HABEY

Enabling Unlimited Embedded Computing

PRO-6820
Owner's Manual

Intel 3rd Gen Ivy Bridge Quad Core i7 Six GbE
Fanless Barebone System

Disclaimer

Except for the accessories attached to the product as specified herein, what is contained in this user manual does not represent the commitments of Habey USA Company. Habey USA Company reserves the right to revise this User Manual, without prior notice, and will not be held liable for any direct, indirect, intended or unintended losses and/or hidden dangers due to improper installation or operation.

Before ordering products, please learn about the product performance from the distributors to see if it is in line with your needs.

Safety Instructions

1. Please read the product manual carefully before using this product.

2. Put all the unused or uninstalled boards or electronic components on a static dissipative surface or in static shielding bag.

3. Always ground yourself to remove any static discharge before touching board. To ground, place your hands on a grounding metal object or wear a grounding wrist strap (not included) at all times.

4. When taking or fetching the boards or cards, please wear anti-static gloves and hold the boards by its edges.

5. Make sure that your power supply is set to the correct voltage in your area. Incorrect voltage may cause personal injuries and damage the system.

6. To prevent electronic shock hazard or any damage to the product, please ensure that all power cables for the devices are unplugged when adding or removing any devices or reconfiguring the system.

7. To prevent electrical shock, disconnect the power cable from the electrical outlet before relocating the system.

8. When adding or removing components to or from the system, ensure that all the power cables for the system are unplugged prior to installation or removal.

9. To prevent any unnecessary damage to the products due to frequent power on/off, please wait at least 30 seconds to restart the unit after the shutdown.

10. If the system fails during normal operation, do not attempt to fix yourself. Contact a qualified service technician or your retailer.

11. This product is classified as Class A product, which may cause radio interference in our living environment. In this occasion, users need to take measures to handle the interference.

Contents

Packing List

Thank you for purchasing a Habey USA product. Please check this package carefully to ensure all parts are packaged. If you find any defective, damaged, or lost components, please contact your vendor or retailer ASAP.

Item	QTY.
PRO-6820	1
Green 3Pin Phoenix Power Connector	1
Drivers and Utilities	1

Section 1 : Product Introduction

1.1 Specification

Proces-sor	CPU	Intel 2ndIntel & 3rd Core i3/i5/i7 (LGA1155)
	Chipset	QM77
	BOIS	W25Q64BVSIG
Memory	Type	2x 204-Pin DDR3 SO-DIMM
	Capacity	Up to 8GB
Power	Single Supply	DC12V/DC14V—DC28V
Display	VGA	1x VGA, 1x DVI
Audio	Chip	ALC887 /ALC892
LAN	Chip	1x 82579LM(AMT), 5x 82574L
Storage	SATA	1x 2.5” SATA HDD bay, front accessible
	SATA	2x SATA
	CF	1 x CF card socket (support system auto recovery)
Front Panel	VGA+DVI	1x VGA+1x DVI
	RJ45+USB	2 x (RJ45+2xUSB2.0)
	RJ45	4x RJ45
	COM	COM1/COM2: 232/485/422 adjustable; COM3/COM4: 232
	AUDIO	1x Line OUT + MIC IN
	Green Port	4x GPI, 4x GPO
	LED	2x LED (double layer; HDD_LED down, PWR_LED up)
	Switch	Red toggle key, reset switch
	HDD	2.5” pluggable HDD
	CF	CF card slot, pluggable
	Power	3PIN Green Power Connector
Rear Panel	PS/2	1x PS/2 Pin
	USB 3.0	2x USB3.0

Inner Interfaces	MINI-PCIE	1x MINI-PCIE (the same interface with mSATA) 1x MINI-PCIE 3G/4G/WIFI
	USB	6x USB Dongle
	PCI	1x PCI (reserved)
	SATA	1x SATA
	SO-DIMM	2x DDR3 SO-DIMM slots
	GPIO	8bit GPIO
Watchdog	Output	Reset
	Time Interval	Programmable 1-255S / 1-255m
Dimension		240mm(W) x 253mm(D) x 115mm(H)
Cooling		Fanless
Model No.		BPC-7920

Section 2 Installation Instructions

Safety Precautions

Electricity is used to perform many useful functions, but it can also cause personal injuries and property damage if improperly handled. This product has been engineered and manufactured with the highest priority on safety. However, improper use can result in electric shock and/or fire. In order to ensure your safety and prolong the service life of the system, please observe the following and read the following precautions when installing and handling the product.

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 Player chassis.

Caution!

• When installing the heat conduction structure of the CPU and motherboard MOS tube. Please make sure the thermal adhesive or thermal pad is properly coated or sticked. Recommend to ask manufacturer technician to install or provide guidance, so as to se cure good heat transfer performance.
• The product has one 3Pin Green Phoenix power connector.
• It is normal that the temperature of the machine case will be a little bit high when it is working.
• Please read the users manual in detail before using this product.
• Product specification and pictures are subject to change without prior notice.

Safety Instruction

Electrical Safety

• If the power supply is broken, do not try to fix it yourself. Contact a qualified service technician or your retailer.

• When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

• To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

• Before connecting or removing signal cables from the motherboard, please ensure that all power cables are unplugged.

• Do not damage the power cord nor place heavy objects on it, stretch it or over bend it. Damage to the cord may result in or electric shock.

• Make sure that your power supply is set to the correct voltage in your area. Incorrect voltage may cause personal injuries and damage the system.

Operation Safety

• Before installing the motherboard and adding devices on it, carefully read all the guides that came with the package.

• To avoid short circuits, keep paper clips, screws, staples, and any other small metal objects away from connectors, slots, sockets and circuitry.

• Do not use the system where there is a lot of dust, humidity is high, or where the system may come into contact with oil or steam, as this could lead to fire.

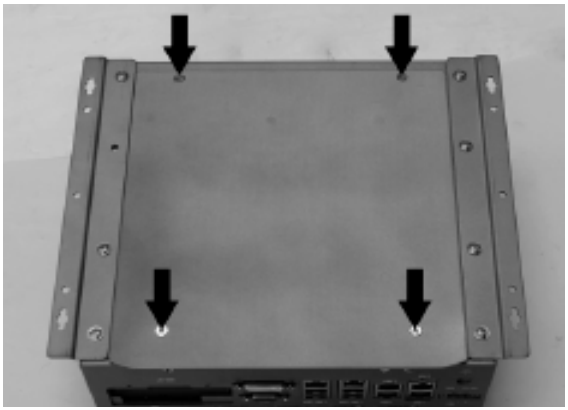
• Ensure that the system does not come into contact with water or other fluids. Ensure that no objects such as paper clips or pins enter the system as this could lead to electric shock.

• Do not place the system in unsafe places. Do not allow the system to receive strong shocks or to strongly vibrate. This may cause the system to fall or topple over damaging the system.

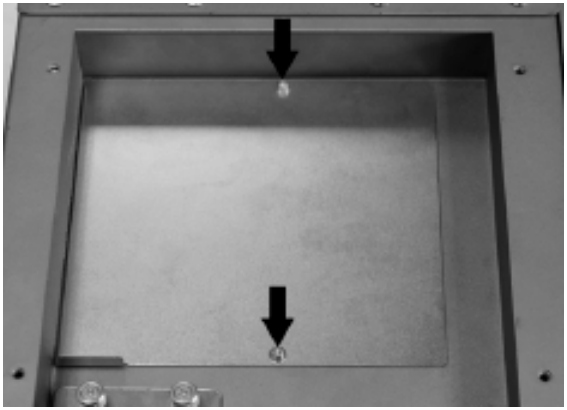
• Do not use the system near heating equipment or in places where there is likelihood of high temperature, as this may lead to excessive heat and outbreak of fire.

• Do not use the system in places where it may be exposed to direct sunlight. The product specification and pictures are subject to change without prior notice!

2.1 Remove the Computer Cover

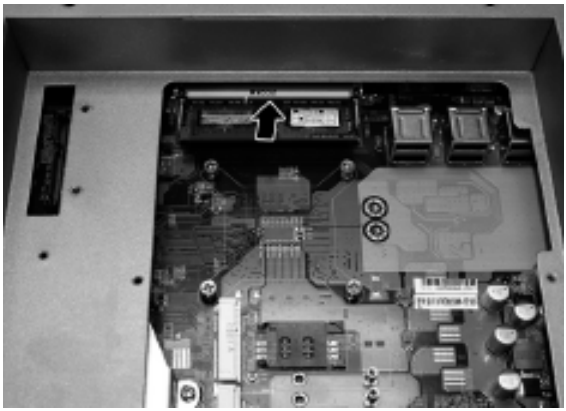


Remove the four screws marked by black arrows and then remove the rear panel.

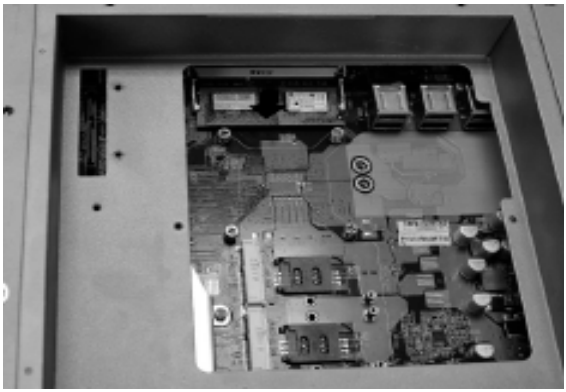


Twist off the two screws marked by black arrows and then remove the memory, dongle and 3G module.

2.2 Install Memory

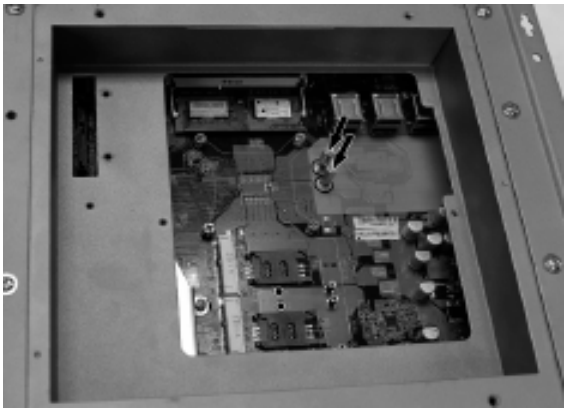


Insert the memory bank into the SO-DIMM slot in the 45 degree direction

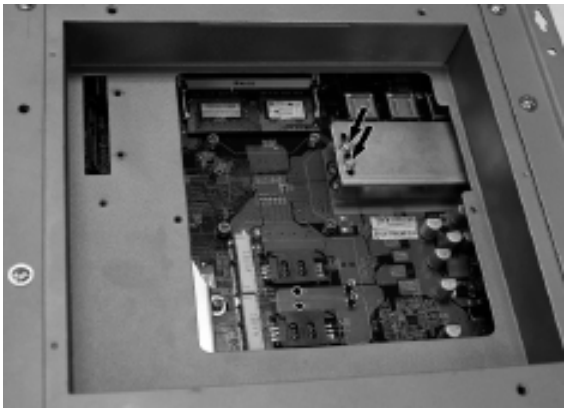


Then hand press against the top and press it down into the SO-DIMM slot till it fits into the slot.

