TECHNICAL MANUAL

Of

Intel Cedar Trail-D & NM10 Chipset

Based

Mini-ITX M/B for ATOM Processor

NO.G03-NC9K-F

Revision: 1.0

Release date: November, 2011

Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.

TABLE OF CONTENT

Environmental Safety Instruction

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.

- 0 to 60 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)

- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.

- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.

- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

USER'S NOTICE

Manual Revision Information

Reversion	Revision History	Date
1.0	First Edition	December 8, 2011

Item Checklist

- ☑ Motherboard
- ☑ User's Manual
- ☑ DVD for motherboard utilities
- ☑ Cable(s)
- ☑ I/O Back panel shield

Chapter 1
Introduction of the Motherboard

1-1 Feature of motherboard

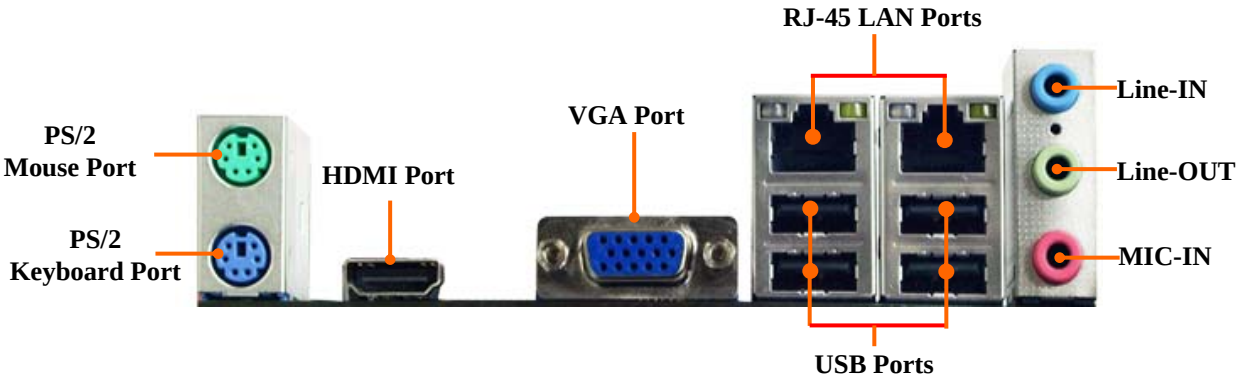
- Intel Cedar Trail-D and NM10 chipset, with low power consumption never denies high performance.
- Support two DDRIII 800/1066MHz SO-DIMM up to 4GB.
- Support 2 * Serial ATAII (3Gb/s) Devices
- Onboard dual Realtek RTL 8111E Gigabit Ethernet LAN chip.
- Integrated ALC662 6-channel HD audio CODEC.
- Support USB2.0 data transport demands.
- Support PCI slot
- Support Watchdog function.
- Support Smart Fan function.
- Compliance with ErP standard

