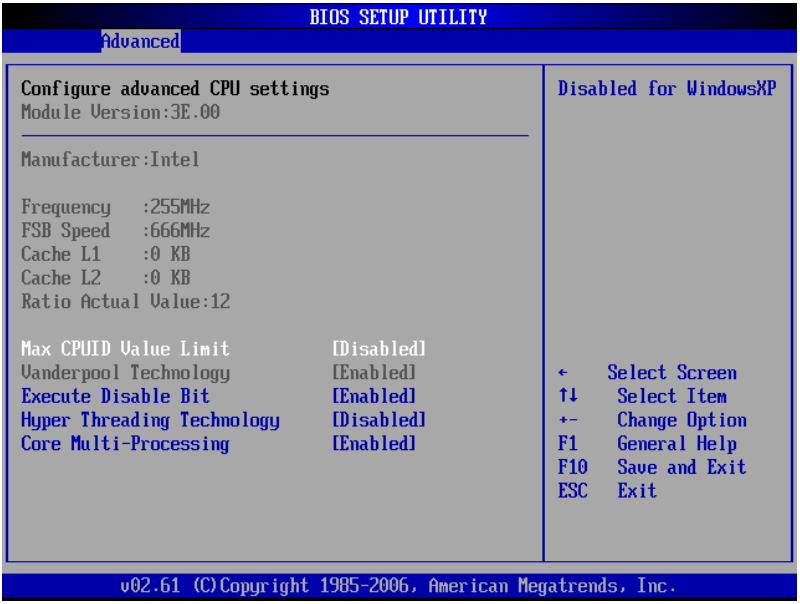
Format: Day/Month/Date/Year；<Day><Month><Date><Year> can be set by user.

3.2 Advanced Menu



WARNING: setting wrong values in below sections may cause system to malfunction.

3.2.1 CPU Configuration



Configure advanced settings

Include CPU detail description: Vendor, Type, Frequency, L1 cache, L2 cache…

Max CPUID Value Limit

When you are using the operating system which doesn't support extended CPU ID function, please set this project "Enabled]。The settings are [Disabled] [Enabled]。

Venderpool Technology

Virtualization solutions enhanced by Intel VT allow a platform to run multiple operating systems (OSs) and applications as independent virtual machines, allowing one computer system to function as multiple "virtual" systems. For example, IT managers can create a single build with multiple and different OSs, software, and legacy applications.

Execute Disable Bit

This item specifies the Execute Disable Bit Feature. The settings are Enabled

and Disabled. The Optimal and Fail-Safe default setting is Enabled. If Disabled is selected, the BIOS forces the XD feature flag to always return to 0.

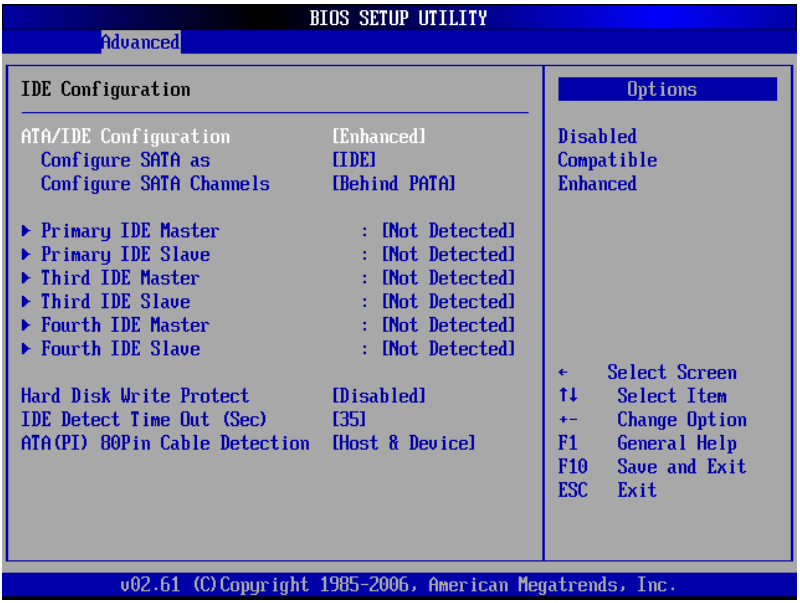
Hyper-Threading Technology

While using CPU with Hyper-Threading technology, you can select "Enabled" to enable Hyper Threading Technology in OS which supports Hyper-Threading Technology or select "Disabled" for other OS which do not support HT technology.

Core Multi-Processing

This option can ensure kernel load dual-processor in best way [Enabled]: use multi-kernel CPU,[Disabled]: use one of CPU.

3.2.2 IDE Configuration



ATA/IDE Configuration

ATA/IDE mode is compatible for compatibility mode or turbo mode. In compatibility mode, only 4 HDDs are supported. The rest 2 HDD ports will not available even if they are connected. Turbo mode can support all the HDDs, but some of the old OS can't support above 4 HDDs.

Configure SATA as

SATA configuration mode selection, you can set it as [RAID], [AHCI] or [IDE]

Configure SATA Channels

SATA Channels selection.

。

Primary/Secondary/Third/ IDE Master/Slave

This six options use to choose IDE device's type etc. include Type, LBA/Large Mode, Block (Multi-Sector Transfer), PIO Mode, DMA Mode, S.M.A.R.T.（Self-Monitoring, Analysis and Reporting Technology）, 32Bit Data Transfer these seven option, we suggest you choose Auto, the system will auto-search devices, if you want Config by yourself, make sure all parameter of the HDD support this mode first.

Hard Disk Write Protect

Setup HDD Write Protect function :< Enabled> Write Protect, HDD read only: <Disabled> HDD can write or read.

IDE Detect Time Out （Sec）

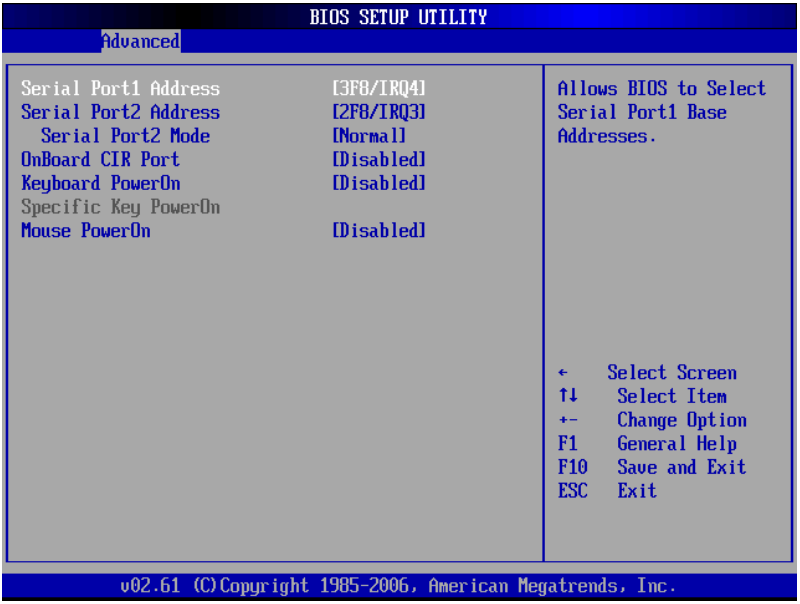
This option for BIOS searching IDE device in appointed time (by seconds).

ATA（PI） 80Pin Cable Detection

Setup detect ATA (PI) 80pin cable: 80pin ATA cable is for Ultra ATA/66, Ultra ATA/100 and Ultra ATA/133 .Standard cable is 40pin, can not support high transfer rate. These two cables is pin compatible.

<Host & Device> will reference the cable type both IDE controller and IDE device. Also it is default value. <Host> use the cable type used by IDE controller；<Device> use the cable type used by IDE device.

3.2.3 SupperIO Configuration



Serial Port1 Address

This option is used to config interrupt and address of serial port 1, There are options :3F8/IRQ4 (default)],[2F8/ IRQ3],[3E8/ IRQ4], [2E8/IRQ3], [Auto], [Disabled]，best to select Default address and interrupt. COM1 and COM2 can't share with the same address and interrupt no.

Serial Port2 Address

This option is used to config interrupt and address of serial port 1, There are options :3F8/IRQ4 (default)],[2F8/ IRQ3],[3E8/ IRQ4], [2E8/IRQ3], [Auto], [Disabled]，COM1 and COM2 can't share with the same address and interrupt no.