2.3 Install Dongle Bracket

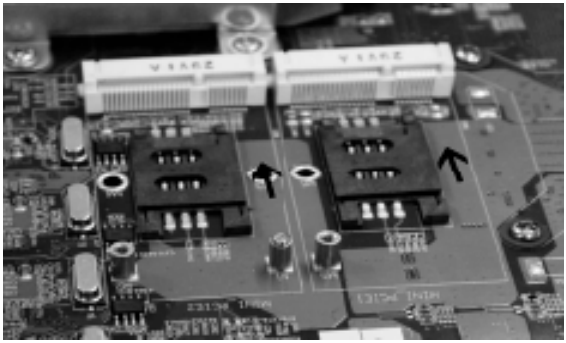


Install two screw bolts in the position (black arrow) and tighten the screw bolts

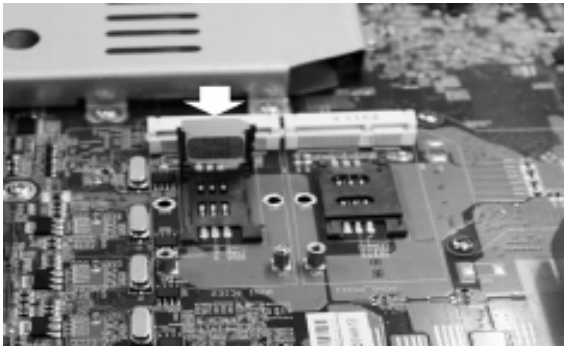


Put the dongle mounting bracket onto the screw bolts and use screws to fix the dongle mounting bracket on the screw bolts

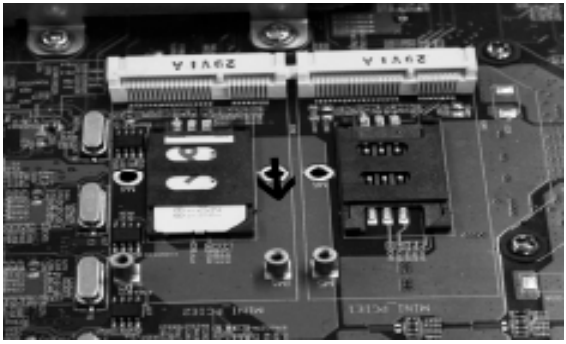
2.4 Install 3G Card



Loosen the SIM card socket in the direction illustrated as the black arrow.



Insert the SIM Card into the SIM card socket top cover till it reaches the bottom.



Fix the SIM card into its socket in the direction as marked by the black arrow.

Insert the 3G module into the socket at a 30 degree direction of until it reaches the bottom

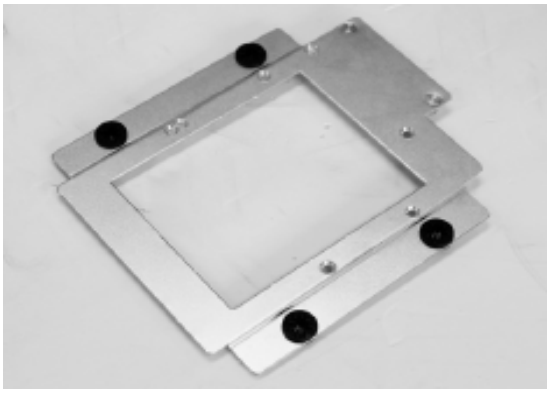
Then press it vertically down and use screws to fix the 3G module onto the motherboard.

2.5 Install HDD on the Backplane

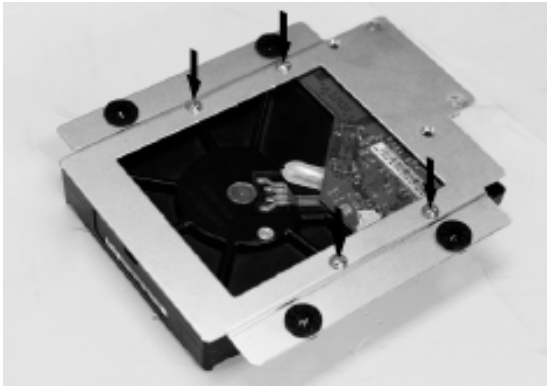
Twist off the two screws at the position marked by black arrows and then remove the separation blade.

Connect the 7+15 pin SATA HDD cable to SATA port

Use the separation plate to stuck the SATA cable as illustrated in the picture and tighten the screws

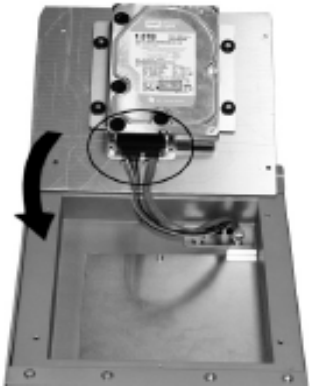


Remove the HDD mounting bracket from the backplane.

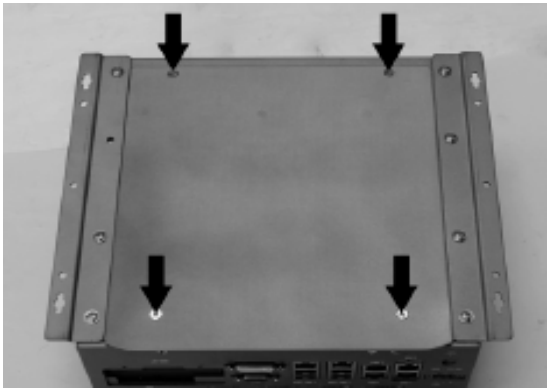


Mount the HDD onto the bracket as illustrated in the picture and then fix it with 4 screws

Then mount the HDD bracket back onto the backplane and fix it with four screws.



Place the rear cover as illustrated in the picture and connect the 7+15pin SATA cable to HDD marked in circle and then turn over the backplane as per the black arrow.



Fix the backplane with four screws.

2.6 Install HDD/CF Card on the Front Panel

Mount the 2.5” HDD into HDD tray.

Install damping rubber boot on both sides of the HDD as marked in circle.

For 7mm HDD, damping rubber strip is required to be pasted onto the topside of the damping rubber boot.
For 9mmHDD, just need the damping rubber boot.

Insert the HDD tray into the hard disk rack on the front panel till it reaches the bottom. Pull the drawstring on the HDD to remove HDD.

Insert CF card into the CF socket on front panel.
To remove CF card, just need to pull the drawstring on it

Mount the HDD cover on front panel and fix it with 2 screws.

2.7 Complete Installation

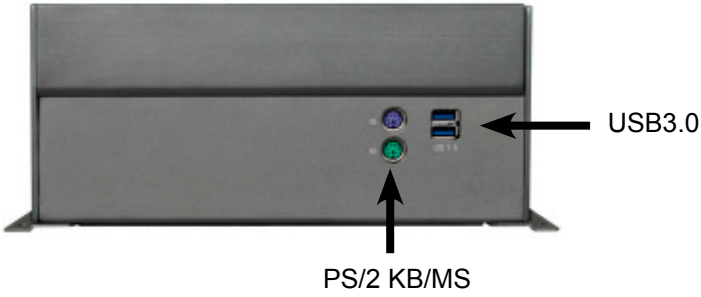
Rear I/O Location

Front I/O Location

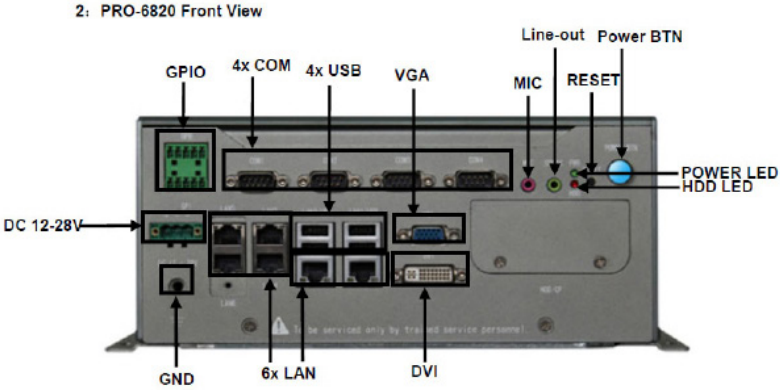
Section3 Hardware Functions

3.1 External Interfaces Location

1: PRO-6820 Rear View

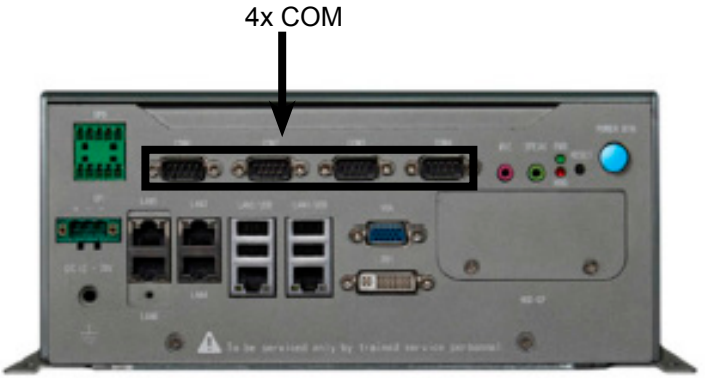


2: PRO-6820 Front View



3.1.1 Serial Ports (COM1_COM6)

System provides 6x RS232 serial ports:four on front panel and two reserved inside on the motherboard. COM1_COM4 are standard DB9 interfaces; COM1/COM2:RS422/RS485, COM1/COM2 default setting: RS485.



COM1_COM4:

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

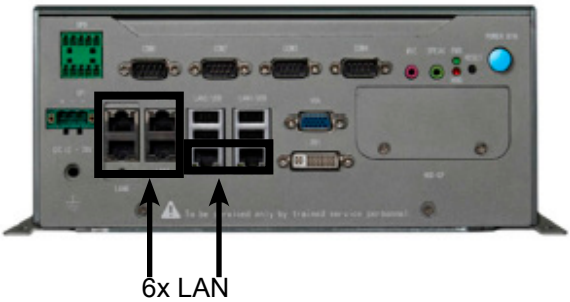
COM2:RS232/RS422/RS485, Pins defined as below:

Pin	RS232 (default)	RS422	RS485
1	DCD	TX-	DATA-
2	TXD	TX+	DATA+
3	RXD	RX+	NC
4	DTR	RX-	NC
5	GND	CND	GND

6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

3.1.2 Ethernet (LAN1_2, LAN3_4, LAN5, LAN6)

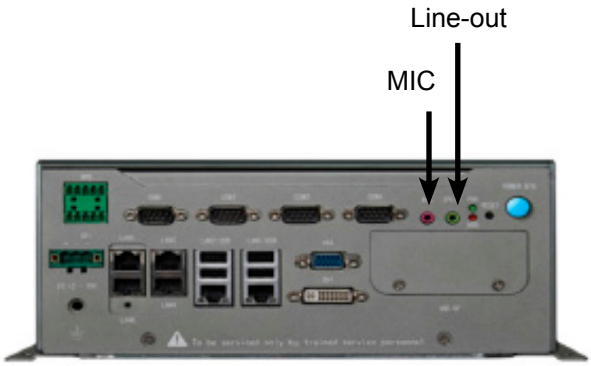
System provides 6x RJ-45 Ethernet LAN ports. Both sides of the RJ-45 interface have one LED lamp. The yellow one indicates data transfer status. The green one indicates network link status.