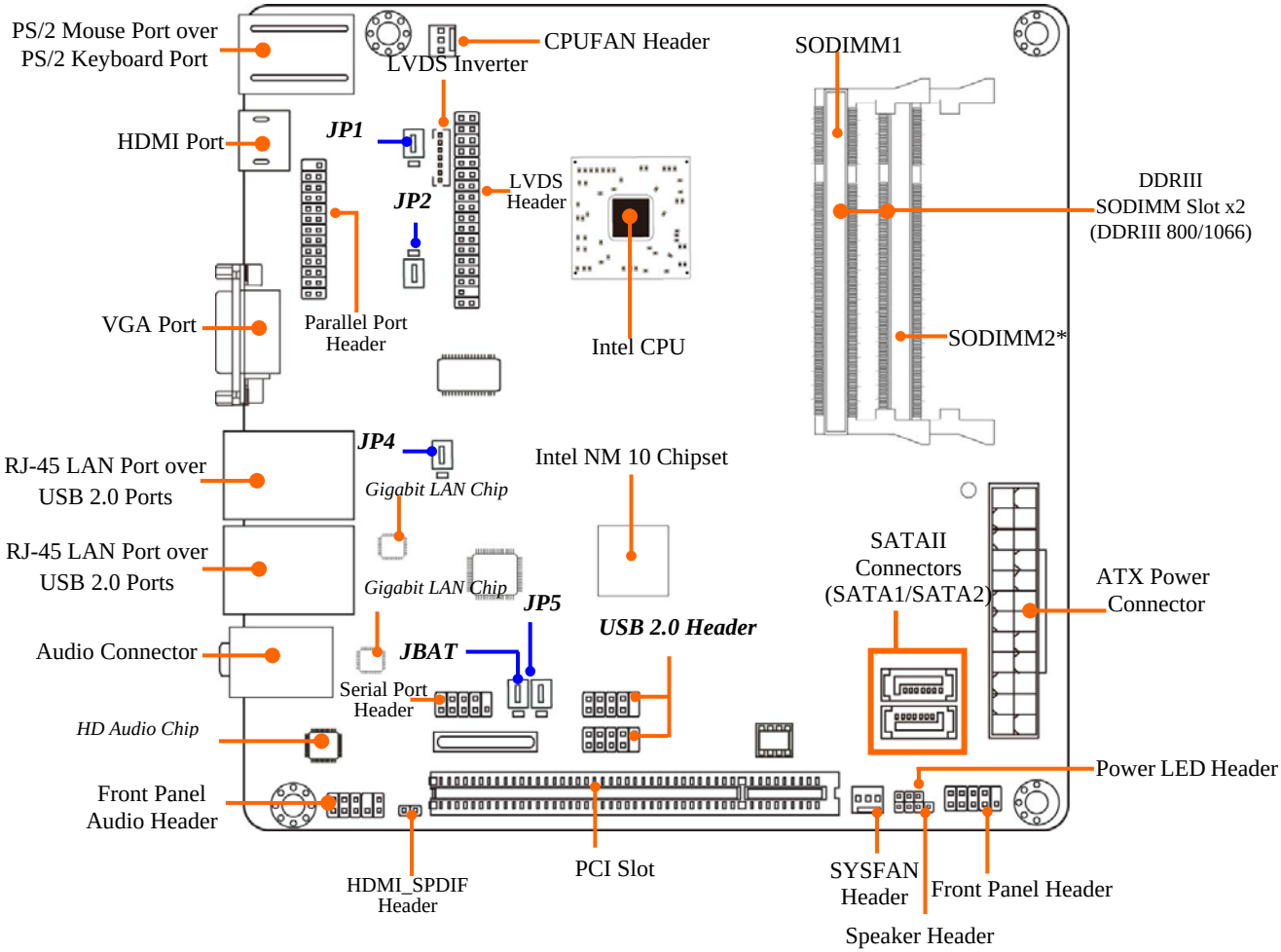
1-2 Specification

Spec	Description
Design	● Mini-ITX form factor; PCB size: 17.0x17.0cm
Chipset	● Intel®NM10 Express chipset
Embedded CPU	● Intel Cedar Trail-D Processor
Memory Slot	● SO-DIMM DDRIII slot x 2 ● Support two DDRIII 800/1066 MHz SO-DIMM with memory capacity expandable to 4GB
Expansion Slot	● 32-bit PCI slot x 1
Dual LAN Chip	● Integrated with two Realtek RTL8111E PCI-E Gigabit LAN chips ● Support Fast Ethernet LAN function of providing 10/100/1000Mbps Ethernet data transfer rate
Audio Chip	● ALC 662 6-channel Audio Codec integrated ● Audio driver and utility included
BIOS	● AMI 16MB DIP Flash ROM
Multi I/O	● PS/2 keyboard connector x1 ● PS/2 mouse connector x1 ● VGA port connector x1 ● HDMI port connector x1 ● USB port connector x4 ● RJ-45 LAN connector x2 ● Audio connector x3 (Line-in, Line-out, MIC) ● SATAII Connector x2 ● Front panel audio header x1 ● HDMI_SPDIF header x1 ● Serial port header x1 ● USB 2.0 header x2 ● PWRLED header x1 ● Speaker header x1 ● Front panel header x1

	● LVDS header x1 ● LVDS Inverter x1 ● Parallel header x1

1-3 Layout Diagram





Notice! When installing only one SODIMM to the board, please always install it in SODIMM2 slot, otherwise system won't start.

Jumper

Jumper	Name	Description
JBAT	CMOS RAM Clear Function Setting	3-pin Block
JP1	Inverter12V/5V Select	3-pin Block
JP2	LVDS PVCC 5V/3.3V Select	3-pin Block
JP4	K/B, USB Power On Function Setting	3-pin Block
JP5	USB 2/3 Header Power On Function Setting	3-pin Block

Connectors

Connector	Name	Description
ATXPWR1	ATX Power Connector	24-pin Connector
KB from KBMS	PS2 Keyboard Connector	6-pin Female
MS from KBMS	PS2Mouse Connector	6-pin Female
HDMI	High-Definition Multimedia Interface	10-pin Connector
VGA	Video Graphic Attach Connector	15-pin Female
LAN from UL1,UL2	RJ-45 LAN Connector	8-pin Connector
USB from UL1,UL2	USB Port Connector	4-pin Connector
AUDIO	Audio Connector(Line-in/Line-out/MIC)	3-phone Jack
SATA1,2	Serial ATAII Connector	7-pin Connector

Headers

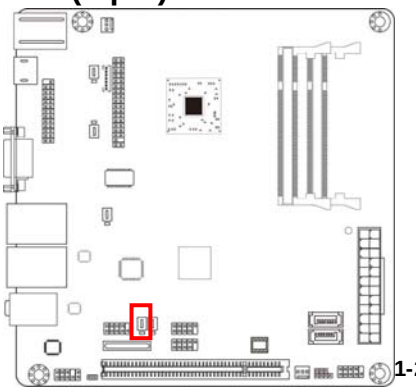
Header	Name	Description
FP-AUDIO	Front panel audio Header	9-pin block
SPDIF	SPDIF Out header	2-pin block
COM1	Serial Port Header	9-pin Block
USB2, USB3	USB Header	9-pin Block
PWR LED1	Power LED	3-pin Block
SPEAK1	Speaker Header	4-pin Block
JW_FP1	Front Panel Header(PWR LED/ HD LED/ /Power Button /Reset)	9-pin Block
LVDS	LVDS Header	35-pin Block
INVERTER1	LVDS Inverter Connector	7-pin Block
CPUFAN,SYSFAN	FAN Speed Headers	3-pin Block

PARALLEL	Parallel Port Header	25-pin Block

Chapter 2
Hardware Installation

2-1 Jumper Setting

(1) JBAT(3-pin): Clear CMOS



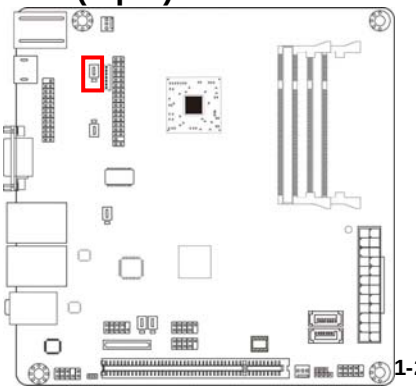
JBAT

1-2 closed: Normal

JBAT

2-3 closed : Clear CMOS

(2) JP1 (3-pin): Inverter VCC 5V/12V select



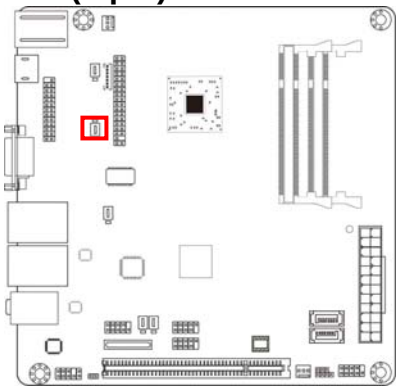
JP1

1-2 closed: Inverter 12V Select

JP1

2-3 closed : Inverter 5V Select

(3) JP2 (3-pin): LVDS 5V/3.3V select



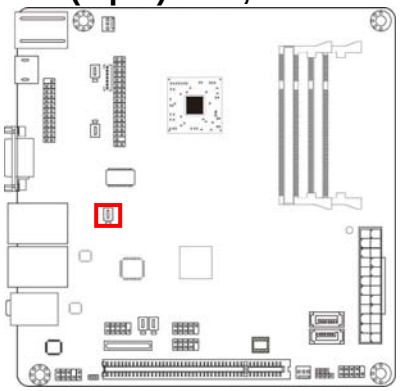
JP2

1-2 closed: LVDS VCC 5V

JP2

2-3 closed : LVDS VCC 3.3V

(4) JP4 (3-pin): K/B, USB Power on Function Setting



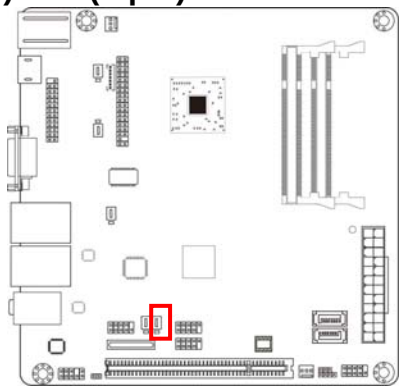
JP4

1-2 Closed: K/B, USB Power-On Disacled(default)