Serial Port2 Mode

This option configures serial port 2 mode. Default [Normal] as a standard RS-232 serial communications interface, the value of other settings for infrared communications interface standard.

Onboard CIR Port

This option for configure on board CIR port, <Enabled>: Open ,<Disabled>:

Close.

Keyboard PowerOn

Enabled: use PS/2 keyboard power-on function

Disabled: close PS/2 keyboard power-on function.

Specific Key PowerOn

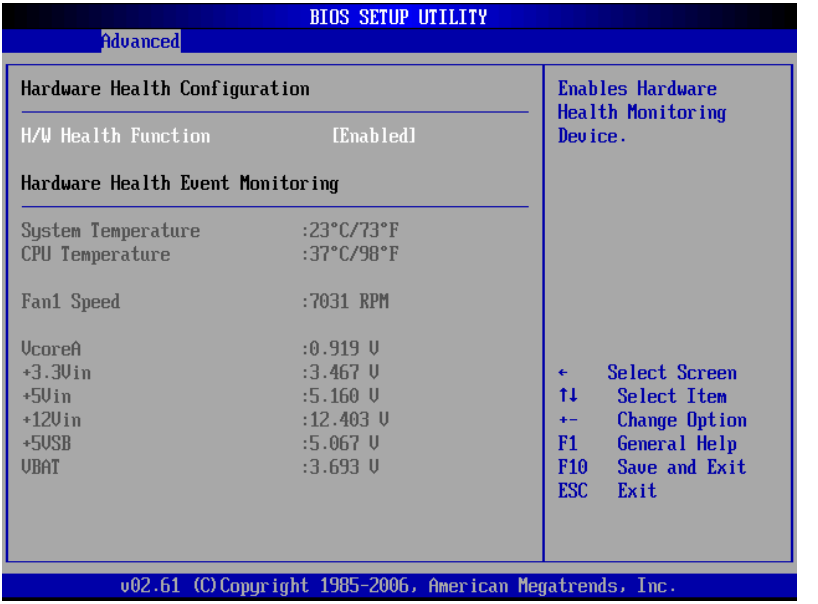
Specific power-on key configure, while you enable keyboard power-on, set specific key here.

Mouse PowerOn

Enabled: use PS/2 mouse power-on function

Disabled: close PS/2 mouse power-on function.

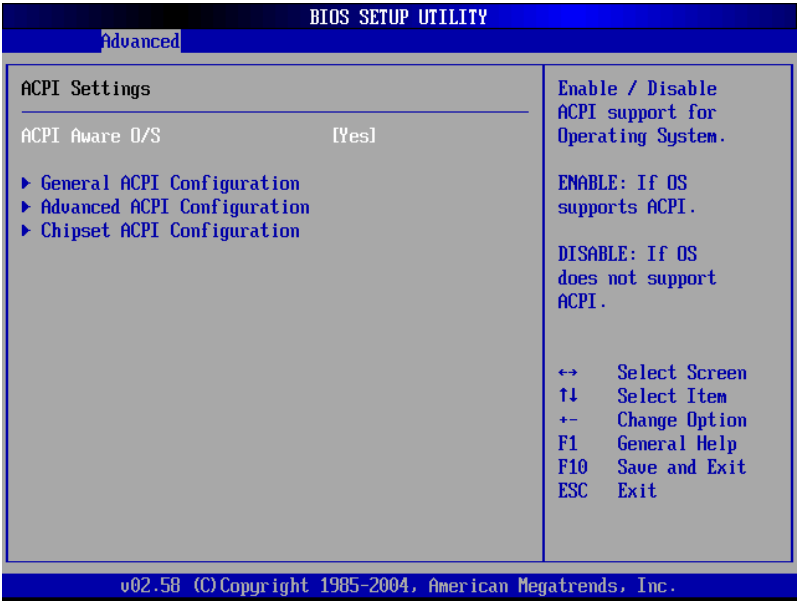
3.2.4 Hardware Health Configuration



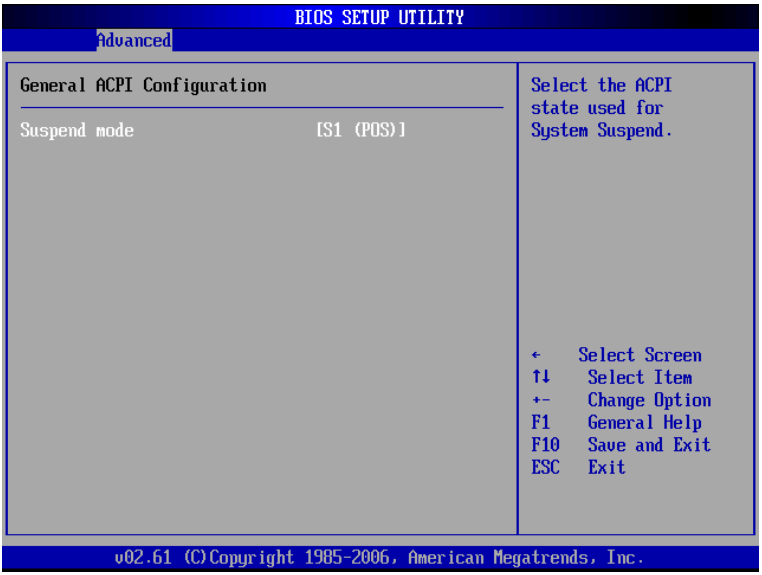
Hardware Health Configuration

Enable/Disable the onboard hardware monitor controller. If this option is enabled, the BIOS and OBS utility can get the system board's health information from hardware monitor controller.

3.2.5 ACPI Configuration



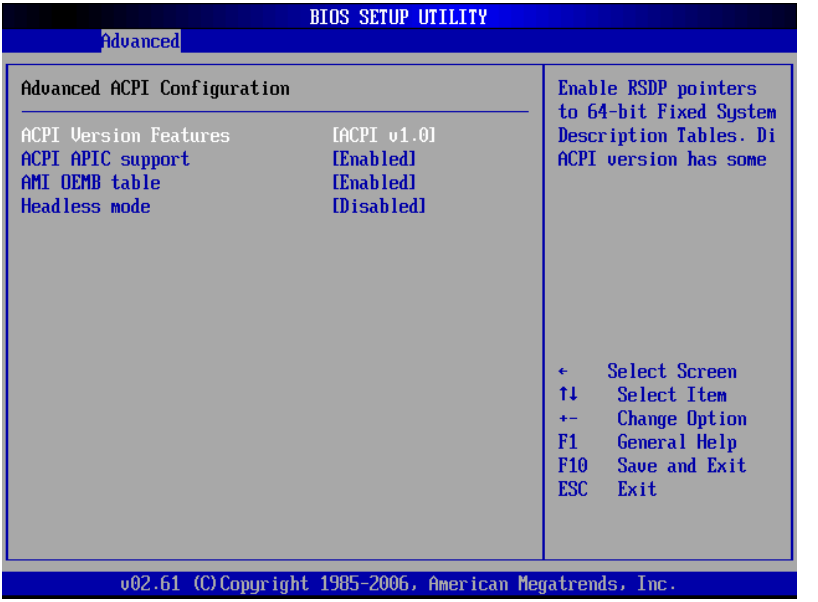
(1) General ACPI Configuration



Suspend

Enter into power-saving model after selecting system into sleep. The model is not the same, nor is the level of system function consumption. S1(pos)：CPU stops working, other devices remain normal power supply

(2) Advanced ACPI Configuration



ACPI Version Features

Select ACPI version number, different versions support different characteristics, more often downward compatible.

ACPI APIC support

Select whether to open ACPI (Advanced programmed Intermit controller） ,enlargeable system can make use of IRQ resource.

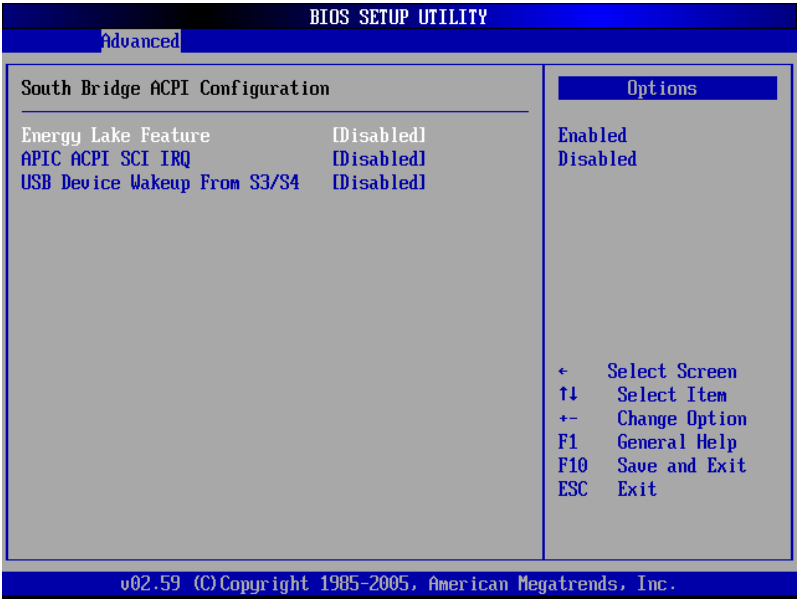
AMI OEMB table

Select whether to support OEMB table, option item: Disabled / Enabled.