RJ45 LAN LED Status:

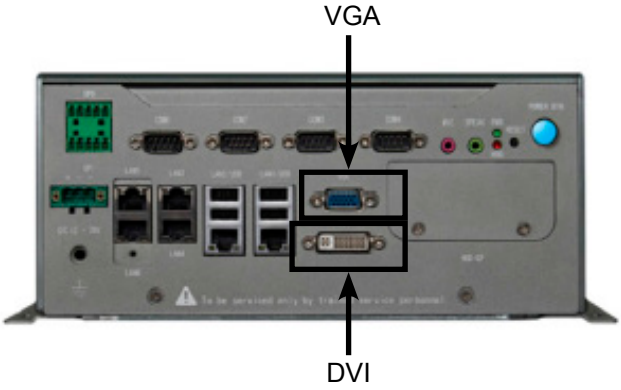
LILED (Green)	Function	ACTLED (Yellow)	Function
On	10/100/100M	Flash	Data Transfer

3.1.3 Audio 9Line-out, MIC-in)



3.1.4 Display (VGA, DVI-D)

System provides one standard 15Pin VGA port to connect all VGA monitors, and one DVI port to connect DVI monitors.



VGA:

Pin	Signal Name	Pin	Signal Name	Pin	Signal 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	SCL

DVI-D:

Signal Name	Pin		Signal 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#
NC	C1	C2	NC
NC	C3	C4	NC

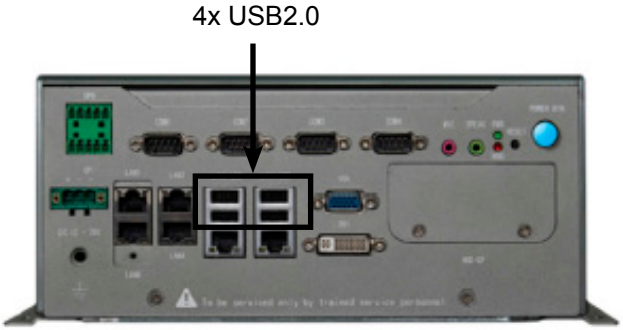
3.1.5 Power Interface (DC_JACK)

DC_JACK:

Pin	Signal Name
1	Power Input
2	GND
3	GND

3.1.6 USB2.0

Front panel has 4x standard USB2.0 ports.



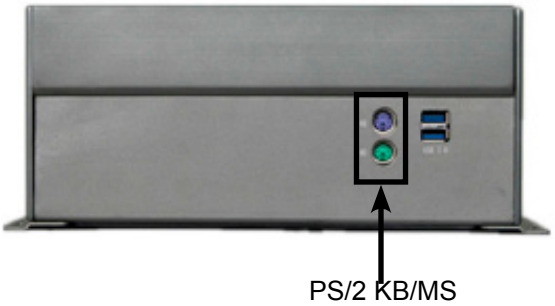
Pin	Signal Name
1	+5V
2	USB DATA-
3	USB DATA+
4	GND

3.1.7 USB3.0

Rear panel has 2x standard USB3.0 ports.

3.1.8 PS/2

Rear panel has one PS/2 keyboard and PS/2 mouse interfaces.



MS:

Pin	Signal Name
1	+5V
2	GND
3	NC
4	MS_DATA
5	MS_CLK
6	NC

KB:

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

3.1.9 GPIO

GPIO:

Signal Name	Pin		Signal Name
GPI1	1	6	GPI1
GPI2	2	7	GPI2
GPI3	3	8	GPI3
GPI4	4	9	GPI4
NC	5	10	GND_GPIO

3.2 Jumper Settings

Please refer to the following jumper setting guide before installing your hardware devices. Note: How to identify PIN1 of jumper and interface: Please observe the word mark of plug socket, it will use “1” or bold line or triangular symbols; and please look at the back of PCB. Each interface weld spot has a square point, which is PIN 1. The PIN1 of all the jumpers has a white arrow beside it.

3.2.1 CMOS Clear/Hold Jumper Setting (JCC)

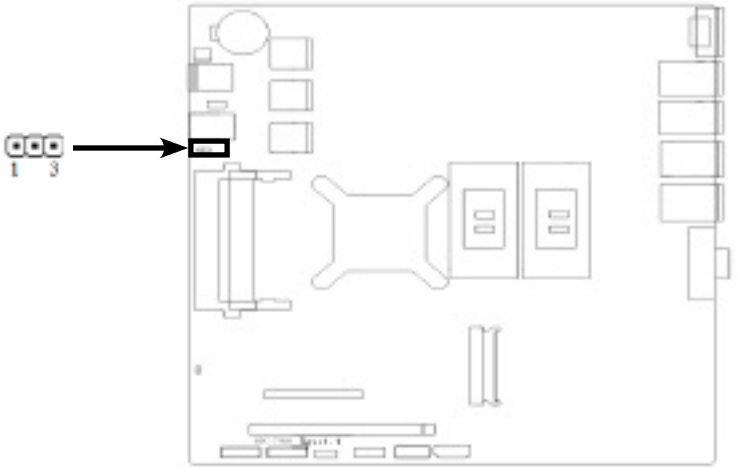
CMOS is powered by the onboard button cell. Clear CMOS will lead to permanent elimination of previous system settings and back to the original system setting (factory default).
Steps:

(1) Turn off the computer and disconnect the power supply

(2) Use Jumper Cap JCC Pin1-2 short for 10 sec(1-2). Then restore the default setting with Pin2-3 connected(2-3)

(3) Turn on the computer, then press “DEL” key to enter BIOS setting and reload optimal defaults.

(4) Save and Exit.

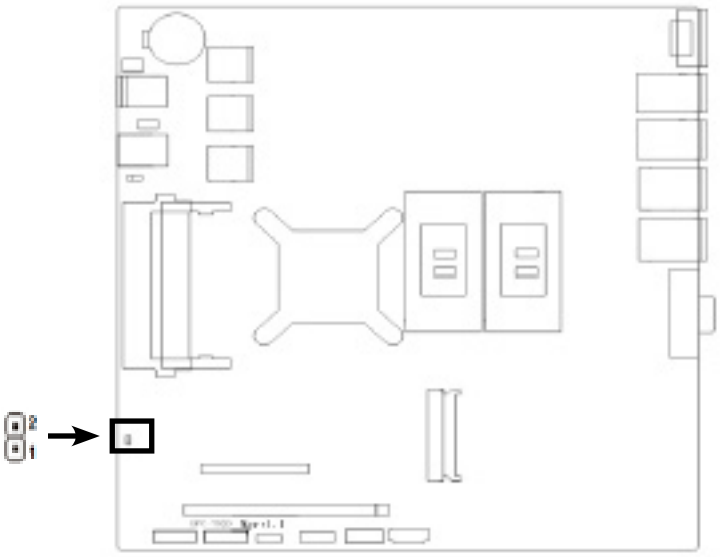


JCC1:

Setting	JCC
1-2	BIOS back to initialization (factory default)
2-3	Normal Status, System default

Do not clear CMOS when the computer is power on, otherwise, it will cause damage to the motherboard

3.2.2 Hardware Switch for System Auto Boot After Restore AC Power (JAT)



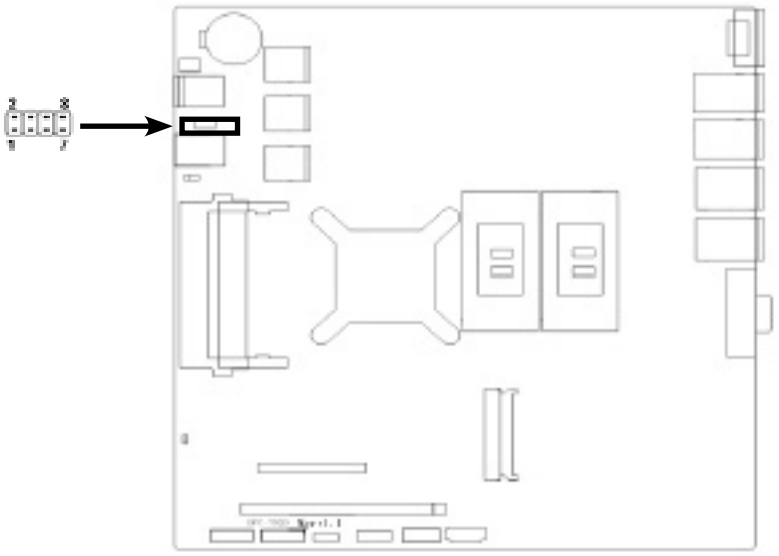
JAT:

Setting	JAT
Open	Disable this auto boot function
Close	Enable this auto boot function

3.3 Inner Interfaces

3.3.1 Keyboard and Mouse Interface (K/M_PS/2)

System provides one 2x4Pin keyboard and mouse interface, to be converted to standard PS/2 interface with an extension cable.