JP4

2-3 closed:K/B, USB Power-On Enabled

(5) JP5 (3-pin): USB2/3 header Power on function setting



JP5

1-2 closed : USB 2/3 Header Power-On Disacled(default)

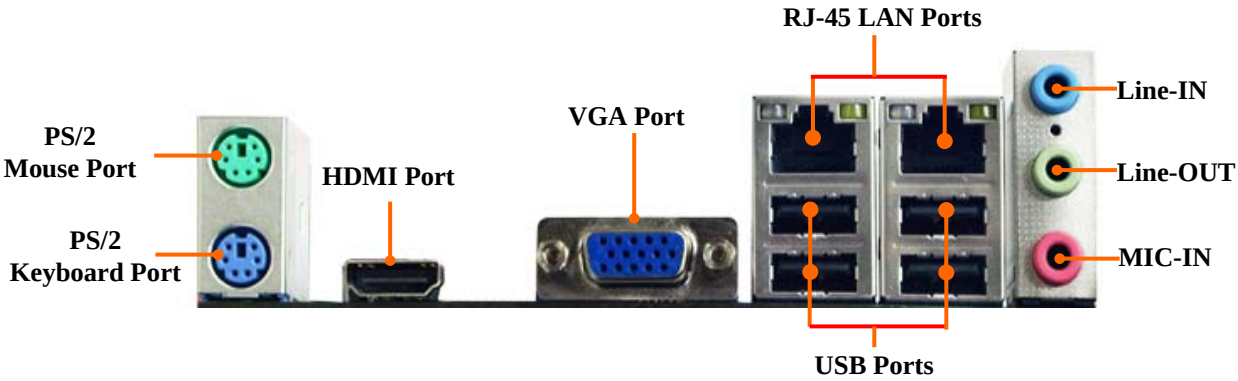
JP5

2-3 closed: USB 2/3 Header Power-On Enabled

2-2 Connectors and Headers

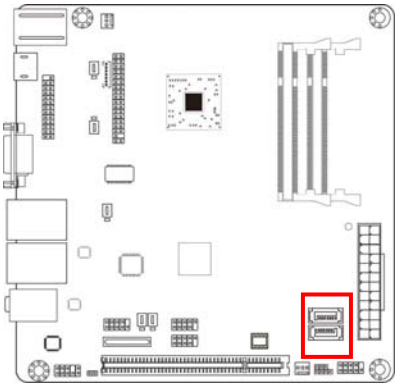
2-2-1 Connectors

(1) I/O Panel Connector:

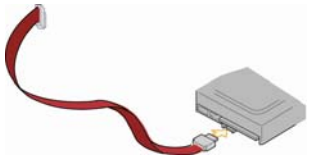


(2) SATAII Port connector: SATA1/SATA2

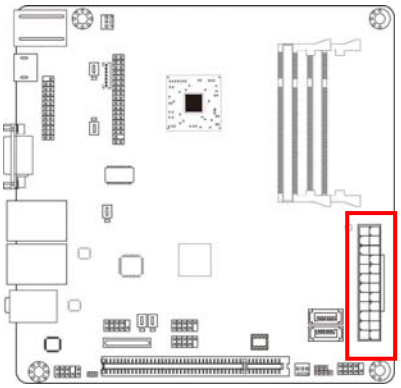
These SATAII connectors support SATA 3Gb/s specification. Please connect SATAII device to the connector with SATAII cable. One connector supports one SATAII device.

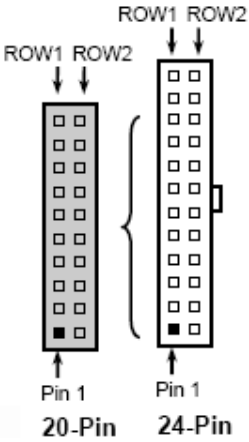


Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



(3) Power Connector (24-pin block): ATXPWR



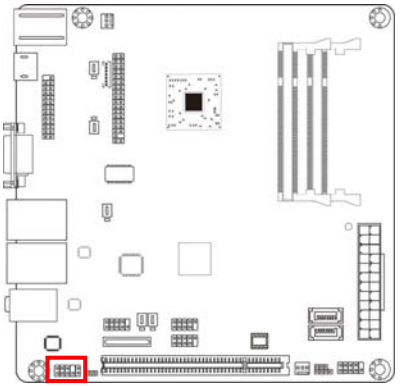


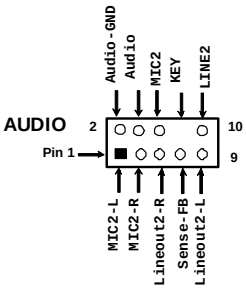
PIN	ROW1	ROW2
1	3.3V	3.3V
2	3.3V	-12V
3	GND	GND
4	5V	Soft Power On
5	GND	GND
6	5V	GND
7	GND	GND
8	Power OK	-5V
9	+5V (for Soft Logic)	+5V
10	+12V	+5V
11	+12V	+5V
12	+3V	GND

2-2-2 Headers

(1) Front Panel Audio Header (9-pin): FP_AUDIO

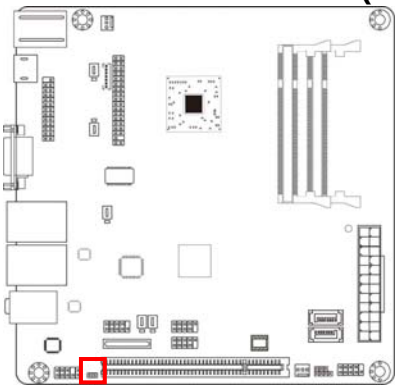
This header connects to front panel Line-out, MIC-In connector with cable.