Headless mode

Select whether to support Headless (not display facilities, not mouse, not keyboard) mode.

(3) Chipset ACPI Configuration



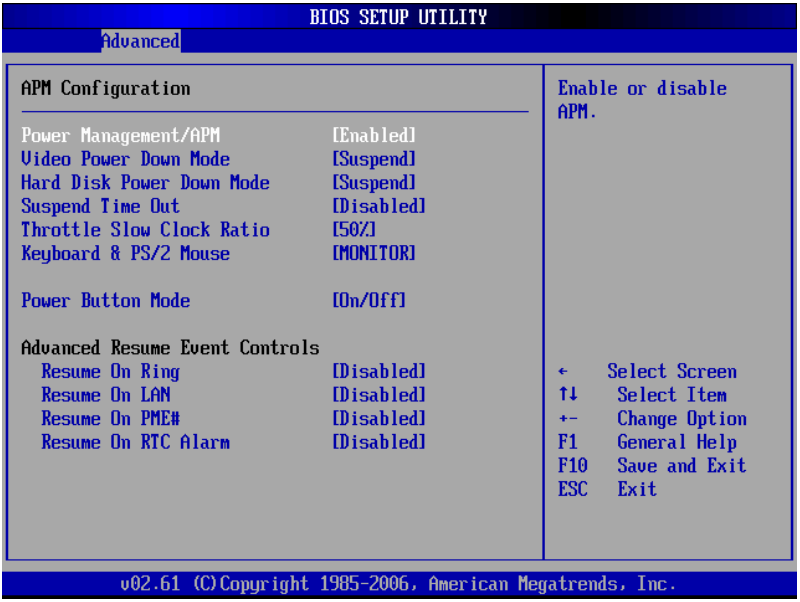
Energy Lake Feature

Whether support energy Lake power-save technology .option item :Disabled / Enabled.

APIC ACPI SCI IRQ

Enabled/Disabled interior I/O APIC（Advanced programmed Intermit controller）and multiprocessor list.

3.2.6 APM Configuration



Power Management/APM

<Enable>: open power saving mode.

<Disable>: close power saving mode.

Video Power Down Mode

Video power down mode setting，options <Suspend><Stand by><Disable> for select.

Hard Disk Power Down Mode

Hard disk power down mode setting，options <Suspend><Stand by><Disable> for select.

Suspend Timeout

Set the time limit when system detecting no operation to enter “suspend” mode. The time limit can be set from 1~60 minutes.

Throttle Slow Clock Ratio

If started up CPU power-save mode，when CPU temperature reaches a fixed value，this option will show the CPU slow clock ratio.

Keyboard & PS/2 Mouse

If you want set keyboard and PS/2 mouse activities as power-management event, if so, set Power Management/APM as Enabled, not for Disabled.

Power Button Mode

This project can be used to set on/off model of system entrance after pressing power button. The settings are : [on/off]，[standby].

Resume on ring

Set if Ring can resume your PC, < Enabled> for yes, <Disabled> for no.

Resume on LAN

Set if LAN can resume your PC, < Enabled> for yes, <Disabled> for no.

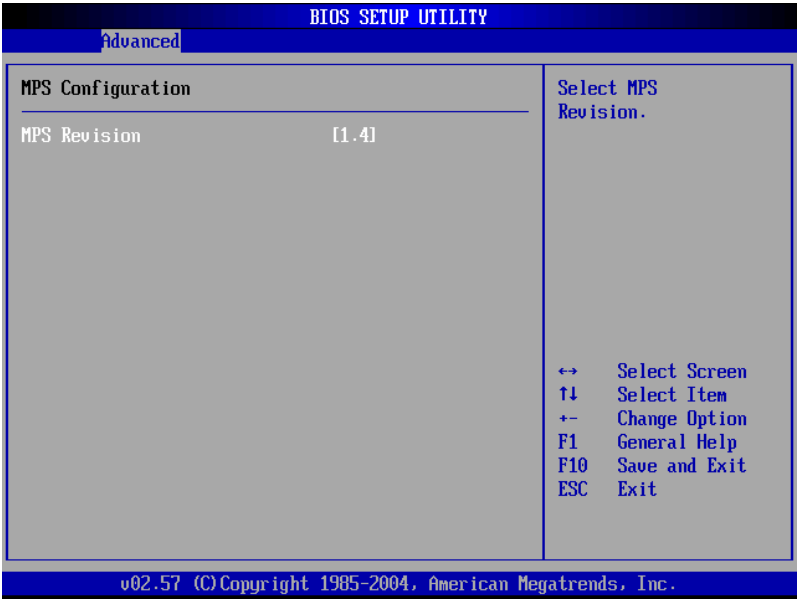
Resume on PME#

When this option is set as Enabled, and when the detection comes from PME (Power Management Event), it will awaken the system from the power saving mode.

Resume on RTC

This option is used to set the automatic startup of time/date for the system timing.

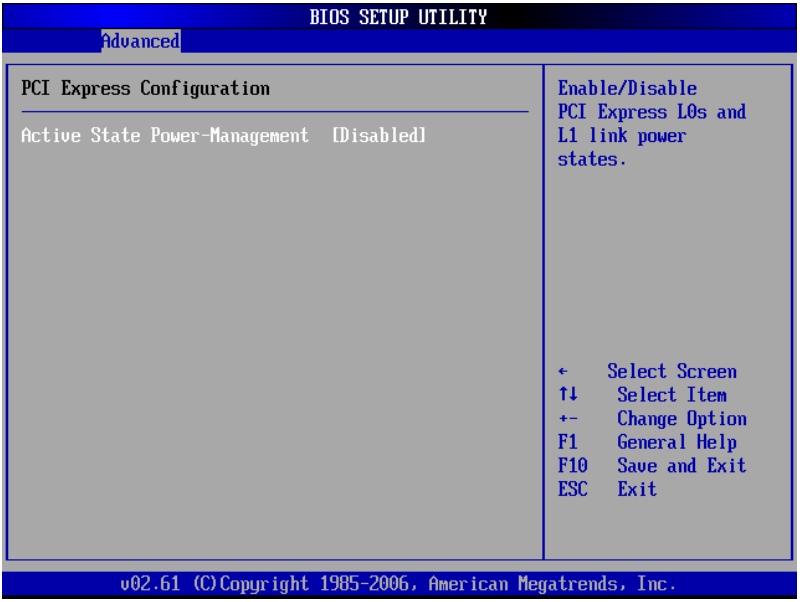
3.2.7 MPS Configuration



MPS Revision

This is a multi-processor standard version option. This option allows the user to select multi-processor standard version according to the operation system being used. And this option can function only when there are two or more than two physical or logical processors.