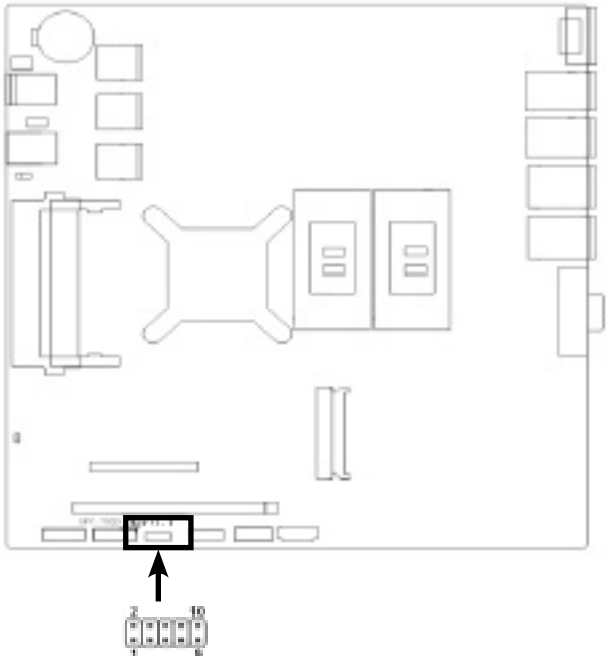


KIM:

Signal Name	Pin		Signal Name
VCC	1	2	MS_CLK
GND	3	4	MS_DATA
KB_DATA	5	6	GND
KB_CLK	7	8	VCC

3.3.2 GPIO

GPIO: General Purpose Programmable Input/output Port

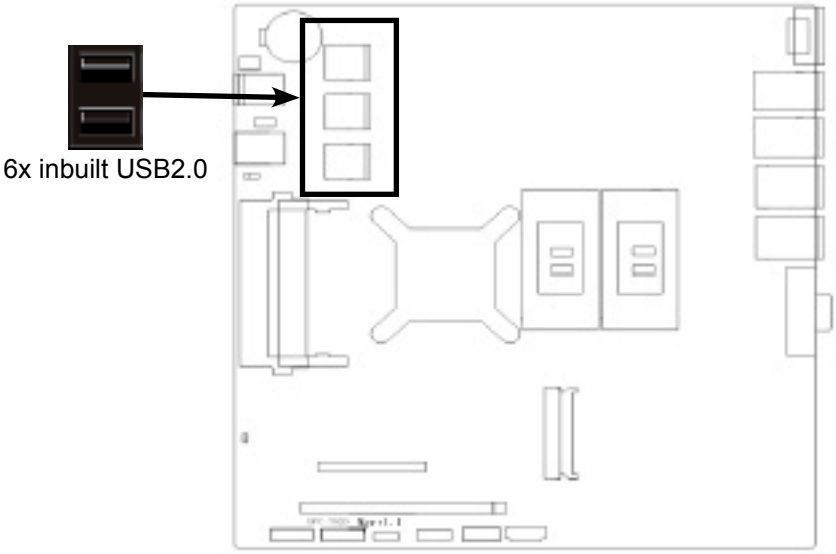


GPIO:

Signal Name	Pin		Signal Name
GPIO1	1	2	VCC
GPIO2	3	4	GPIO5
GPIO3	5	6	GPIO6
GPIO4	7	8	GPIO7
GND	9	10	GPIO8

3.3.3 USB Ports [USB2.0 (USB4_5,USB6_7,USB10_11)]

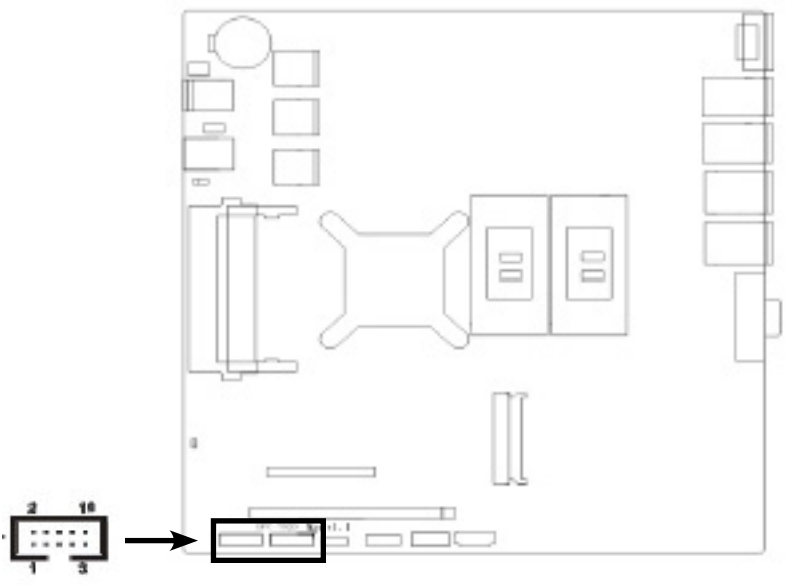
System provides 6x USB2.0 Ports.



USB2.0:

Pin	Signal Name
1	+5V
2	USB DATA-
3	USB DATA+
4	GND

3.3.4Serial Ports (COM5, COM 6)

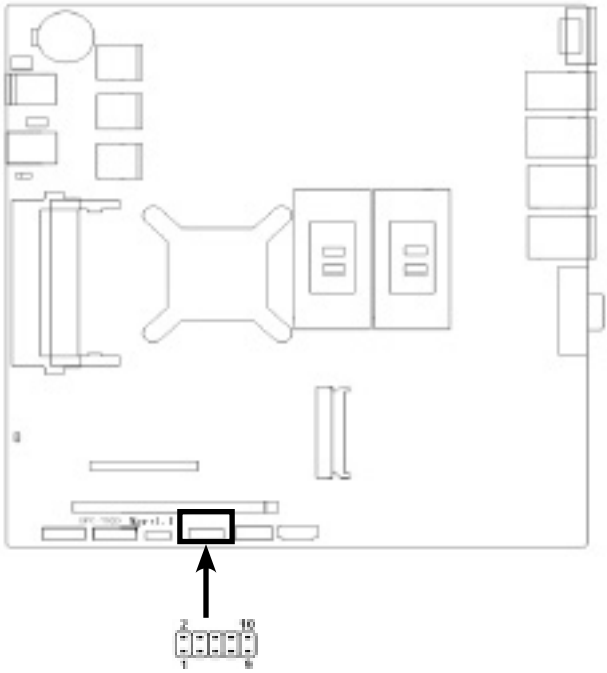


COM5_COM6:

Signal Name	Pin		Signal Name
DCD	1	2	DSR
SIN	3	4	RTS
SOUT	5	6	CTS
DTR	7	8	RI
GND	9	10	GND

3.3.5 Front Panel Connector (JFP)

JFP is used to connect the function buttons and LED lamps on the front panel.



JFP:

Signal Name	Pin		Signal Name
POWER LED+	1	2	POWER LED-
HD LED+	3	4	HD LED-
VCC	5	6	BUZZDATA-
RESET SW	7	8	GND
POWER SW	9	10	GND

Please follow the table below to connect, pay attention to the anode (+) and cathode (-), otherwise, some function cannot be realized.

JFP
POWER LED
HDD LED
BUZZ
RESET BUTTON

1) System Power LED Pins (Pin 1/2 for PWRLED)
Connect system power LED cable with these pins. (pin 1 is LED anode) When system is power on, power LED is on: when system is power off, power LED is off.

2) HD LED Pins (Pin3/4 for HDD LED)
Case panel has one HD LED indicating HD status. When HD read and write, the LED will flash, indicating the device is working. Connect the LED cable to the LED pins (Pin3 is LED anode).

3) Buzzer Pins (Pin5/6 for SPEAKER)
External Speaker Pins

4) Reset Button Pins (Pin7/8 for RESET)
Connect the reset button cable to these two pins. When system fails, reset button can make the system continue to work and no need to turn on / off the power.

5) Power Button Pins (Pin 9/10 for POWER BUTTON)
Connect these two pins to the bounce switch on the chassis to connect or disconnet the power supply.

3.3.6 SO-DIMM Slot
System supports 2x dual channel SO-DIMM slots to offer DDRIII 1066/1333/1600MHz RAM 4GB and maximum RAM up to 8GB.

3.3.7 MINI PCIe (MINI PCIe1, MINI PCIe2,)
Board provides 2x MINI PCIe slots. If you use the Mini PCIE WiFi card, the wireless network you select will display the WiFi card status. (MINI PCIe1 (default MSATA SSD card) supports WiFi /3G module, compatible with SSD card function, EPC/MSATA optional; MINI PCIe2 supports WiFi /3G)

3.3.8 PCI
System reserves PCI slot.

Section 4 BIOS SETUP

AMI BIOS Flash

BIOS functions as a bridge connecting hardware and operating system. Hardware and software are upgrading all the time, so when your system goes wrong, for example, your system can not support the newest CPU, you need to upgrade BIOS to keep up with the latest technology.

AFUEFI.EXE is the FLASH IC program for BIOS to upgrade, which needs to be run in DOS mode.
Please use a boot disk to load DOS, then run AFUEFI.EXE to upgrade BIOS (for example: write XXXX.ROM into FLASH IC)
Specific Command: C:\ AFUEFI ****.rom /P /B /N /X or C:\FPT -F ****. BIN –BIOS
If you need to add other parameters after the order format, please add <space>/?

Remark:

1. BIOS upgrading is only executed when it is necessary.
2. Please use the BIOS SETUP Utility in the CD-ROM provided by us or downloads the latest version on related websites.
3. Please do not power off or reboot the system during BIOS upgrading, otherwise, the BIOS maybe be damaged or system may not be able to boot again.
4. After BIOS flash, please manually Load Default to optimize BIOS settings.
5. Please backup your BIOS in advance.

AMI BIOS Description

When the computer is power on, BIOS will conduct self-diagnosis to its hardware on motherboard and configure hardware parameter; finally the operating system will take control. BIOS is the communication bridge between hardware and O/S. Correct configuration of BIOS is critical for maintaining system stability and its optimized performance.

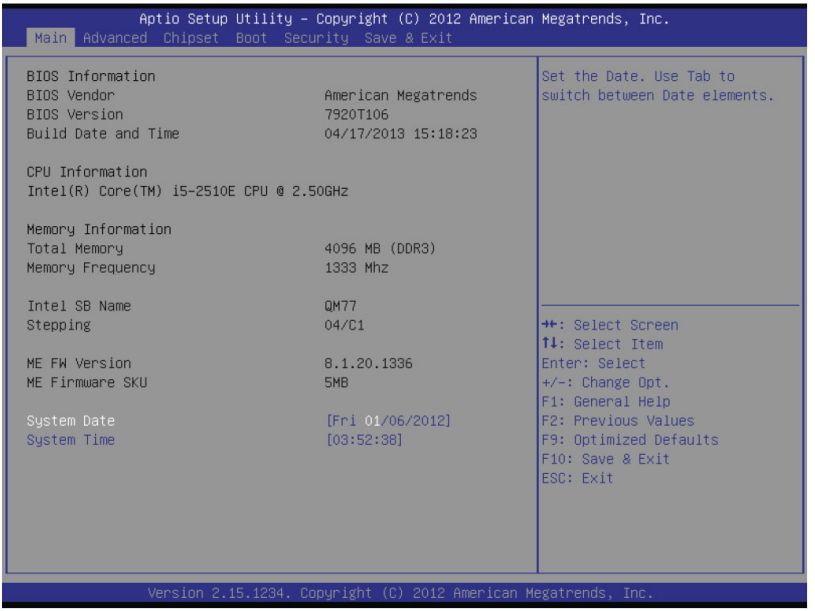
BIOS Settings

1. Power on or restart the system, self-detection message will display on the screen.
2. When system pops out the prompt “Press <Del> to enter setup, <F11> to Popup menu “ , please press <Del> key to enter BIOS setup interface.
3. Use the “←↑→↓” to select the option which your want to modify, press <Enter> to go to the sub-menu
4. Use the “←↑→↓” and <Enter> to modify the value; press “Enter” to modify BIOS Options that you choose.

5. At any time, press <Esc> can go back to the father-menu.

Remark: BIOS settings have direct impacts to computer performance. Incorrect configurations will cause damage to the computer and even lead to system halted. Please use BIOS default settings to recovery system. As our company is always ceaselessly update the BIOS SETUP Utility, so, following BIOS SETUP screens are only for your reference. Some may be different from the BIOS you are using now.