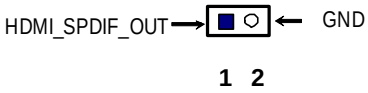




Line-Out, MIC Headers

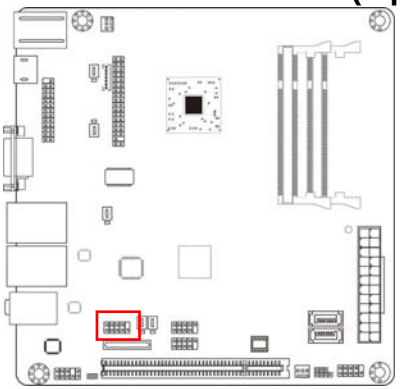
(2) HDMI-SPDIF Out header (2-pin): SPDIF

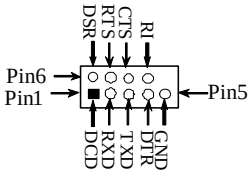




HDMI_SPDIF Header

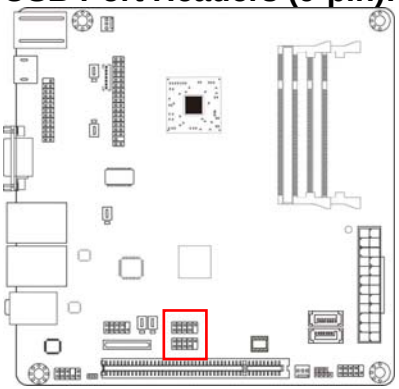
(3) Serial Port Connectors (9-pin): COM1

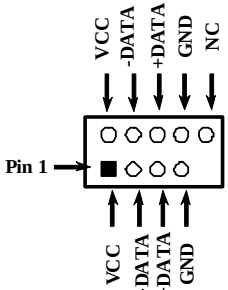




Serial COM Port 9-pin Block

(4) USB Port Headers (9-pin): USB2/USB3



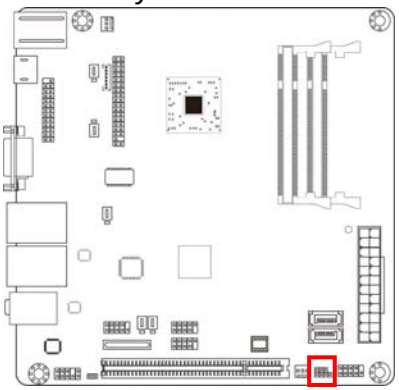


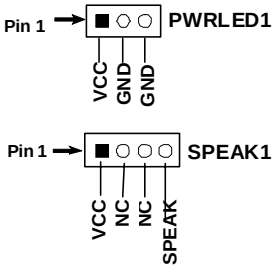
(5) Speaker connector: SPEAK1

This 4-pin connector connects to the case-mounted speaker. See the figure below.

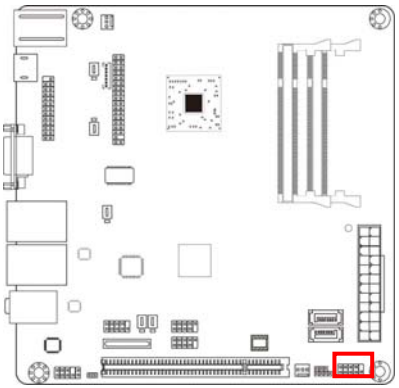
(6) Power LED: PWR LED1

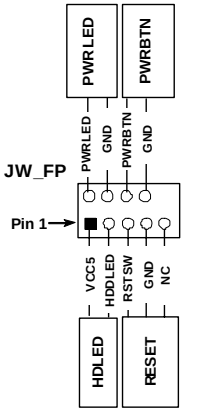
The Power LED is light on while the system power is on. Connect the Power LED from the system case to this pin header.





(7) Front Panel Header (9-pin): JW-FP





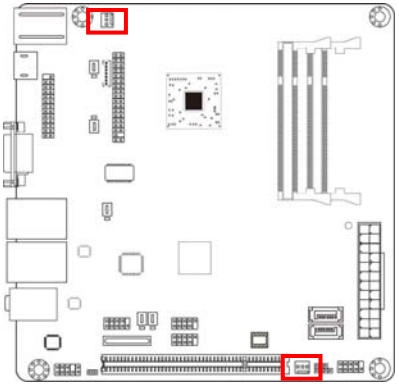
System Case Connections

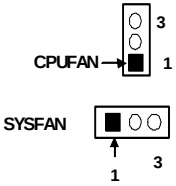
(8) FAN Speed Headers (3-pin): CPUFAN, SYSFAN

Pin1: GND

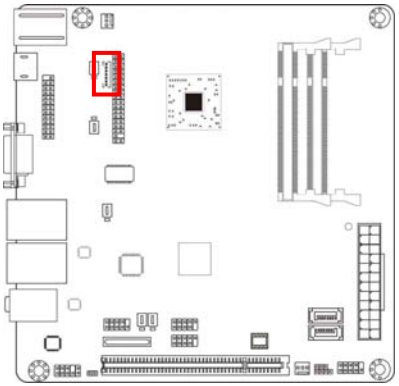
Pin2: +12V fan power

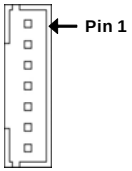
Pin3: Fan Speed





(9) LVDS Inverter headers: INVERTER1

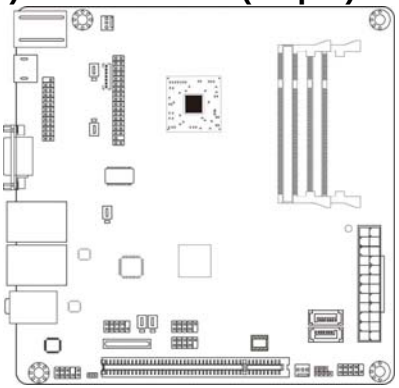


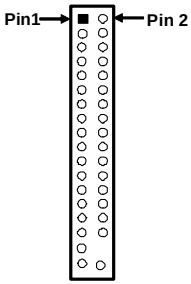


INVERTER1

Pin No.	Definition
1	VCC
2	VCC
3	GND
4	GND
5	Backlight
6	GND
7	Brightness

(10) LVDS Header (35-pin): LVDS





LVDS Header

Pin NO.	Pin Definition	Pin NO.	Pin Definition
Pin 1	LVDSB_DATAN3	Pin 2	LVDSB_DATAP3
Pin 3	LVDSB_CLKBN	Pin 4	LVDSB_DATABP
Pin 5	LVDSB_DATAN2	Pin 6	LVDSB_DATAP2
Pin 7	LVDSB_DATAN1	Pin 8	LVDSB_DATAP1
Pin 9	LVDSB_DATAN0	Pin 10	LVDSB_DATAP0
Pin 11	LVDS_DDC_DATA	Pin 12	LVDS_DDC_CLK
Pin 13	GND	Pin 14	GND
Pin 15	GND	Pin 16	GND
Pin 17	LVDSA_DATAP3	Pin 18	LVDSA_DATAN3
Pin 19	LVDS_CLKAP	Pin 20	LVDS_CLKAN
Pin 21	LVDSA_DATAP2	Pin 22	LVDSA_DATAN2
Pin 23	LVDSA_DATAP1	Pin 24	LVDSA_DATAN1
Pin 25	LVDSA_DATAP0	Pin 26	LVDSA_DATAN0
Pin 27	PVDD	Pin 28	PVDD
Pin 29	PVDD	Pin 30	PVDD
Pin 31	GND	Pin 32	GND
Pin 33	+5V	Pin 34	N/A
Pin 35	+12V (Reserved)	Pin 36	+3V

Chapter 3
Introducing BIOS

Notice!	The BIOS options in this manual are for reference only. Different configurations may lead to difference in BIOS screen and BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard. Users are welcome to download the latest BIOS version form our official website.