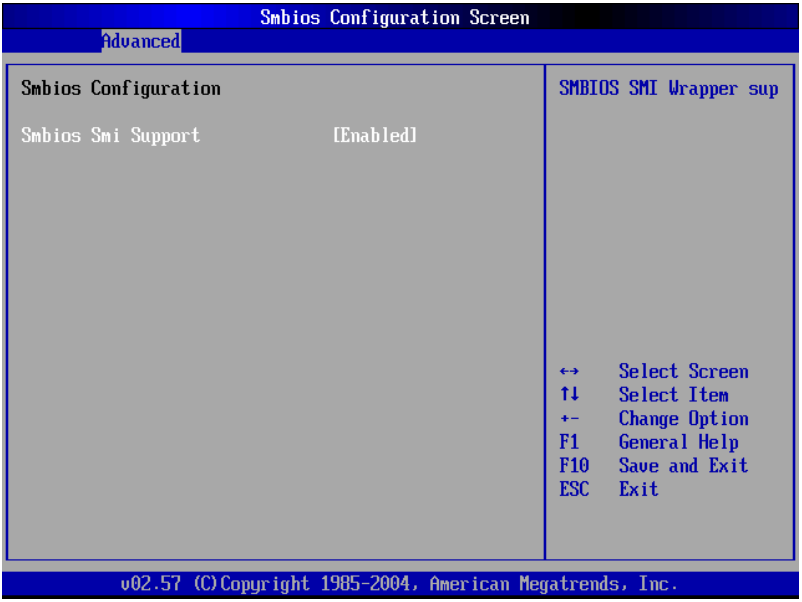
3.2.8 PCI Express Configuration



Active State Power-Management

This option allows you to use/non-use PCI- express 1 and 2 to connect power supply, setting options：[Enabled]，[Disabled]。

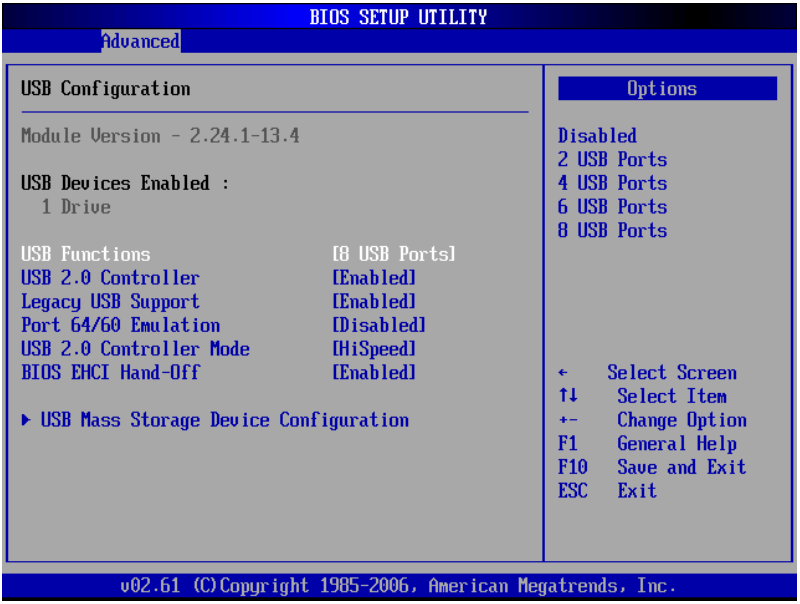
3.2.9 Smbios Configuration



Smbios Smi Support

If support SMBIOS PnP Function 50-54h by SMI. [Enabled：Support]，[Disabled：NO Support].

3.2.10 USB Configuration



Module Version （read-only）

This option displays the version message of currency serial bus module.

USB Devices Enabled（read-only）

This option displays USB devices which are in connection with motherboard.

USB Function

This options for opening the amount of USB port.

USB2.0 Controller

<Enabled>: allow use USB2.0 ports

<Disabled>: forbid use USB2.0ports

Legacy USB Support

If need support USB device in DOS mode: such as USB Flash Disk, USB keyboard, then select<Enabled> or<Auto>.If not :< Disabled>.

Port 64/60 Emulation

This option is for control USB port 64/60 emluator function. When it startup this function, USB keyboard can gather some special key combination.

Close：<Disabled>

Open：< Enabled>

USB2.0 Controller Mode

This option for choose USB2.0 port mode, Available after “USB2.0 Controller” --<Enable>:：

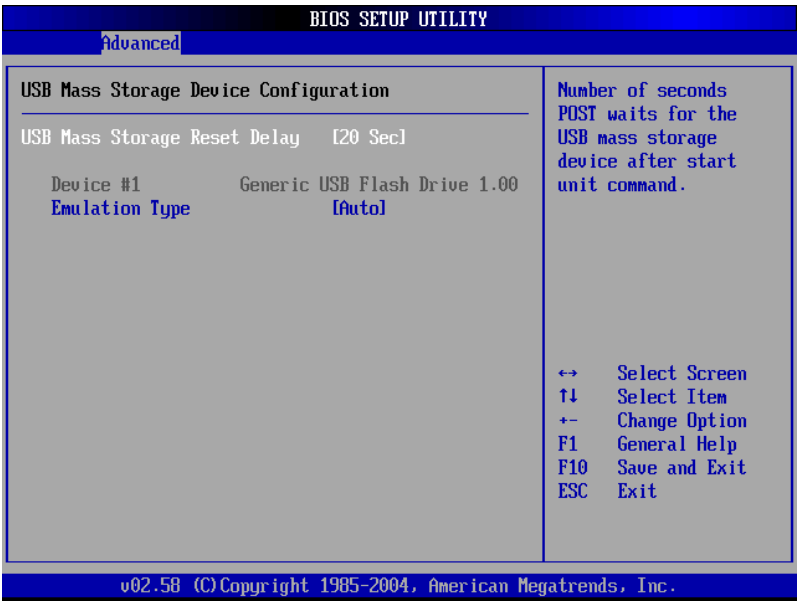
<FullSpeed> : USB port is 1.1 spec (12Mbps)。

<HiSpeed>: USB port is 2.0 spec (480Mbps)。

BIOS EHCI Hand-off

This item is to stop EHCI when OS hasn't EHCI Hand-off loading mechanism. If this item is set as [Disabled], the driver can change the attribute of EHCI.

Move the cursor to” USB Mass Storage Device Configuration”, and press <Enter> key to appear the frame as below:



USB Mass Storage Reset Delay

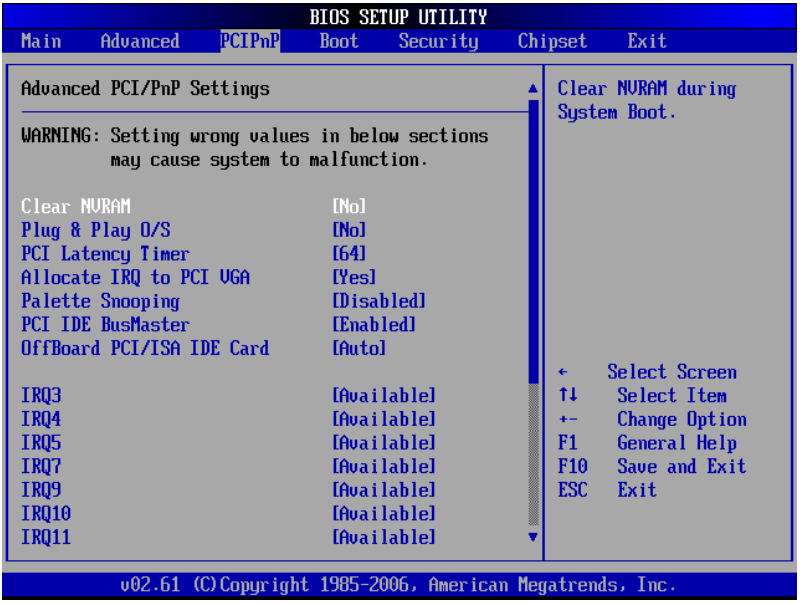
This option allows you to choose your system bios usb storage devices to detect the waiting time, Default set is :< 20Sec>.

Emulation Type

Setup removable Disk mode when use U Disk boot up system.

Mode: Auto/Floppy/Forced FDD/Hard Disk/CDROM. Default set is <AUTO>

3.3 PCI PnP Menu



WARNING: setting wrong values in below sections may cause system to malfunction.

Clear NVRAM

Set this value to force the BIOS to clear the Non-Volatile Random Access Memory (NVRAM). The Optimal and Fail-Safe default setting is [No].

Plug & Play O/S

Set this value to allow the system to modify the settings for Plug and Play operating system support. The Optimal and Fail-Safe default setting is [No].

PCI Latency Timer

Use this to adjust the PCI Latency Timer. This option sets the latency of all PCI devices on the PCI bus. The Optimal and Fail-Safe default setting is [64].

Allocate IRQ to PCI VGA

Set this value to allow or stop the system from giving the VGA adapter card an interrupt address. The Optimal and Fail-Safe default setting is [Yes].

PCI IDE BusMaster

<Enabled>: Open BusMaster function: improve PCI IDE device transfer speed.

<Disabled>: Close BusMaster function.

OffBoard PCI/ISA IDE Card

This item is to set PCI and ISA IDE card which is not onboard. If this item is set as [AUTO], the system will automatically detect the status of this item. You can also assign the slot which the cards are resided.

IRQ3-15

[Available]: Specified IRQ is available to be used by PCI/PnP devices.

[Reserved]: Specified IRQ is reserved for use by Legacy ISA devices.