4.1 Main Menu

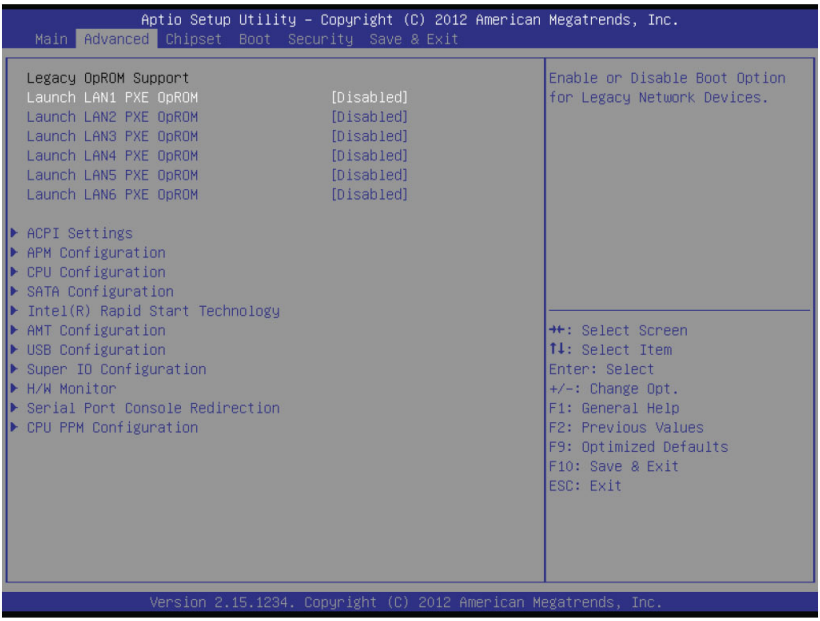


BIOS Vendor: American Megatrends
BIOS Version
Build Date and Time
CPU Information: CPU supplier, model Memory Information: memory size, frequency Intel SB Name
Stepping
ME FW Version
ME Firmware SKU

System Date
System Date Format: Month/ (Jan.-Dec.) Date/ (01-31) Year/ (up to 2099) Week/ (Mon. ~Sun.).

System Time
System Time Format: Hour/ (00-23) Minute/(00-59) Second/(00-59).

4.2 Advanced Menu



Note: Any mistakes in the following part parameter settings will lead to system failure. Therefore, please refer to following instructions to operate the machine.

Launch LAN1/2/3/4/5/6 /PXE OpROM
Enable or disable boot option for legacy network device.

ACPI Settings
Setup system in deepest sleep mode S1/ S3

APM Configuration
Set RTC parameters

CPU Configuration
CPU parameters and options configuration

SATA Configuration
SATA Mode and Information Setting

Intel(R) Rapid Start Technology
Intel (R) Rapid Start Technology is developed by Intel Corporation and is newly added to Intel 7 series CPU. Intel Rapid Start Technology enables your system to get up and running faster from even the deepest sleep within 5-8 seconds and continue with the work before entering the sleep status, saving time and power consumption. This technology offers users the following benefits:
1. High Security ----System will finally enter the S4 sleep mode. The data is stored in HDD. So even the system is power down, the stored data won't be lost.
2. Fast Wakeup ---- only need 5-8 seconds to wake up from sleep mode, twice as fast as that of 20 seconds from the traditional sleep mode.
3. Low Power Consumption ----The power consumption is almost at 0 when system is in sleep mode.

TO run this technology, you need the following:
1. Intel 7 series chipset based Motherboard
2. Board ACPI of (S3) mode. HDD: AHCI/RAID
3. Motherboard with SSD
4. Install Intel Rapid Start Technology Driver
5. Install Windows 7 or higher level OS

AMT Configuration
AMT Configuration Options

USB Configuration
USB information and control options.

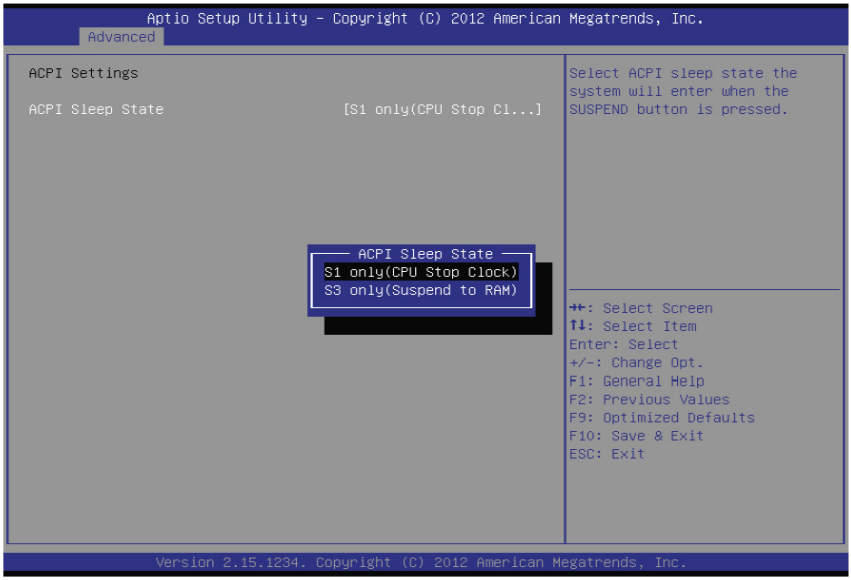
Super IO Configuration
Super IO configuration, including COM port IRQ and Address.

H/W Monitor
Hardware voltage monitoring

Serial Port Console Redirection
Serial Port Console Redirection setting

CPU PPM Configuration
CPU Power Management Configuration

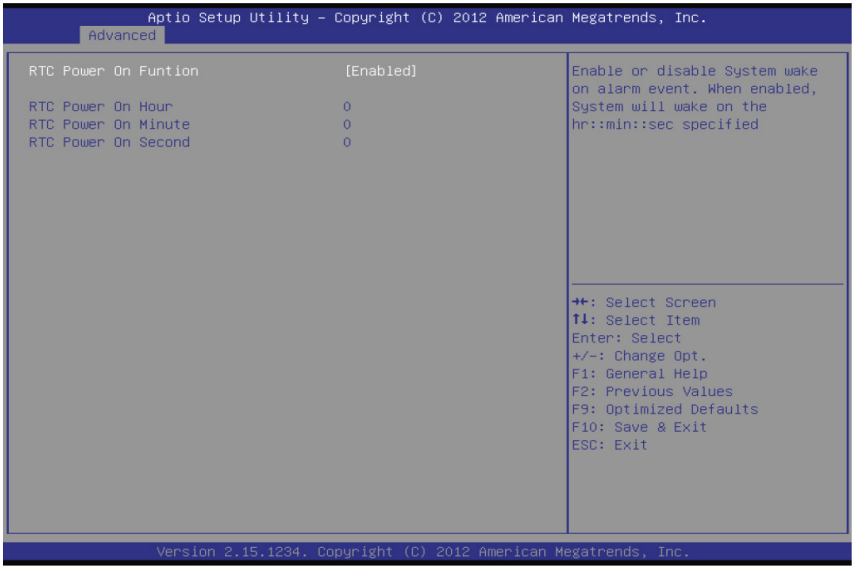
4.2.1 ACPI Settings



ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
S1 (POS): CPU stops working while other devices are still connected to power supply.
S3 (STR): Power is only supplied to system memory.

4.2.2 APM Configuration



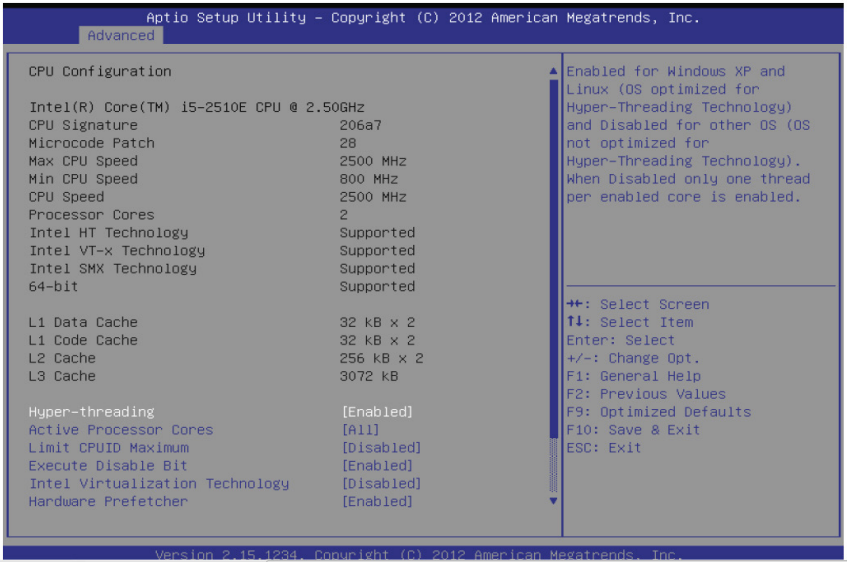
RTC Power On Function
Enable or disable the RTC Power On Function.

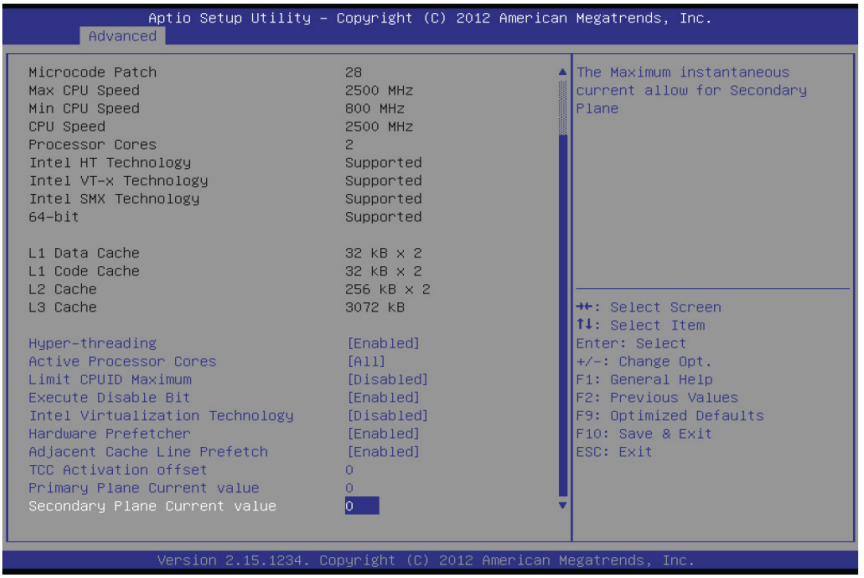
RTC Power On Hour
To setup RTC Power On Hour.

RTC Power On Minute
Setup RTC Power On Minute.

RTC Power On Second
Setup RTC Power On Second.

4.2.3 CPU Configuration





The read only options contain the detailed information of CPU, including CPU supplier, model, frequency, Level1 Cache, Level2 Cache, etc.

Hyper-Threading
Enable or disable CPU Hyper-Threading Technology.

Active Processor Cores
Activate Processor Cores (only when the processor has multiple cores).