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

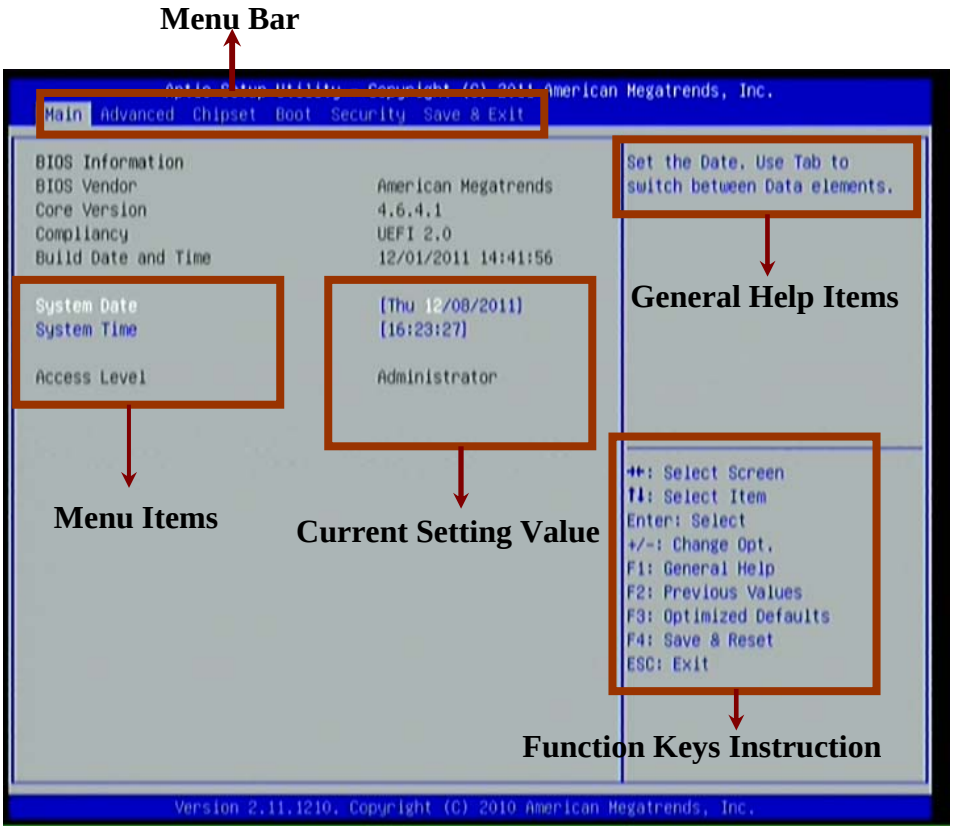
3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press <Del> to enter Setup

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:



3-3 Function Key

In the above BIOS Setup main menu, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press←→ (left, right) to select screen;
- Press ↑↓ (up, down) to choose the item you want to confirm or to modify in the main menu.
- Press <Enter> to select.

- Press <+>/<–> key when you want to modify the BIOS parameters for the active option.
- [F1]: Press to general help information.
- [F2]: Press to load previous value.
- [F3]: Press to load optimized defaults.
- [F4]: Save and Exit.
- Press <Esc> to quit the BIOS Setup.

3-4 Getting Help

Main Menu

The on-line description of the highlighted setup function is displayed at the top right corner the screen.

Status Page Setup Menu/Option Page Setup Menu

Press [F1] to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

3-5 Menu Bar

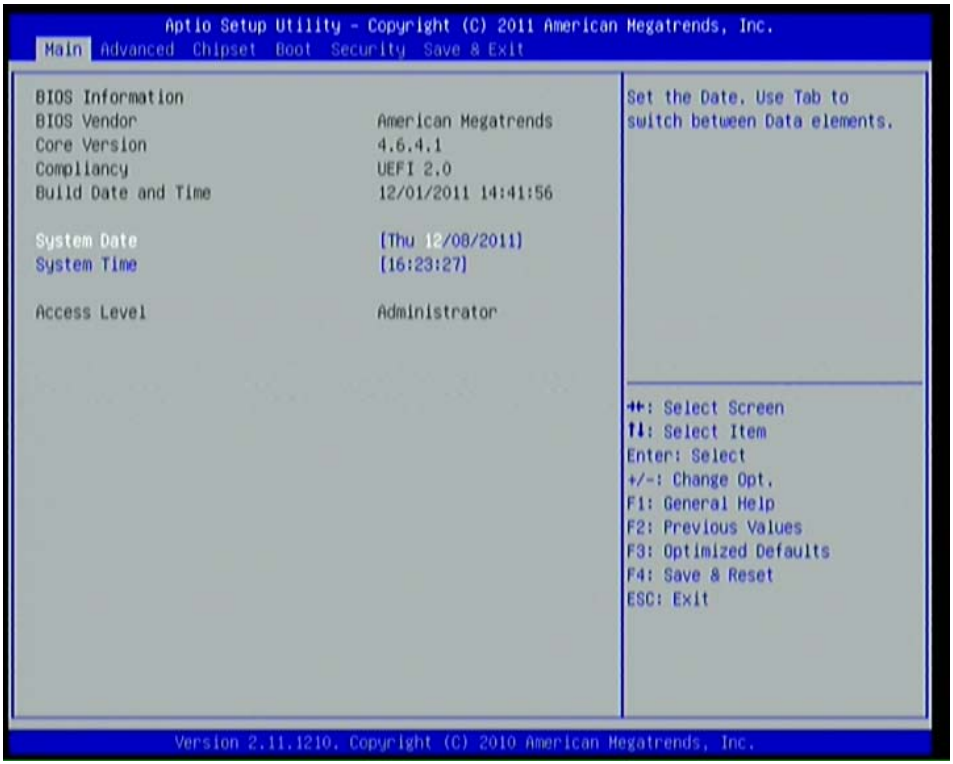
There are six menu bars on top of BIOS screen:

Main	To change system basic configuration
Advanced	To change system advanced configuration
Chipset	To change chipset configuration
Boot	To change boot settings
Security	Password settings
Save & Exit	Save setting, loading and exit options.

User can press the ←/→ (left, right) arrow key on the keyboard to switch from menu bar. The selected one is highlighted.