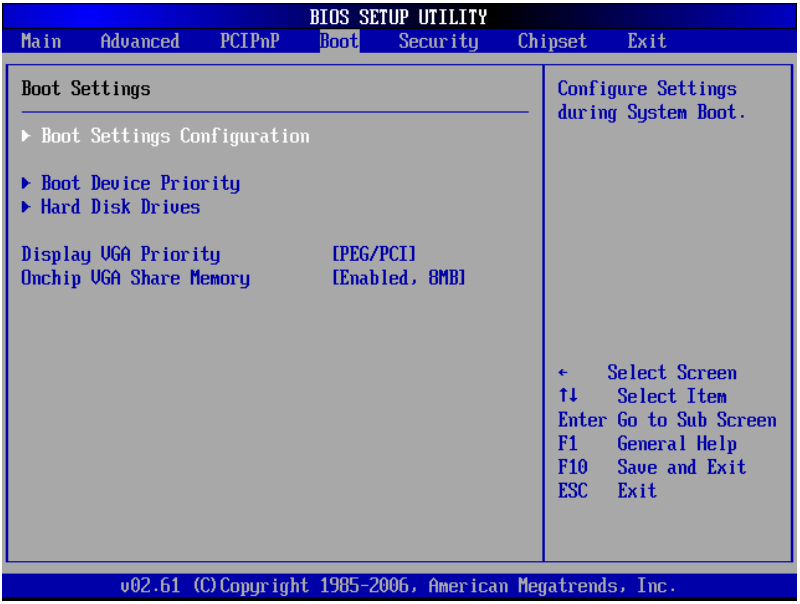
DMA Channel 0-7

[Available]: Specified DMA is available to be used by PCI/PnP devices.

[Reserved]: Specified DMA is reserved for use by legacy ISA devices.

[Reserved Memory Size]: Size of memory block to reserve for legacy ISA devices.

3.4 Boot Menu



Display VGA Priority

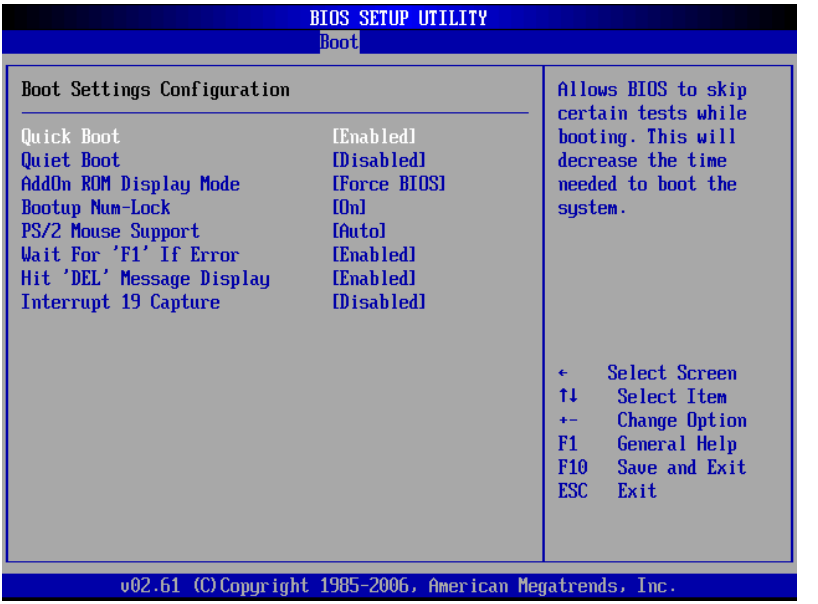
Display VGA priority set.

Onchip VGA Share Memory

Shared graphic memory size setting, this option only take effect before VGA driver loading, after driver loading, it will redistribute graphic memory according to system memory, size up to 224MB.

Move the cursor to" Boot Settings Configuration", and press <Enter> key to appear the frame as below:

Boot Setting Configuration:



Quick Boot

This function will skip over the 2nd and 3rd tests, accelerating the time of POST, whereas every PSOT is a complete test.

Quiet Boot

If this option is set to [Disabled], the BIOS display normal POST messages. If set to [Enabled], an OEM Logo is shown instead of POST messages.

AddOn ROM Display Mode

For choosing Option ROM display mode, Default:[Force BIOS]。

Boot Up Num-Lock

This item is to allow you select the Number Lock status when the system is power on. By default, [ON] is set to allow the number lock open when system start; if [OFF], the number pad is set as cursor controller.

PS/2 Mouse Support

This option is used to enable or disable the operation of PS/2 mouse port.

Wait For "F1" If Error

In the case of any errors found in the system self-detection, it is waiting for the user to press F1 key. While the system is activating self-detection, if the issue found is not fatal (unlikely to cause lockup or gross consequences), then the system will go on operation, but the prompt information such as "Press 'F1' to resume" or "Press 'F1' to Set up" will be displayed. Now, press F1 key to resume operation.

Hit "DEL" Message Display

If set as [Enabled], the boot-up screen will show hint as "Hit Del if you want to run setup". If set as [Disabled], the hint will be shown on the screen when system is booted. In most occasions, this item is set as [Enabled].

Interrupt 19 Capture

If BIOS start-up can be captured by special outside insert card.

<Enabled>: Yes, here BIOS will start-up by inserted card setting in its ROM,

<Disabled>: No, here BIOS start-up by the influence of inserted card..

Boot Device Priority

Press "Enter" will show sub-menu:

1st Boot Device

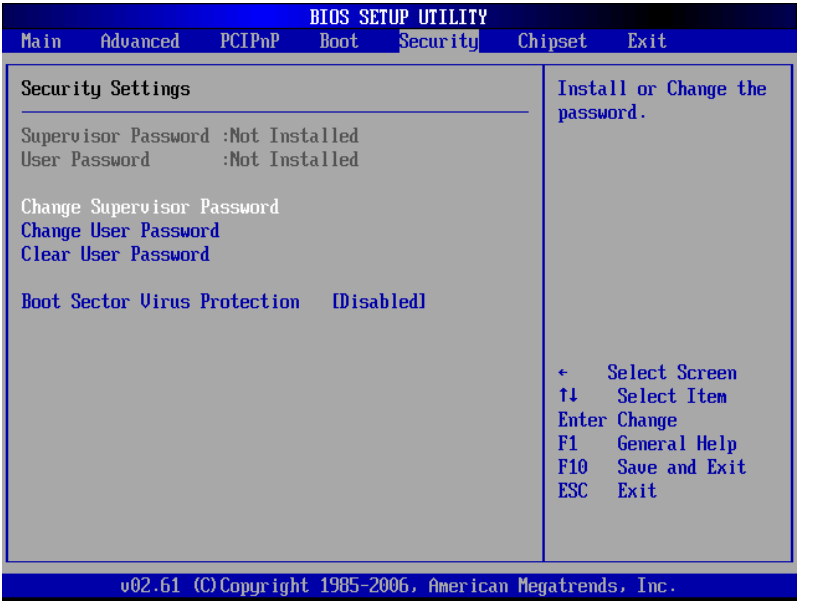
2nd Boot Device

System will detect device after this priority until find an available boot device then boot from it (Boot device support Removable Drive or Hard Disk Drive).

Hard Disk Drives

Boot device set for HDD, If has multi- HDD, must set up priority. The Highest Priority HDD will display in "Boot Device Priority"

3.5 Security Menu



Supervisor Password (read-only)

If set up supervisor password, will display [Installed], if not, will display [Not Installed].

User Password (read-only)

If set up user password, will display [Installed],If not , will display [Not Installed].

Change Supervisor Password

Select the Supervisor or User icon from the Security section of the BIOS Setup main menu. Enter the password and press 'Enter'. The screen does not display the characters entered. After the new password is entered, retype the new password as prompted and press 'Enter'.

Change User Password

Press 'Enter', and enter sub-menu then you can change supervisor password.。

Clear User Password

Press 'Enter', and select "yes" then you can clear user password.

Boot Sector Virus Protection

[Enabled]:Boot sector virus protection will be enabled. When execute Disk format or Write the Bootable section instruction, BIOS will send a warning.

Example as below:

Boot Sector Write!