Limit CPUID Maximum
Please set this item as [Enabled] if the system OS doesn't support the extended CPUID function. System default value: [Disabled].

Execute Disabled Bit
Execute Disable Bit (EDB) is a hardware-based security feature that introduced to its new generation CPU by Intel, which can help reduce system exposure to viruses and malicious code. EDB allows the processor to classify areas in memory where application code can or cannot execute. To use Execute Disable Bit you must have Windows XP SP2 operating system to support this function. System default this option [Enabled].

Intel Virtualization Technology
Intel virtualization technology enables to run multiple O/S of the same kind or different kind by using the same physical platform so as to realize the management and allocation of computer resources, maximizing the resource utilization.

Hardware Prefetcher
The hardware prefetcher operates transparently, without programmer intervention, to fetch streams of data and instruction from memory into the unified second-level cache. The prefetcher is capable of handling multiple streams in either the forward or backward direction. Enable or disable this function.

Adjacent Cache Line Prefetch

The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. In applications with relatively poor spatial locality, the cache miss ratio is higher. Enable or disable this function.

TCC Activation offset

Thermal Control Circuit: Thermal monitor uses the TCC to reduce the die temperature by using clock modulation and/or operating frequency and input voltage adjustment when the die temperature is very near its operating limits.

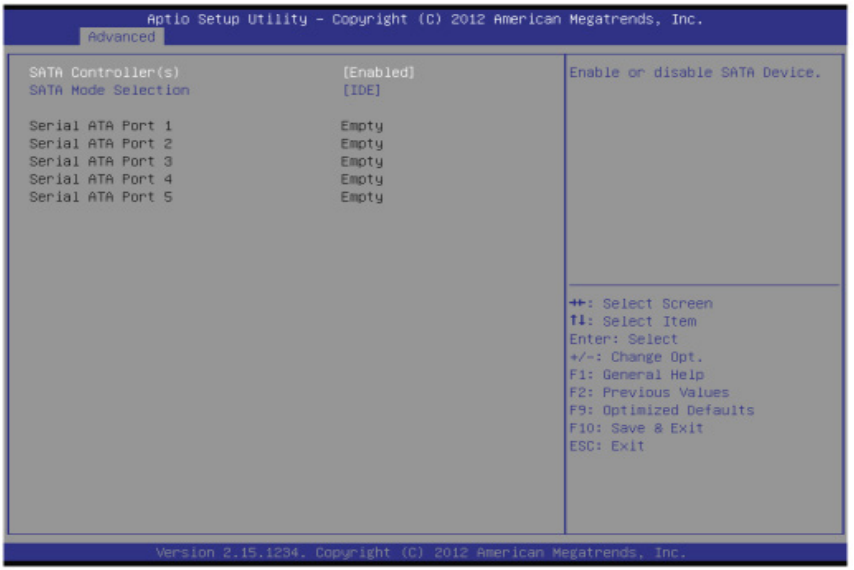
Primary Plane Current Value

The default value is [0]. Primary Plane Current Limit Use this item to configure the maximum instantaneous current allowed for the primary plane.

Secondary Plane Current Value

The default value is [0]. Secondary Plane Current Limit Use this item to configure the maximum instantaneous current allowed for the secondary plane.

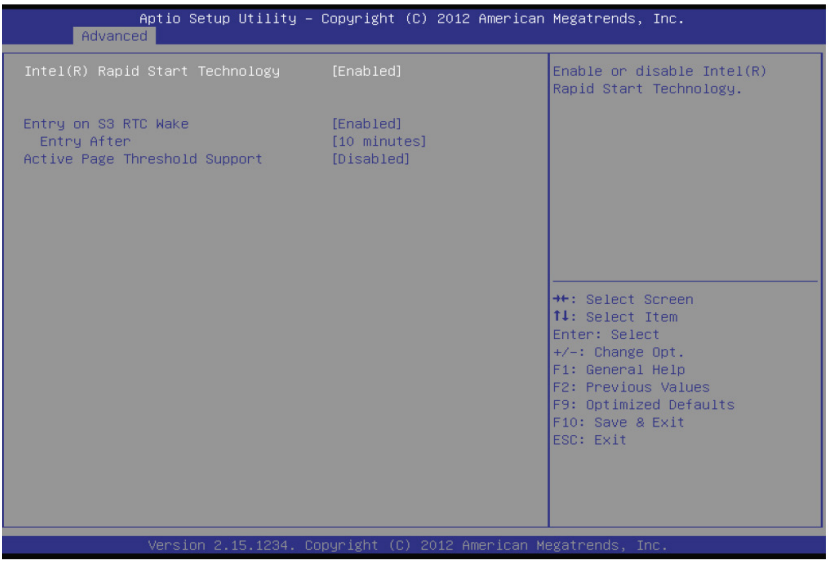
4.2.4 SATA Configuration



SATA Controller(s)

Enable or disable Serial-ATA controllers.
SATA Mode Selection
This option is used to configure SATA mode: [IDE] or [AHCI]/[RAID].

4.2.5 Intel(R) Rapid Start Technology



Intel(R) Rapid Start Technology
Enable or disable Intel Rapid Start Technology.

Entry on S3 RTC Wake
Intel rapid start technology needs to wake from S3 to enter S4. Enable or disable Entry on S3 RTC Wake.

Entry After
RTC Wake Time Setting: select wake right now or wake after 1 minute, 2minutes, etc. System default [10 Seconds].

Active Page Threshold Support
Enable or disable Active page threshold support. Default value: [Disabled].

4.2.6 AMT Configuration

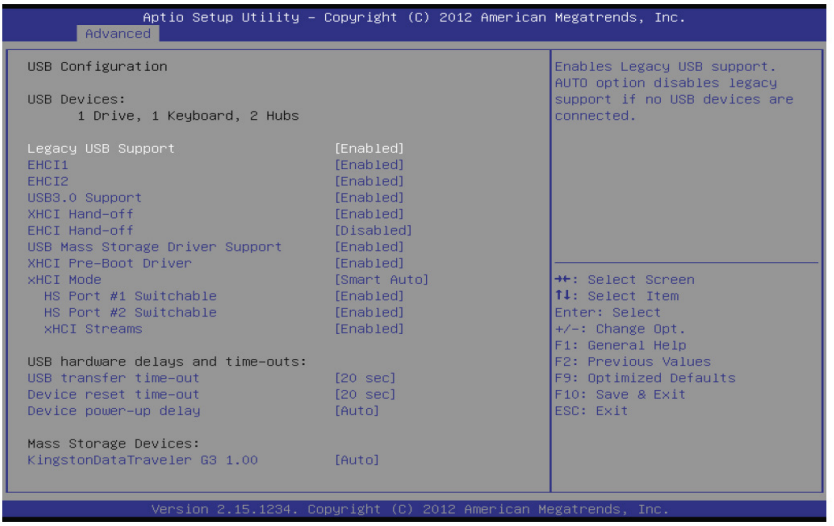
Intel AMT

Enable or disable Intel Active Management Technology.

Un-configure ME

[Enabled]: System will auto reconfigure ME without password during POST stage (Load ME Default Value). System Default setting: [Disabled].

4.2.7 USB Configuration



Legacy USB Support

Enable Legacy USB support. Set this option [Enabled] or [Auto] if you want system to support USB devices, such as U disk, USB keyboard, etc. in DOS. Otherwise, select this option as [Disabled]. [Auto] option disables legacy support if no USB devices are connected.

EHCI1/2 Controller

Enable or disable USB2.0 controller.

USB3.0 Support

Enable or disable USB3.0 controller.

XHCI Hand-off

Enabling this option is mandatory. System default: [Enabled].

EHCI Hand-off

Enable or disable to switch from USB to USB2.0 mode before entering OS. [Disabled]: System supports USB1.1 mode before entering OS.

USB Mass Storage Driver Support
Setup USB Mass Storage Device Support

XHCI Pre-Boot Driver
USB3.0 Pre-Boot Option: please [Enable] this option if XHCI Mode is selected as [Smart Auto]. System default [Enable].

XHCI Mode
USB3.0 Controller mode select: [Smart Auto]/[Auto] enables system to auto switch to USB 2.0 or USB 3.0. [Enable] only enables USB3.0 support. [Disable] will disable USB3.0 controller and does not switch to USB2.0. After installing USB3.0 driver in WIN7, it is recommend to set XHCI Mode as [Enable] to prevent speed down of USB3.0 device. XP has no USB3.0 driver. WIN8 comes with USB3.0 driver.

HS Port ## Switchable
USB3.0 Port Switchable setting.
[Enabled]: connect to USB3.0 Controller; [Disabled]: connect to USB2.0 Controller

XHCI Streams
Enable or disable XHCI streams

USB Transfer time-out
USB transfer time-out: Set the time-out for USB mass transfer/transfer control/ transfer interrupt. Default time-out [20Sec].

Device reset time-out
Device reset time-out: Set mass capacity USB disk start command time-out. System default [20Sec].

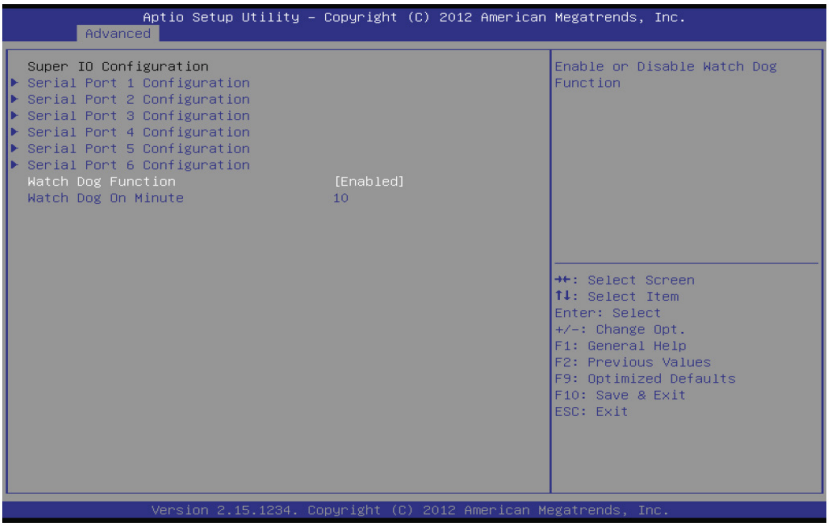
Device Power-up Delay

Device Power-up Delay: Set the maximum delay time for USB device report to Master controller.

USB Mass Storage Device

This option is used to set the USB device type connected, including [Auto][Floppy][Forced FDD][Hard Disk][CD-ROM]. System default [Auto].

4.2.8 Super IO Configuration



Serial Port 1 Configuration

1) Serial Port

Enable or disable the serial port.

2) Device Setting (Read Only)

Display serial port IRQ and Base Address

3) Change Setting

This option is used to change serial port settings. System default setting: [Auto].

Serial Port 1-6 Configuration is the same as above.