3-6 Main Menu

Main menu screen includes some basic system information. Highlight the item and then use the <+> / <-> key or numerical keyboard keys to select the value you want in each item.



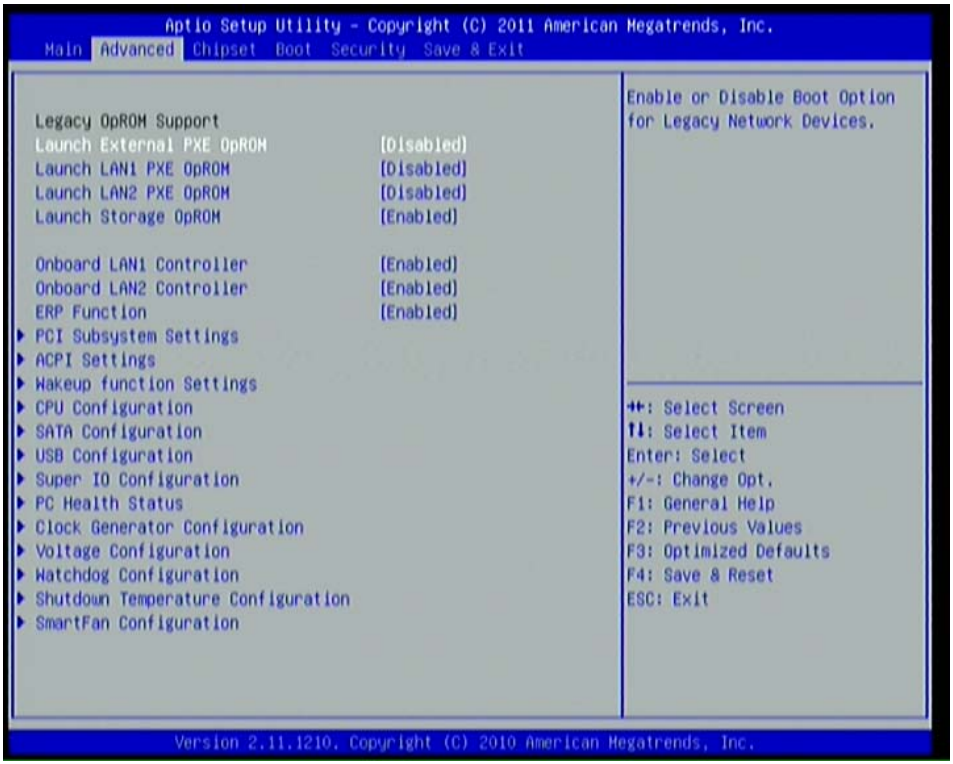
System Date

Set the date. Please use [TAB] to switch between data elements.

System Time

Set the time. Please use[TAB] to switch between time elements.

3-7 Advanced Menu



Launch External PxE OpROM/Launch LAN1 PXE OpROM/Launch LAN2 PXE OpROM

Use this item to enable or disable boot option for legacy network devices.

Launch Storage OpROM

Use this item to enable or disable boot option for legacy mass storage devices with option ROM.

Onboard LAN 1 Controller

Use the above items to enable or disable PCI Express root port 1.

Onboard LAN 2 Controller

Use the above items to enable or disable Mini-PCIE control.

ERP Function

Use this item to enable or disable ERP function for this board.

PCI Subsystem Settings

Press [Enter] to enter and make settings for the following sub-items:

PCI ROM Priority

In the case of multiple option ROMs(Legacy and EFI compatible), specifies what PCI option ROM to launch. The optional settings: [Legacy ROM]; [EFI Compatible ROM].

PCI Common Settings:

PCI Latency Timer

Use this item to set value to be programmed into PCI latency timer register.

VGA Palette Snoop

Use this item to enable or disable VGA palette register snooping.

PERR# Generation

Use this item to enable or disable PCI device to generate PERR#.

SERR# Generation

Use this item to enable or disable PCI device to generate SERR#.

ACPI Settings

ACPI Sleep State

Use this item to select the highest ACPI sleep state the system will enter when the suspend button is pressed.

Wakeup Function Settings

Wake System with Fixed Time

Use this item to enable or disable system wake on alarm event. When set as [Enabled], system will wake on the hour/min/sec specified.

PS2 KB/MS Wakeup

Use this item to enable or disable PS2 KB/MS wakeup function.

PCI PME Wakeup

Use this item to enable or disable S3/S4/S5 PCI PME wakeup. This function is only supported when ERP function is set as [Disabled].

CPU Configuration

Hyper-Threading

The optional settings are: [Disabled]; [Enabled].Set as [Enabled] for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and [Disabled] for other OS (OS not optimized for Hyper-Threading Technology).

Execute Disable Bit

The optional settings are: [Disabled]; [Enabled].

Limit CPUID Maximum

The optional settings are: [Disabled]; [Enabled].

This item should be set as [Disabled] for Windows XP.

SATA Configuration

SATA Controller(s)

The optional settings are: [Disabled]; [Enabled].

Configure SATA as

The optional settings are: IDE Mode]; [AHCI].

USB Configuration

Legacy USB Support

The optional settings are: [Auto]; [Disabled]; [Enabled].

EHCI Hand-off

The optional settings are: [Disabled]; [Enabled].

USB Transfer time-out

Use this item to set the time-out value for control, bulk, and interrupt transfers.

Device reset time-out

Use this item to set USB mass storage device start unit command time-out.

Device power-up delay

Use this item to set maximum time the device will take before it properly reports itself to the host controller. 'Auto' uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor. The optional settings: [Auto]; [Manual].Select [Manual] you can set value for the following sub-item:

Device Power-up delay in seconds, the delay range in from 1 to 40 seconds in one second increments.

Super I/O Configuration

COM1 Port Configuration

Press [Enter] to make settings for the following items:

Serial Port

Use this item to enable or disable serial port (COM1).

Change Settings

Use this item to select an optimal setting for super IO device.

Parallel Port Configuration

Press [enter] to make settings for the following items:

Parallel Port

Use this item to enable or disable parallel port (LPT/LPTE).

Change Settings

Use this item to select an optimal setting for super IO device.

Device Mode

Use this item to change the printer port mode.

PC Health Status

Press [Enter] to view hardware health status.

Clock Generator Configuration

Clockgen Spread Spectrum

Use this item to enable or disable spread spectrum function.

IO Output Voltage

Use this item to set IO output voltage.

Voltage Configuration

DIMM Voltage

The optional settings are: [Default]; [+50mV]; [+100mV]; [+150mV].

WatchDog Configuration

WatchDog Timer Control

Use this item to enable or disable WatchDog Timer Control. When set as Enabled, the following sub-items shall appear:

WatchDog Timer Value

User can set a value in the range of 4 to 255.