Possible VIRUS: Continue (Y/N)? _

(Must press much 'N' and skip up)

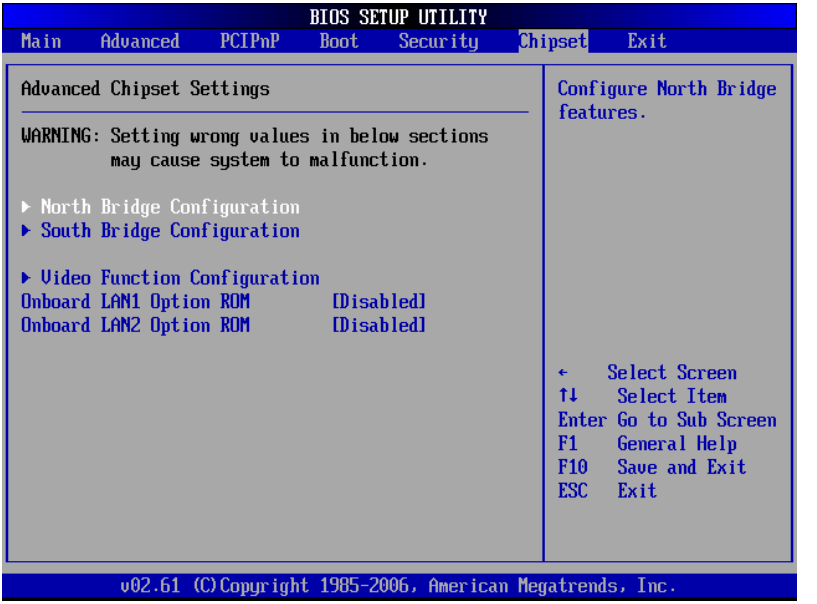
Format!!!

Possible VIRUS: Continue (Y/N)? _

(Must press much 'N' and skip up)

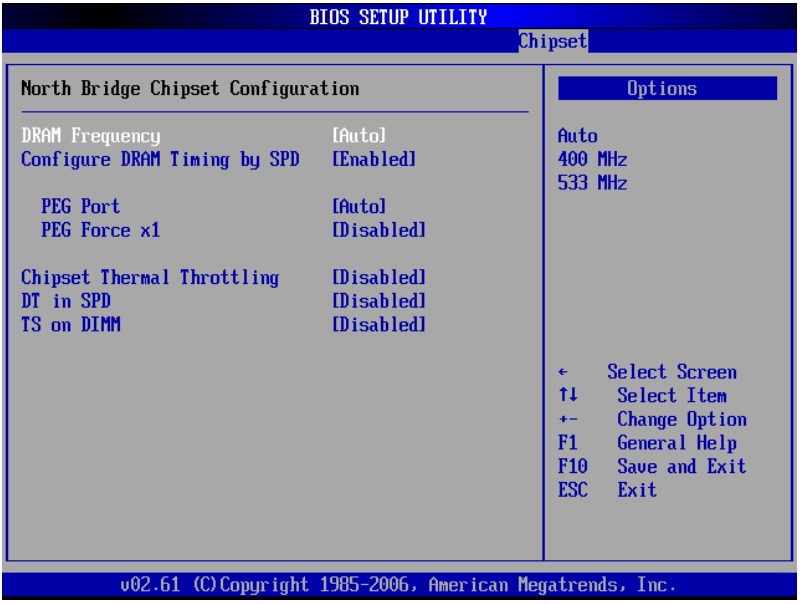
[Disabled]: close this function.

3.6 Chipset Menu



3.6.1 North Bridge Configuration

Move the cursor to “NorthBridge Configuration”, and press <Enter> key to appear the frame as below:



DRAM Frequency

Please config memory frequency according to its parameter, advice setting [Auto]。

Configure DRAM Timing by SPD

This option is specially designed for SPD memory of DIMM, that is to say, if the SPD memory chips are installed into the computer, then it will be set as [Enabled].

PEG Port

Open or close PCI Express Graphics port, options: [Disabled], [Enabled], [auto]. Default set is [Auto].

PEG Force ×1

PCI Express Graphics port transmission speed setting

<Enabled>:×1 mode,

<Disabled>: default

Chipset Thermal Throttling

Function of CPU thermal throttling, enter in it, you can set its temperature and enable it or not.

DT in SPD

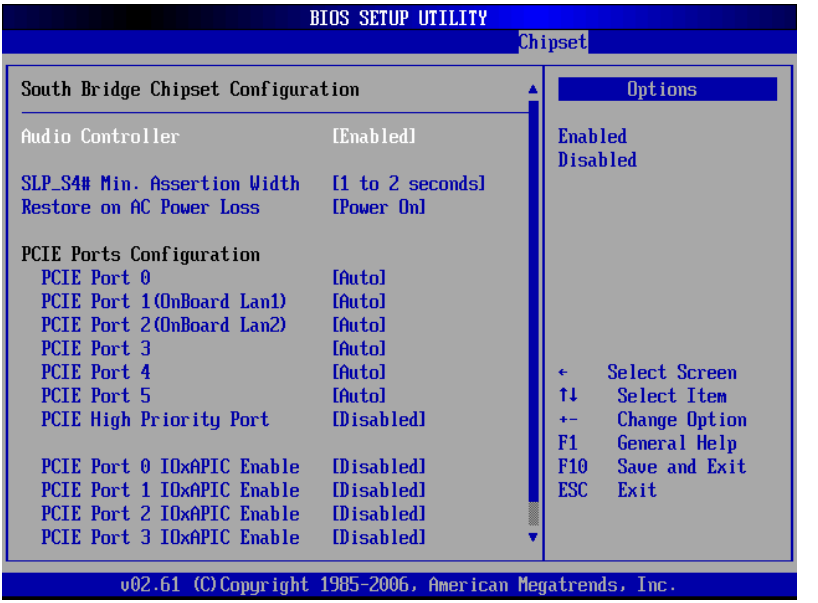
Delta Temperature(DT) is a kind of solution providing the power and heatsink data of the module. it stores the key data of temperature rise and the max DRAM shell temperature threshold data(Tcasemax) on the module SPD. The sytem will use this information to better predict the DRAM temperature and decide. When the technology developed or other optimization method are used to reduce DRAM power rating, the system will use the information stored in SPD to throttle and retrieve the performance of the system.

TS on DIMM

Instead of just looking at memory traffic and estimating what the temperature of the DIMM might be based on estimated memory module power/thermals, now the chipset can monitor the temperature by a sensor built-in the DIMM module. If the sensor detected that the DIMM is exceeding a "programmable critical temperature", the sensor will trigger an event signal to tell the chipset throttle the traffic of dimm aiming to cool down the DRAM core.

3.6.2 South Bridge Configuration

Move the cursor to “South Bridge Configuration”, and press <Enter>key to appear the frame as below:



Audio Controller

Set opening or closing main board integrated sound adapter, recommend [Auto], [Disabled]: close, [Enabled]: open.

SLP_S4# Min. Assertion Width

SLP_S4# of memory Min. assertion width setting, Default as: 1 to 2 seconds

Restore on AC Power Loss

<Power Off>: boot system after press power button while power supply connected

<Power On>: boot system straightway while power supply connected

<Last State>: according to the setting by last time.

PCIE Port 0/1/2/3/4/5

Select Open/Close PCIE port 0, 1, 2, 3, 4, 5, default setting: [Auto].

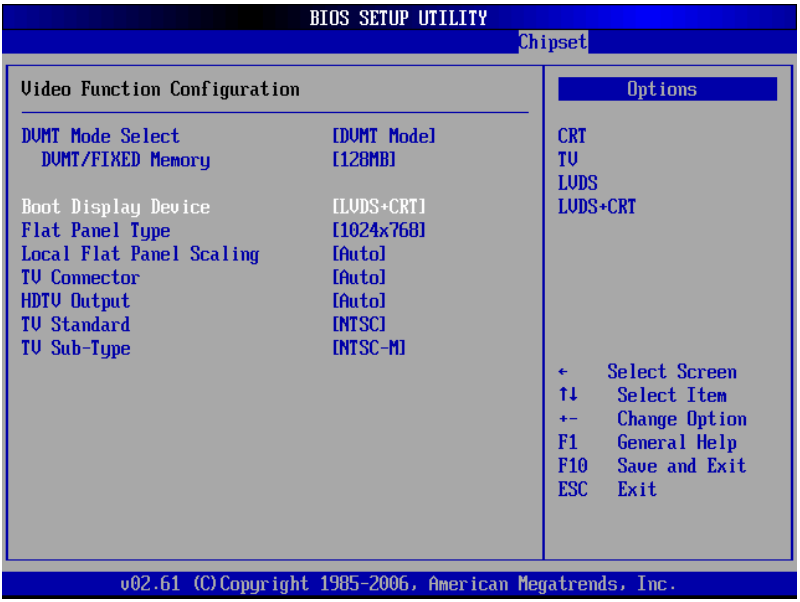
PCIE High Priority Port

Set PCIE port priority.