Watch Dog Function

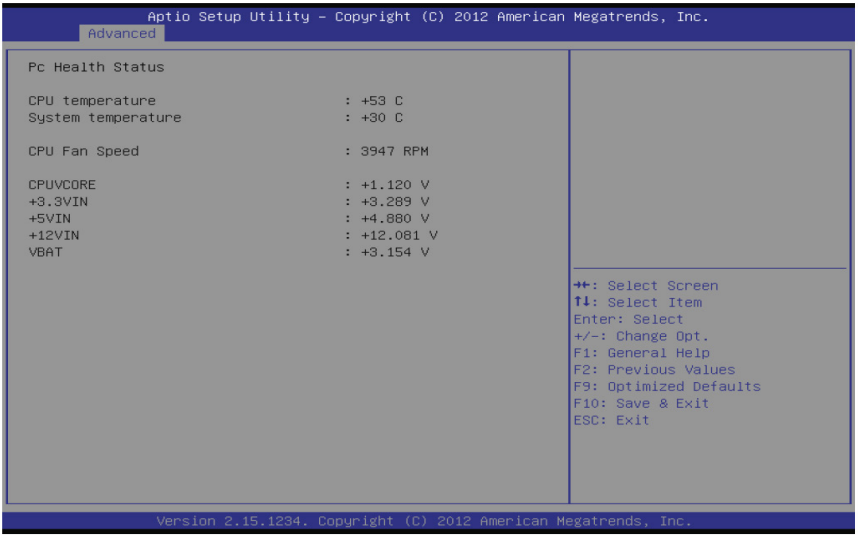
Set watchdog function. System default value: [Disabled].

When selecting [Enabled], following 'Watchdog On Minute' option pops up.

Watch Dog On Minute

Set watchdog restart time. System default value: [10 Minutes].

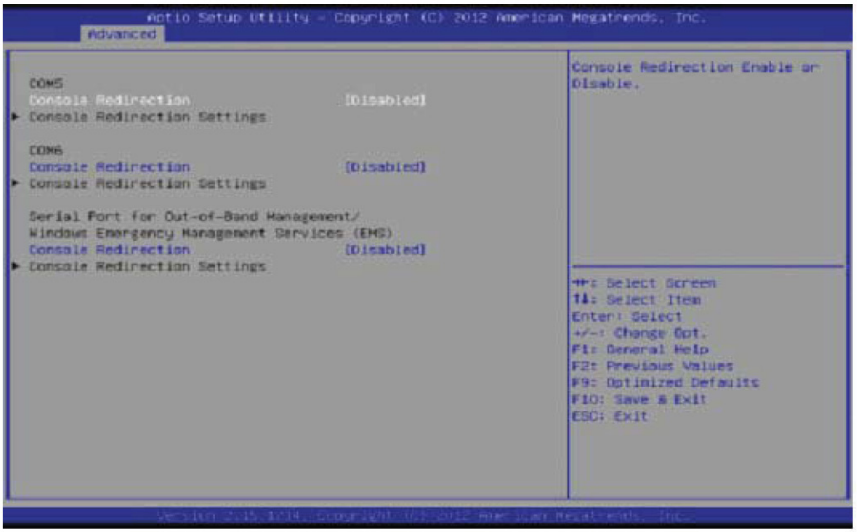
4.2.9 H/W Monitor

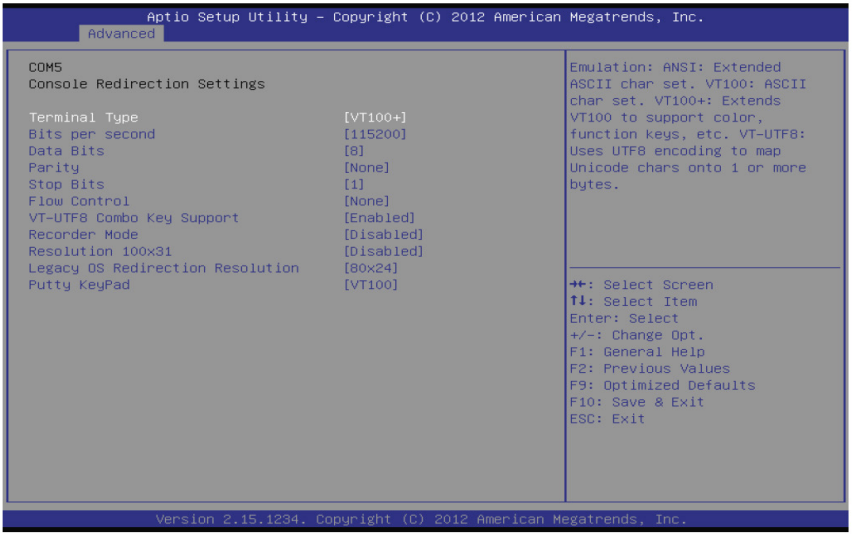


PC Health Status

PC Health Status Detect. BIOS will display current system temperature, CPU temperature, FAN rotate speed, and related voltage value.

4.2.10 Serial Port Console Redirection



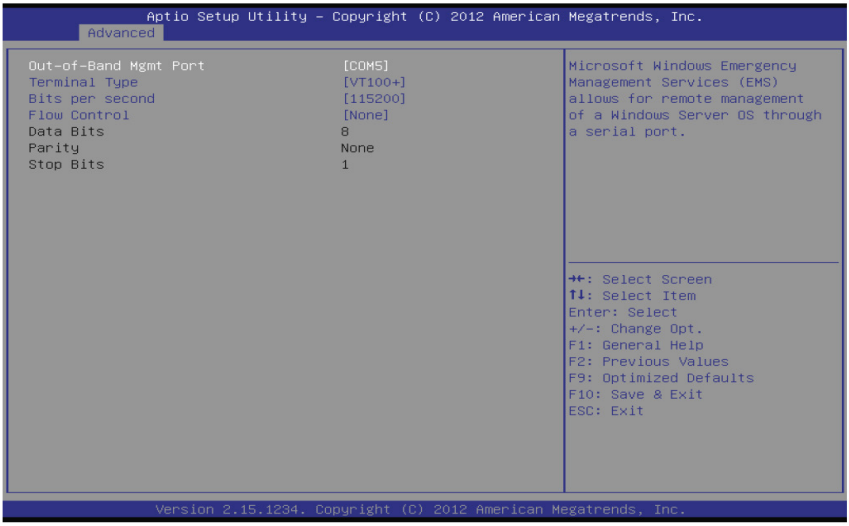


Console Redirection

Console Redirection. Motherboard supports COM1/2 console redirection. System defaults [Disable]. To enable redirection function just need to enable COM1 or COM2 console redirection. There is no need to enable EMS redirection.

General Options:

1. Console Redirection: Console Redirection Options
2. Terminal Type: Terminal types include VT100/VT100+/ VT-UTF8/ANSI. If system gets unreadable code of the terminal console, you need to adjust this option. Default [VT100+].
3. Bits per Second: Baud Rate, Default 115200



The Emergency Management Services (EMS), available in Windows Server 2003 and Windows Server 2008, provides “headless” support for today enterprise servers. It enables management services without the need for a keyboard, mouse, local monitor, and video adapter. A server administrator interacts with EMS through a Special Administration Console

(SAC) to perform management and recovery tasks, even when the system's operational status is questionable. There is no need to enable EMS redirection when enabling serial port console redirection.

General Settings:

1. Out-of-Band Mgmt Port: Serial port number setting
2. Terminal Type: Terminal types include VT100/VT100+/ VT-UTF8/ANSI. If system gets unreadable code of the terminal console, you need to adjust this option. Default [VT100+].
3. Bits per second, Baud Rate setting

4.2.11 CPU PPM Configuration

EIST
Enhanced Intel Speed Step Technology (EIST) is a power and thermal management technology developed by Intel. Enhanced Intel Speed Step Technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production. Ensure it is set to "Enabled."

Turbo Mode
Intel Turbo Boost is a technology implemented by Intel in certain versions of their Nehalem-, Sandy-Bridge- and Ivy-Bridge-based CPUs, including Core i5 and Core i7 that enables the processor to run above its base operating frequency via dynamic control of the CPU's "clock rate". It is activated when the operating system requests the highest performance state of the processor.

CPU C3/C6/C7 Report
This option allows you to determine whether to let the CPU enter C3/C6/C7 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C3/C6/C7 state is a more enhanced power-saving state than C1. (Default: Enabled).

Config TDP LOCK
TDP "Thermal Design Power": Use this feature to lock the Config TDP Control register. You can select to enable or disable this option.

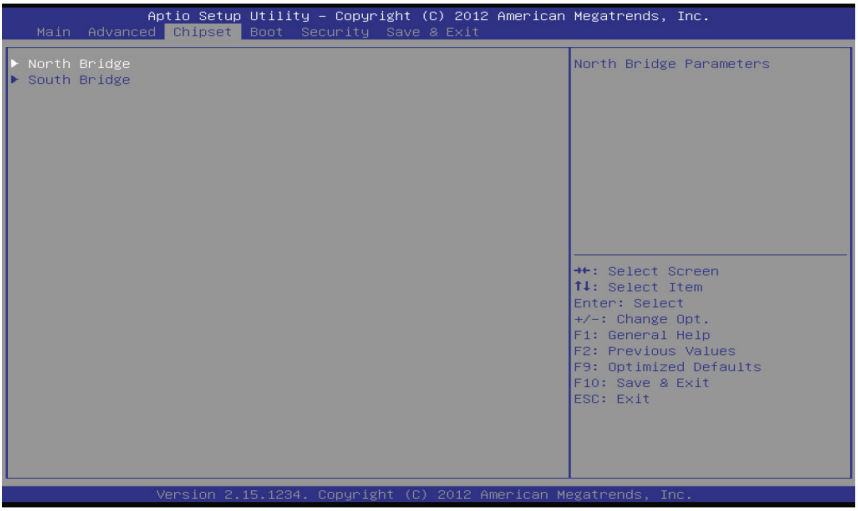
Long duration power limit
This is the processor power consumption limit (in Watts) during a long duration time window. The default setting is 0.

Long duration maintained
Long Duration maintained (ms): This is the time in milliseconds where the Long Duration Power Limit is maintained. The default setting is 0.

Short duration power limit
During Turbo Mode, the system may exceed the processor's default power setting and exceed the Short Duration Power Limit. By increasing this value, the processor can provide better performance for a short duration. The default setting is 0.

ACPI T State
T-States (Processor Throttling States): T-states refer to throttling the processor clock to lower frequencies in order to reduce thermal effects. This means that the CPU is forced to be idle a fixed percentage of its cycles per second. Throttling states range from T1 (the CPU has no forced idle cycles) to Tn, with the percentage of idle cycles increasing the greater n is. Default setting: [Disabled].