WatchDog Timer Unit

The optional settings are: [Second];[Minute].

Shutdown Temperature Configuration

Use this item to select system shutdown temperature.

SmartFan Configuration

CPUFAN / SYSFAN Smart Mode

When set as [Enabled], the following sub-items shall appear:

CPUFAN / SYSFAN Full Speed Temp

Use this item to set a degree for CPU/SYSTEM fan. FAN will run at full speed when above this temperature.

CPUFAN / SYSFAN Idle Temp

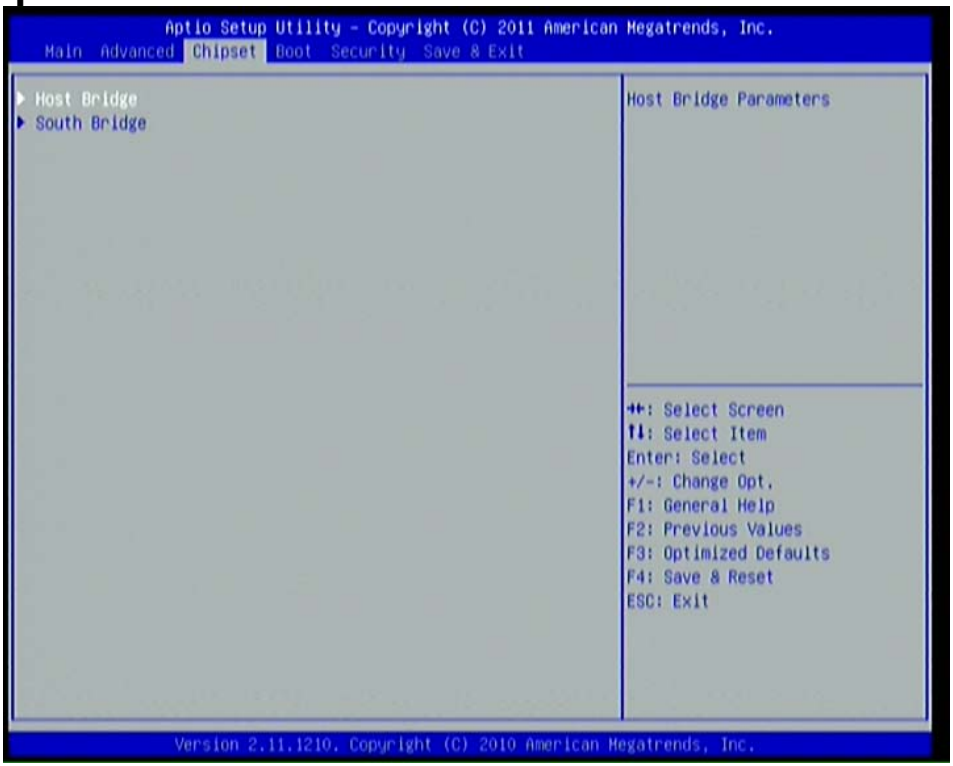
Use this item to set a degree for CPU/SYSTEM fan. FAN will idle speed when below this temperature.

CPUFAN / SYSFAN Stop Temp

Use this item to set a degree for CPU/SYSTEM fan. CPU FAN will stop when

below this temperature.

3-8 Chipset Menu



Host Bridge

Press [Enter] to make settings for Intel IGD Configuration:

Internal Graphics:

Use this item to keep IGD enabled based on the setup options. The optional settings are: [Disabled]; [Auto].

IGFX-Boot Type

Use this item to set the video device which will be activated during POST. This has no effect if external graphics presents. The optional settings are: [VBIOS Default];

[CRT]; [HDMI]; [LVDS]; [HDMI+LVDS]; [CRT+LVDS].

In the case **IGFX-Boot Type** is set as **[HDMI],** the following setting item shall appear:

Active LFP

The optional settings are: [Disable LVDS]; [Enable LVDS].

In the case **IGFX-Boot Type** is set as **[LVDS], [HDMI+LVDS], [CRT+LVDS],** the following setting item shall appear:

LCD Panel Type:

The optional settings are: [1024 x 600]; [800 x 600]; [1024 x 768 18bit]; [1366 x 768]; [1024 x 768 24 bit]; [1200 x 800].

Active LFP

The optional settings are: [Disable LVDS]; [Enable LVDS].

South Bridge

UHCI #1 (Ports 0 and 1)/ UHCI #2 (Ports 2 and 3)/UHCI #3 (Ports 4 and 5)/UHCI #4 (Ports 6 and 7)

Use this item to control the USB UHCI (USB 1.1) functions. The optional settings are: [Enabled]; [Disabled].

USB 2.0 (EHCI) Support

Use this item to enable or disable USB 2.0 (EHCI) support. The optional settings are: [Enabled]; [Disabled].

High Precision Event Timer Configuration:

High Precision Timer

The optional settings are: [Enabled]; [Disabled].

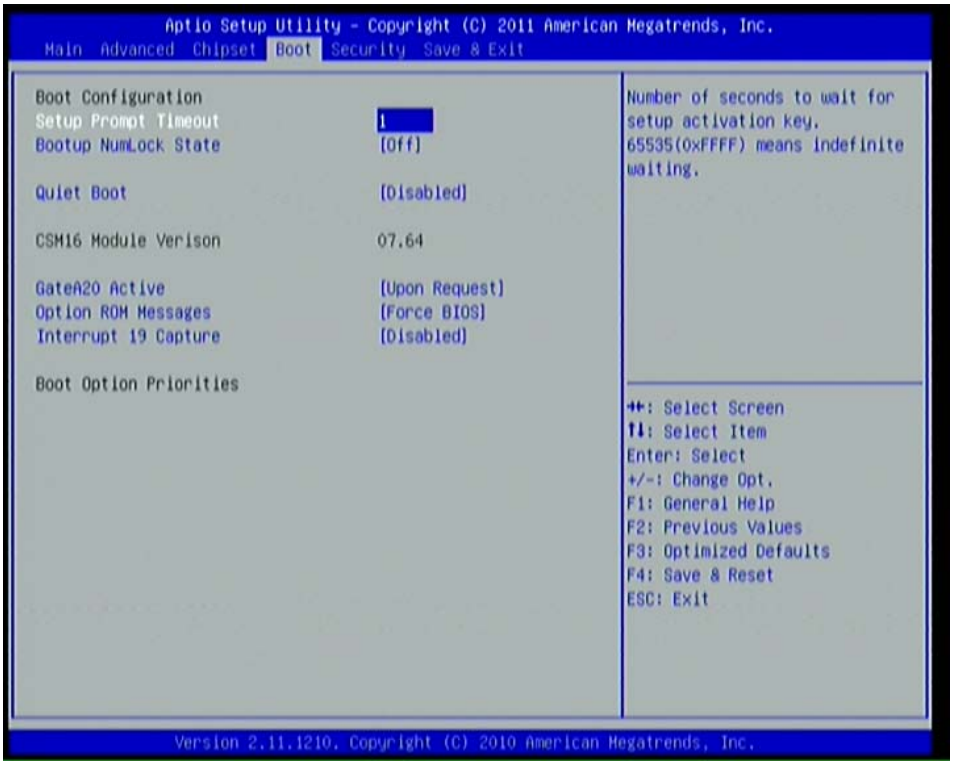
SLP_S4 Assertion Width

Use this item to select a minimum assertion width of the SLP_S4# signal.