PCIE Port 0、1、2、3、4、5 IO×APIC Enable

Open/Close PCIE port 0, 1, 2, 3, 4, 5 I/O device APIC, options[Disabled：default]，[Enabled] (recommend default setting).

3.6.3 Video Function Configuration



DVMT Mode Select

Setup the first used internal display device, can be set as：[Fixed Mode] [DVMT Mode].

DVMT: dynamic shared graphic memory size, driver will dynamic distribute system memory size to it

FIXED: fixed shared memory, driver will distribute system memory size according to BIOS setting

DVMT/FIXED Memory

Specify the amount of DVMT / FIXED system memory to allocate for video

memory.

Boot Display Device

Display devices setting, such as LVDS+CRT, CRT, LVDS, TV etc.

Flat Panel Type

This option is for set LCD type and resolution.

Local Flat Panel Scaling

LVDS full screen display or all content display setting.

TV Connector

TV-OUT port selection.

HDTV Output

High-Definition TV output format set.

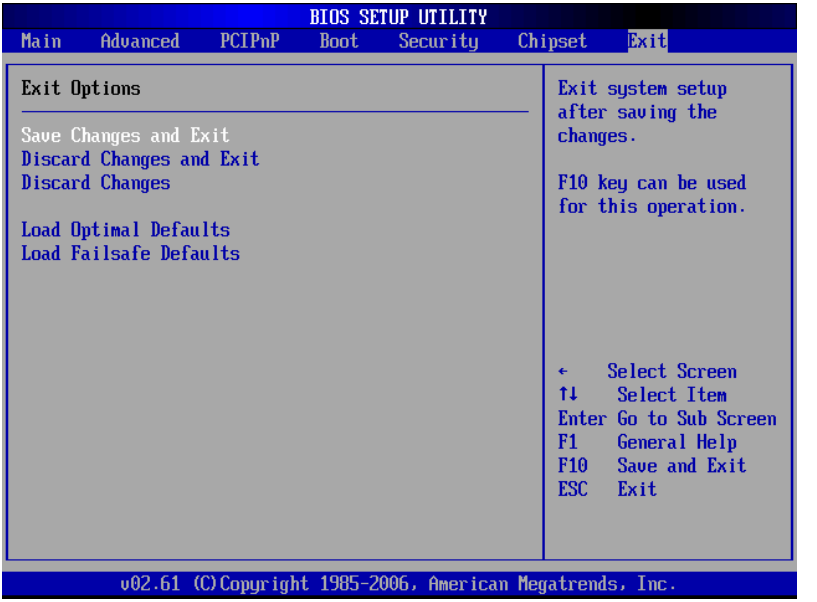
TV Standard

TV Standard settings.

TV Sub-Type

TV Standard Sub-Type settings.

3.7 Exit Menu



Save Changes and Exit

Press <Enter> and <Enter>, to save BIOS change and reboot system.。

Discard Changes and Exit

Press <Enter> and <Enter>, will does not save BIOS change and reboot system.

Discard Changes

Press <Enter> and <Enter>, and continue set BIOS.

Load Optimal Defaults

Recommend you first use this option before config BIOS.

Load Failsafe Defaults

If System fails, recommend to load this option.

Appendix

Appendix

Appendix 1: Driver Installation

Please install drivers according to the following method:：

1：Put the driver CD-ROM of accessories box into computer driver，waiting for a little time，At this time the interface of drives installation selection automatically ejects(If no ejected interface appears, users can manually enter into drive, finding the driver operating procedures).

2：Make a choice according to the specification of motherboard model you purchased. Double-click on the specification of motherboard，choose motherboard model after entering。

3：Double click on the driver to be installed. Start installing according to the screen tips。

4：After completeing the installation of some drives, you will be reminded to restart the system. Repeat 1-3 steps to proceed with the installation of other drivers after restarting the system, untill all the procedures are installed.

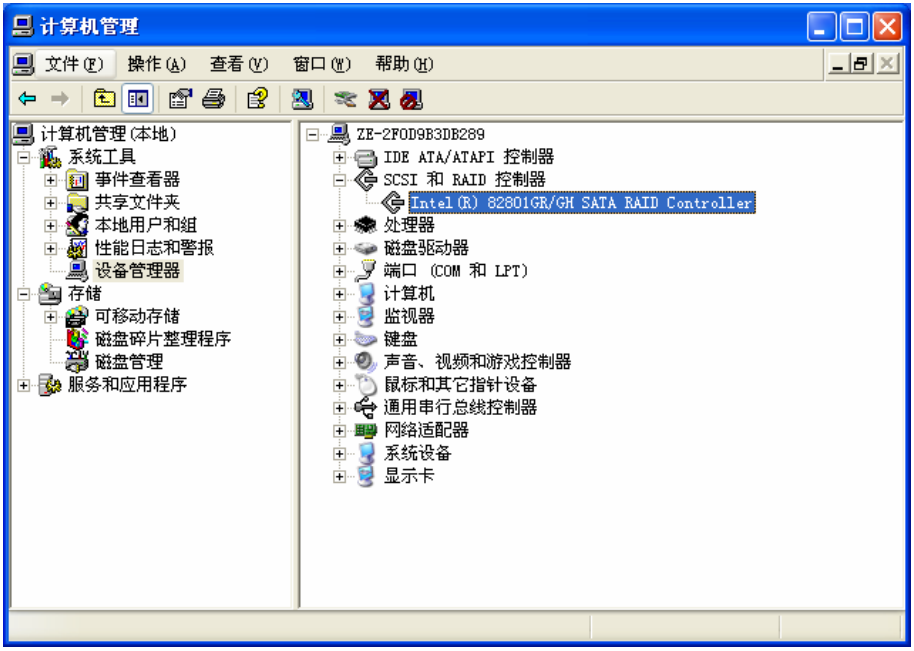
5: after the completion of all the drivers, users have access to see device effect in device manager

Appendix 2：RAID Setup

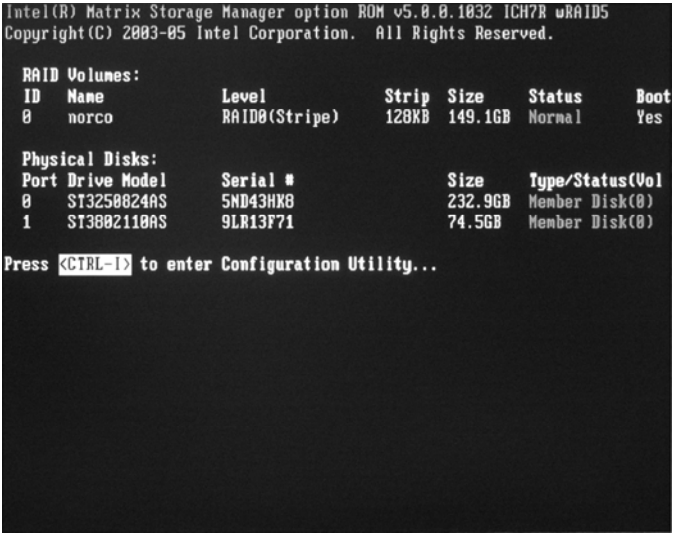
BIOS should be properly configured before RAID can be used:

Start the computer, and press Delete until BIOS configuration menu appears. Then choose "Advanced" option, and enter "IDE Configuration" option, set "SATA #1 Configuration" as "Enabled", and set "Configuration SATA#1 AS" option as RAID. Then save and exit.

Make sure the correct RAID driver is installed before setting RAID, if the RAID driver is installed, the following screen will appear in your "System Manager" windows.



1: After driver installed, reboot system, while booting, system will remind you to press“Ctrl+I”to set RAID. The picture as below：



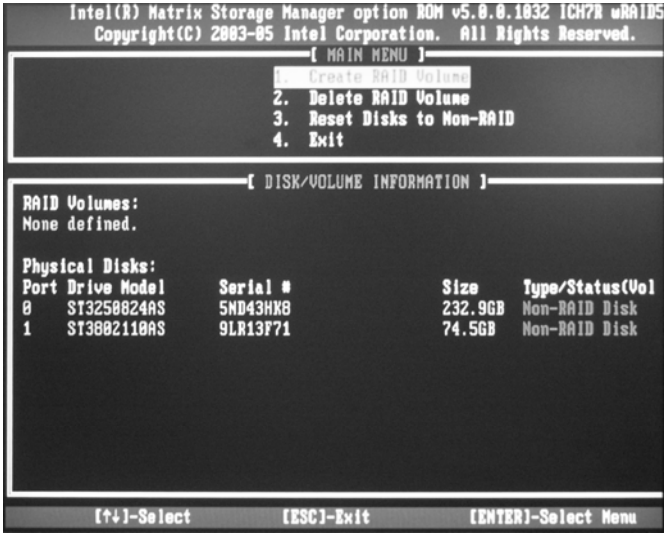
2：Press“Ctrl+I”in RAID setting interface.