4.3 Chipset Menu



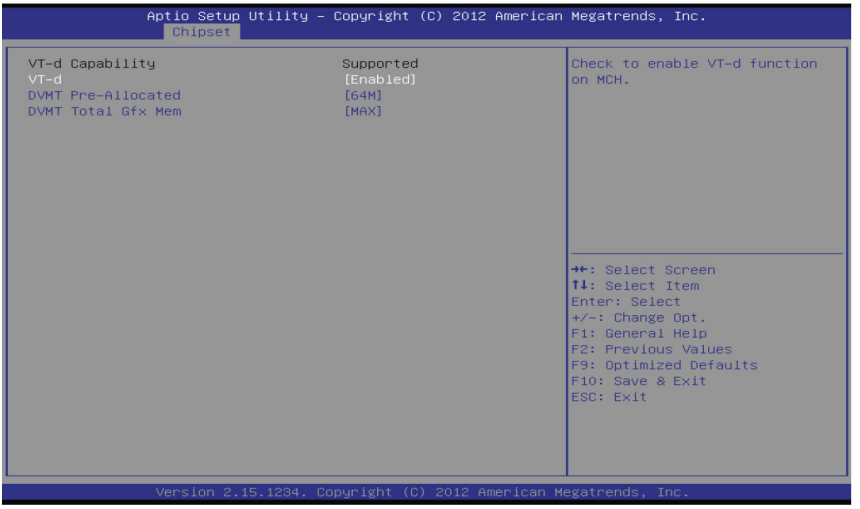
North Bridge

North Bridge Parameters Configuration: including Video memory, display, LVDS and other options.

South Bridge

South Bridge Parameters Configuration: including Audio Card, Network Card, Restore AC Power Loss and other options.

4.3.1 North Bridge

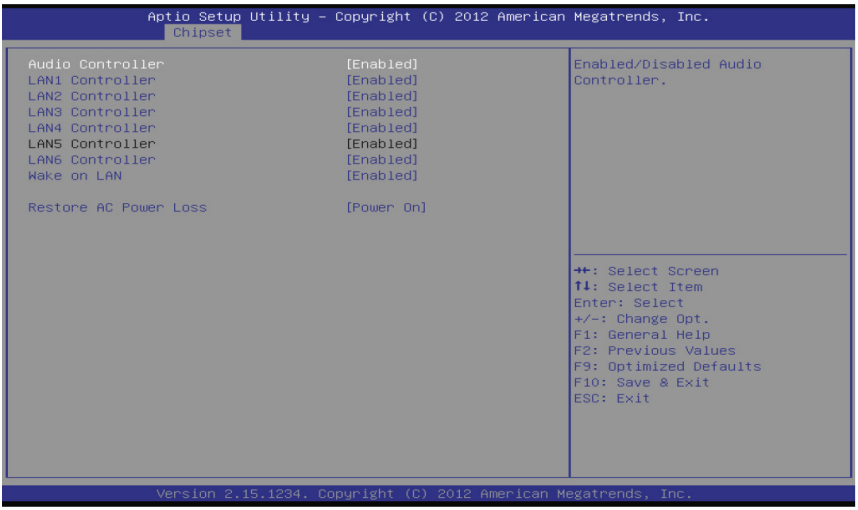


VT-D
Check to enable VT-d Function on MCH

DVMT Pre-Allocated
DVMT Pre-Allocated for inbuilt Graphic card.

DVMT Total Gfx Mem
Shared video memory of inbuilt Graphic card.

4.3.2 South Bridge



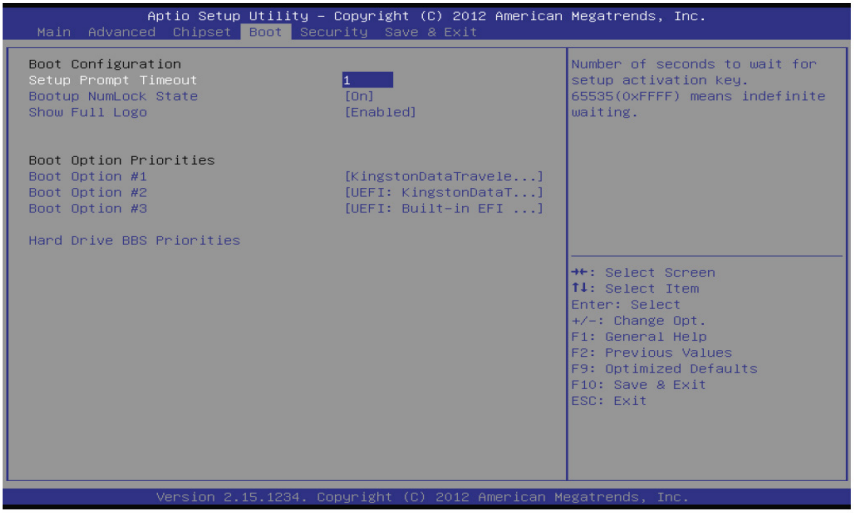
Audio Controller
Enable or disable the onboard audio controller.

LAN 1-6 Controller
Enable or disable the onboard LAN Card Controller.

Wake on LAN
Enable or disable Wake-on-LAN function.

Restore AC Power Loss
This option is to setup the system status while connecting the power again after the AC Power Loss.
<Power Off>: System remains the status of power off. Users need to press the power button to start the computer.
<Power On>: System will reboot automatically when connecting to power supply.
<Last State>: Remain the same state as that before the power loss.

4.4 Boot Menu



Setup Prompt Timeout
Number of seconds to wait for setup shortcut key. 60s is the max seconds of timeout. If don't press Setup key within the preset time, system will contiune to start.

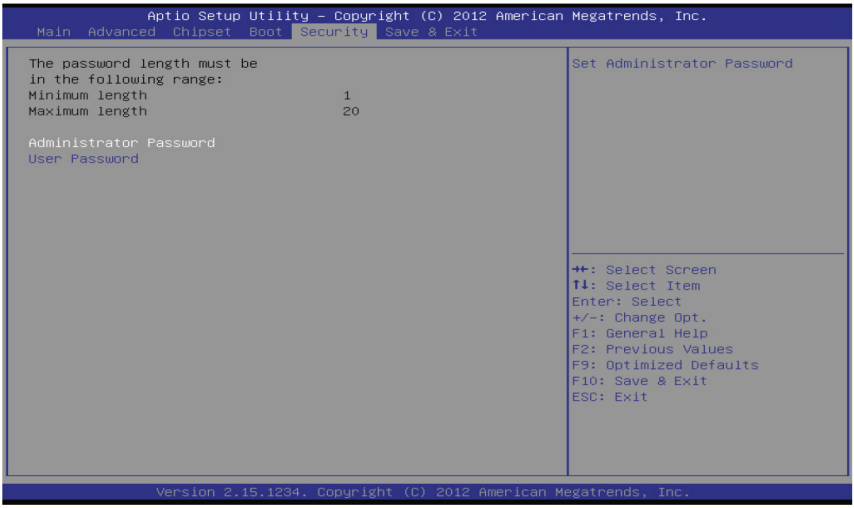
Bootup NumLock State
This function allows users to activate Numlock function when system startsup [ON]: Numlock is activated when system boots up
[OFF]: Numlock under cursor control.

Show Full Logo
[Enabled]: Computer boot screen will show supplier's LOGO. [Disabled]: Self-detect info will show when system boots.

Boot Option Priorities
System will detect devices according to the preset sequence until to find a boot device. Option #1 is the prior boot device.

Hard Drive BBS Priorities
This option contains HDD that can be used as boot device. If multiple HDDs in this option, priority should set for these HDDs, then the prior one will show in Boot Option #1.

4.5 Security Menu

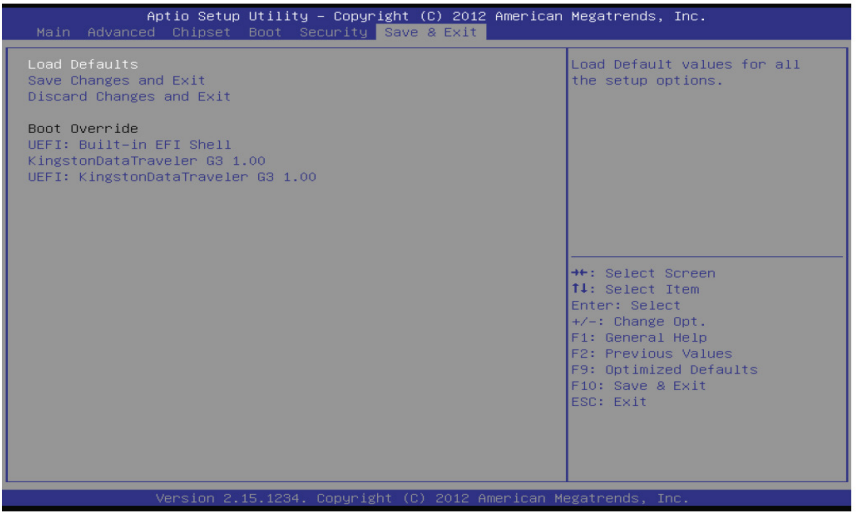


The password length: Min: 1 character, Maximum: 20 characters.

Administrator Password
To setup the password for administrator

User Password
To setup User's Password. If you have set the password, system will display "Installed"; If not, system will display "Not Installed".

4.6 Save & Exit Menu



Load Defaults

Restore/Load Default values for all BIOS setup options.

Save Change and Exit

Press [Enter] to select this option and press [Enter] to confirm to save all BIOS changes and Exit.

Discard Change and Exit

Press [Enter] to select this option and press [Enter] to confirm to discard all changes and exit.

Boot Override

Select the allocated Boot device, such as SATA HDD, U Disk, EFI Shell, PXE, etc, to boot directly.

Appendix

Appendix 1: Install Driver

Please install the driver as per the following steps:

Insert the programmed disk into CD-ROM, so installation of the driver can be made either automatically or manually. Now manually installation instructions are given as below:
1. A variety of options are available regarding manually installation, which you can check from Device Manager.
2. Right click “my computer “, select “management”, and go to “Device Manager”
3. Right click “display controller” in the menu of graphic card, select “Properties “, click “Driver”, select “update driver”.
4. Select “Show the list of all drivers which are designated locations so that choices can be made from it “, select “next.”
5. Select the location of display driver, click “ok”
6. Complete the installation, restart the system.

Proceed with the installation of other drivers after restarting the system, till all installations are completed. Then user can check from the device manager that it says device is working.

Note: If system prompts the message “Reboot the Computer” in the process of installing drivers, we need to restart the computer as per system prompts.

Appendix 2: Watchdog Programming Guide

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

```
{
        int indexp = 0x2e,datap = 0x2f;
        unsigned char temp;

        outportb(indexp,0x87);
        outportb(indexp,0x01);  //unlock
        outportb(indexp,0x55);
        outportb(indexp,0x55);

        outportb(indexp,0x07);
        outportb(datap,0x07);
        outportb(indexp,0x71);
        outportb(datap,0x80); //enable logical device
        outportb(indexp,0x72);
        outportb(datap,0xc0); //set second
         /*outportb(datap,0x40); set minute*/

        outportb(indexp,0x73);
        outportb(datap,0x03);    //set 3 seconds
        outportb(indexp,0x74);
        outportb(datap,0x00);

        outportb(indexp,0x02);
        temp = (unsigned char)inportb(datap);
        temp |= 0x02;
        outportb(datap,temp); //lock
}
```

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