Restore AC Power Loss

Use this item to select AC power state when power is re-applied after a power failure (G3 State). The optional settings are: [Power Off]; [Power On]; [Last State].

3-9 Boot Menu



Setup Prompt Timeout

Use this item to set number of seconds to wait for setup activation key.

Bootup Numlock State

Use this item to select keyboard numlock state. The optional settings are: [On]; [Off].

Quiet Boot

The optional settings are: [Enabled]; [Disabled].

Gate A20 Active

The optional settings are: [Upon Request]; [Always].

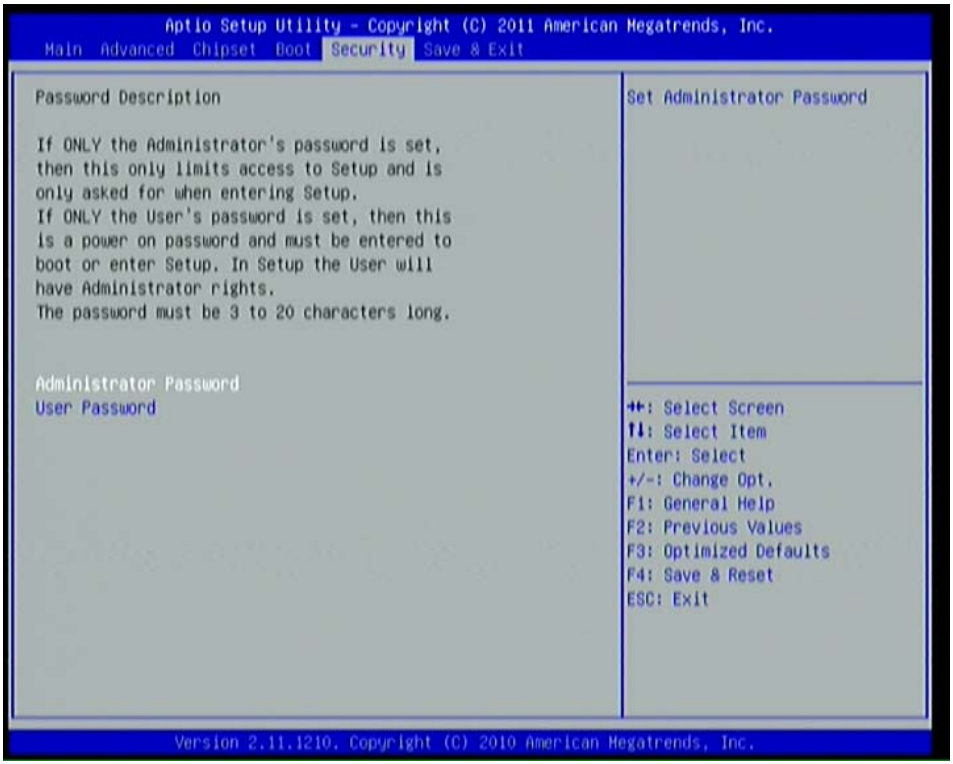
Option ROM Message

Use this item to set display mode for option ROM. The optional settings are: [Force BIOS]; [Keep Current].

Interrupt 19 Capture

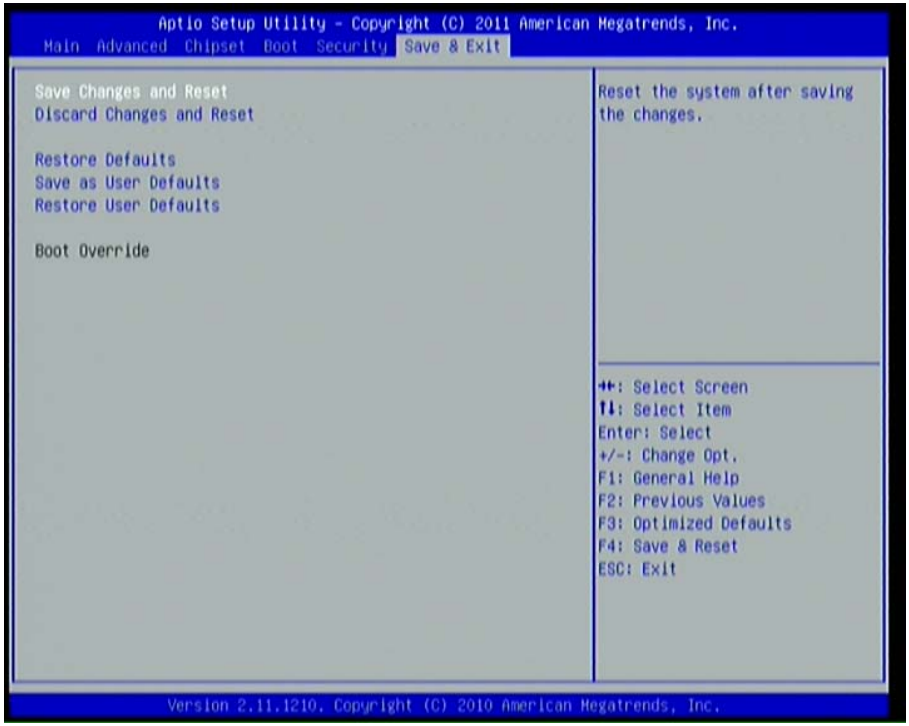
The optional settings are: [Enabled]; [Disabled].

3-10 Security Menu



Security menu allow users to change administrator password and user password settings.

3-11 Save & Exit Menu



Save Changes and Reset

This item allows user to reset the system after saving the changes.

Discard changes and Reset

This item allows user to reset the system without saving any changes.

Restore Defaults

Use this item to restore /Load default values for all the setup options.

Save as User Defaults

Use this item to save the changes done so far as user defaults.

Restore User Defaults

Use this item to restore defaults to all the setup options.