（1）create new RAID value,

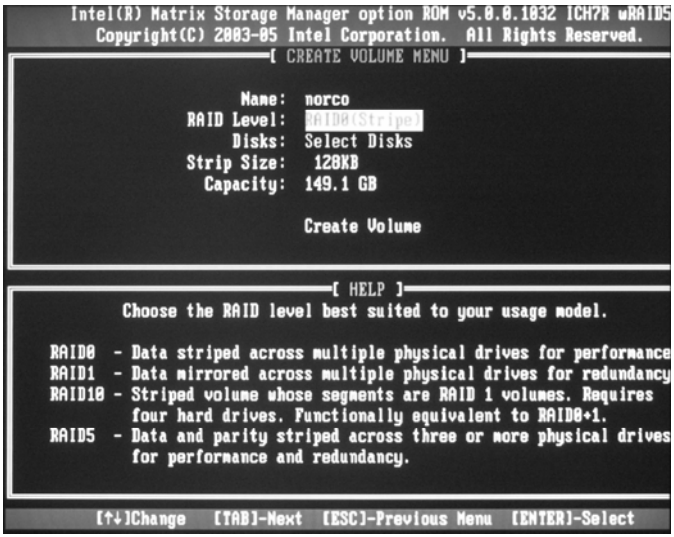
（2）delete RAID value,

（3）reset RAID,

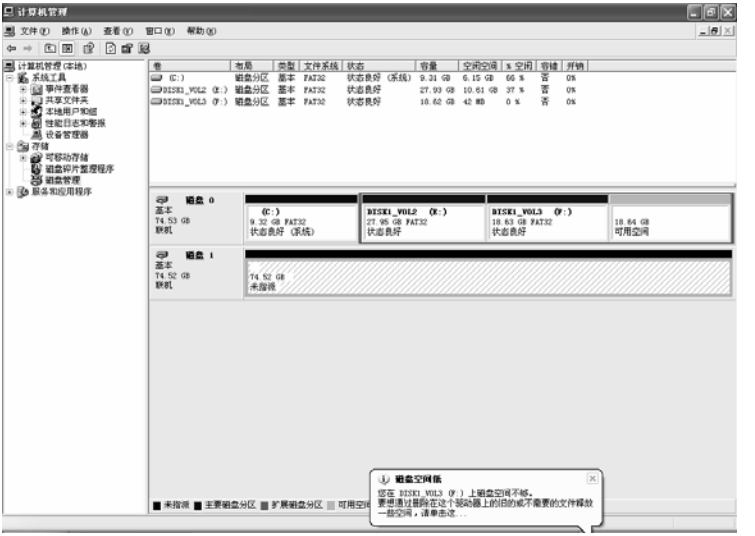
（4）exit .You can select each option by“↑↓”.the picture as below：



3: Select “Create RAID Volume” to create RAID. You can set it based on your demand. shows as below：



4：After setting, press ”Enter” and select “Y”, then exit, you can see the RAID you created in Disk management while entering system.



Appendix 3：Watchdog programmer guide

watchdog reference code（ASM）:

Set the port to realize watchdog function through DEBUG order, so that it can carry out Watchdog Timer's various functions.

port instruction：

2EH ：Address register

2FH ：Data register

Example：Set Watchdog Timer for 30 Seconds, DEBUG in DOS：

```
C:\>debug
-o 2e 87
-o 2e 87          ; Decode
-o 2e 2b
-o 2f e0          ; bit4=0, Select watchdog pin
-o 2e 07
-o 2f 08          ; Choose register
-o 2e 30
-o 2f 01          ; Activation logic devices
-o 2e f5
-o 2f 00          ; Set timer units as second /(set as min: o 2f 08)
-o 2e f6
-o 2f 30          ; Set Timer Count to 30 sec.(Max support FF = 255 , when it set as
                        00 Watchdog function stop)
-o 2fe aa         ; Lock register
-q
C :\>
```

As soon as you input last row of codes and pressed "enter", system will reboot in 30 Sec.

reference code (c++ language)：

```
outputb (0x2e, 0x87)
outputb (0x2e, 0x87)        // Open SUPER IO register
outputb (0x2e, 0x2B)
outputb (0x2f, 0xE0) //bit4=0 , Select watchdog pin
outputb (0x2E, 0x07)
outputb (0x2F, 0x08) //select logical device
outputb (0x2e, 0x30)
outputb (0x2f, 0x01)  //active the device
outputb (0x2e, 0xF5)
outputb (0x2f, 0x00)  // Set timer units as second /(set as min: o 2f 08)
outputb (0x2e, 0xF6)
outputb (0x2f, 0x30)// Set Timer Count to 30 sec.(Max support FF = 255 , when it set
                        as 00 Watchdog function stop)
outputb (0x2E, 0xAA)        // Lock register
//------- code end ---------------------------------
```

In the event of a system crash, Watchdog can automatically restart the system.

Appendix 4: Glossary

ACPI

Advanced Configuration and Power Management Interface for short. ACPI specifications allow OS to control most power of computer and its extended devices. Windows 98/98SE, Windows 2000 and Windows ME are all support ACPI, it provide users a flexible system power management.

ATX:

AT extended, a motherboard layout according with modern standard replaced BabyAT. It changes disposal of many components, and do some new high efficiency design, so it is widely used now.

BIOS

Basic in/out system. It's a kind of software including all in/out control code interface in PC. It will do hardware testing while system booting, then system runs, it provides an interface between OS and hardware. BIOS is stored in a ROM chip.

BUS

In a computer system, it's the channels among different parts for exchanging data; it's also a group of hardware line. BUS here means part lines inside CPU and main components of memory.

Chipset

Integrated chips for executing one or more function. Here "Chipset" means system level chipset structured by Southbridge & Northbridge; it decides motherboard's structure and main functions.

CMOS

Complementary Metal-Oxide Semiconductor, a widely used semiconductor with the characteristic of high speed but low power. CMOS we mention here means part of obligate space in on-board CMOS RAM, for saving date, time, system information and system parameter etc.

COM

Computer-Output Microfilmer. A universal serial communication interface, usually adopts normative OB 9 connector.

DIMM: Dual Inline Memory Module. It's a small circuit board with memory chipset, providing 64bit bus width.

DRAM

Dynamic Random Access Memorizer. It's a normal type of memory often with a transistor and a capacitance to store 1 bit. With the development of the technology, more and more types and specification of ORAM exist in computer application. Now: SDRAM, DDR SDRAM and RDRAM are generally used.

IDE:

Driver specification for integrated device electronics, for connecting HDD/CD-ROM device.

IRDA:

Infrared Data Association for short, here means infrared transmit interface, to connect infrared transmit devices. This sort of device transmits data by infrared light-wave without connecting any cables .It have been developed a standard now.

LAN

Network interface. Network grouped by correlative computers in a small area, generally in a company or a building. Local area network is buildup by sever, workstation, some communications links, as a rule. Terminals can access data and devices anywhere through cables, so, many users can share costly device and resource.

LED

Light-Emitting Diode. a semiconductor device that shines when power supply is connected, often use to denote info lightly, for example, to denote power on or HDD work normally.

LPT:

Line print terminal. The denomination reserved by DOS, is used to denote universal parallel interface, and connect printer in a general way.

POST

Self-test when power on. While booting, BIOS will do once uninterrupted testing operation to the system, including RAM, keyboard, hard disk driver etc. Check them in normal situation and work well.

PS/2

A keyboard & mouse connective interface specification developed by IBM.PS/2 is a DIN interface with only 6PIN; it also can connect other devices, like modem.

USB

It's Universal Serial Bus for short. A hardware interface adapts to low speed external devices, and is always used to connect keyboard, mouse etc. One PC can connect 127 USB devices Max, providing 12Mbit/s transmit bandwidth； USB supports hot swap and multi- data stream, namely, you can plug USB devices while system is running, system can auto-detect and makes it work on.

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