



User Manual

MIOS-5250

Fanless Embedded Box PC

ADVANTECH

Enabling an Intelligent Planet

Attention!

Please note:

This package contains a hard-copy user manual in Chinese for China CCC certification purposes, and there is an English user manual included as a PDF file on the CD. Please disregard the Chinese hard copy user manual if the product is not to be sold and/or installed in China.

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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*



Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*



There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*



Packing List

Before installation, please ensure the following items have been shipped:

- 1 x MIOS-5250 unit
- 1 x 2.5" HDD/SSD Assembly Kit
- 1 x Heatsink Thermal Pad Kit
- 1 x China RoHS
- 1 x Heatsink wrench
- 1 x Mini Jumper(10pcs package)
- 1 x Startup Manual
- 1 x Simplified Chinese user manual

Ordering Information

Model Number	Description
MIOS-5250NS6-D0A1E	Atom N2600 1.6GHz w/ HDMI+VGA+2*GbE+4*COM+6*USB
MIOS-5250DS8-C0A1E	Atom D2550 1.86GHz w/ HDMI+VGA+2*GbE+4*COM+6*USB, 12V DC Phoenix type

Optional Accessories

For MIOS-5250

Part Number	Description
1757003659	AC-to-DC Adapter, DC19 V/3.42 A 65 W, with Phoenix Power Plug
1757003995	AC-to-DC Adapter, DC 12V/5A 60W
1757003996	AC-to-DC Adapter, DC12V/5A 60 W, with Phoenix Power Plug
1700001524	Power Cable 3-pin 180 cm, USA Type
170203183C	Power Cable 3-pin 180 cm, Europe Type
170203180A	Power Cable 3-pin 180 cm, UK Type
1700008921	Power Cable 3-pin 180 cm, PSE Mark

Safety Instructions

1. Please read these safety instructions carefully.
2. Please keep this User's Manual for later reference.
3. Please disconnect this equipment from AC outlet before cleaning. Use a damp cloth. Don't use liquid or sprayed detergent for cleaning. Use moisture sheet or clothe for cleaning.
4. For pluggable equipment, the socket-outlet shall near the equipment and shall be easily accessible.
5. Please keep this equipment from humidity.
6. Lay this equipment on a reliable surface when install. A drop or fall could cause injury.
7. The openings on the enclosure are for air convection hence protecting the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source when connecting the equipment to the power outlet.
9. Place the power cord such a way that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for long time, disconnect the equipment from mains to avoid being damaged by transient over-voltage.
12. Never pour any liquid into ventilation openings; this could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. Do not leave this equipment in an environment where the storage temperature may go below -40°C (-40°F) or above 85°C (185°F). This could damage the equipment. the equipment should be in a controlled environment.
16. Caution: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer, discard used batteries according to the manufacturer's instructions.
17. **Attention:** Danger d'explosion en cas de remplacement incorrect de la pile. Remplacez-la exclusivement par une batterie identique ou par un type de batterie équivalent recommandé par le fabricant. La mise au rebut des batteries usagées doit se faire conformément aux indications du fabricant de ces batteries.
18. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
19. **RESTRICTED ACCESS AREA:** The equipment should only be installed in a Restricted Access Area.
20. **DISCLAIMER:** This set of instructions is given according to IEC 704-1. Advan-tech disclaims all responsibility for the accuracy of any statements contained herein.

Battery Information

Batteries, battery packs, and accumulators should not be disposed of as unsorted household waste.

Please use the public collection system to return, recycle, or treat them in compliance with the local regulations.



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Chapter 1

General Introduction

This chapter gives background information on MIOS-5250 series.

1.1 Introduction

MIOS-5250, an intelligent, fanless embedded system powered by Intel® Atom™ N2600/D2550 Dual Core low power processor with multiple I/O interface. The new generation Intel® Atom™ processor brings 44% improvement on processing power and 90% on graphics performance than previous generation Intel® Atom™ processors. These low-power platforms provide energy-efficient and environmentally responsible solutions, and serve applications targeted at factory automation, machine automation, kiosks, and self-service applications; and they operate reliably in 0 ~ 45 °C environments!

Multifunctional Design

MIOS-5250 is powered by Intel® Atom™ N2600 1.6GHz/D2550 1.86GHz dual core processors in an Advantech, embedded box PC. All models are fanless, and highlight various quality features including wide-input power supplies from 12V to 24V, wide temperature range 0 ~ 45 °C, expandability options, and structural strengthening. It also provides rich I/O interfaces: up to 6 x USBs, 2 x GbEs, 4 x COMs, and more I/O via MI/O extension module, and also supports high capacity 2.5" HDD up to 1 TB.

Multiple Display Support

MIOS-5250 supports multiple display types: VGA, HDMI or LVDS display (by request). The graphic engine is DirectX 9, H/W format decode/Acceleration, MPEG2 (H/W acceleration), H.264/ VC1/ WMV9 (H/W Decode/Acceleration). MIOS-5250 supports dual independent display.

Built in Intelligent Management Tools - Advantech iManager & SUSIAccess

Advantech iManager provides a valuable suite of programmable APIs such as multi-level watchdog, hardware monitor, system restore, and other user-friendly interface. iManager is an intelligent self-management cross platform tool that monitors system status for problems and takes action if anything is abnormal. iManager offers a boot up guarantee in critical, low temperature environments. iManager makes the whole system more reliable and more intelligent. MIOS-5250 also supports Advantech's own SUSIAccess, which provides easy remote management so users can monitor, configure, and control a large number of terminals to make maintenance and system recovery more simple.

1.2 Product Features

1.2.1 General

- **CPU:** Intel® Atom™ Processor N2600 1.6GHz/D2550 1.86GHz
- **System Chipset:** Intel® Atom™ N2600/D2550 + NM10
- **BIOS:** AMI EFI 16-Mbit
- **System Memory:** One DDR3 SODIMM. DDR3 1066 MHz (D2550) or DDR3 800 MHz (N2600) up to 4 GB
- **Watchdog Timer:** 255-level interval timer, by software setup
- **I/O Interface:** 2 x RS-232, 2 x RS-232/422/485 (default RS-232, RS-422/485 supported by request)
- **USB:** 6 x USB 2.0 compliant ports
- **Audio:** High Definition Audio (HD), Line-in, Line out, Mic-in
- **DIO:** 8 bits general purpose input/output
- **Storage:** 1 x 2.5" SATA HDD (up to 11.5mm height) and 1 x CFAST (support by request)
- **Expansion Interface:** Supports 1 x Mini-PCIe with SIM holder and MIOe for MI/O extension module
- **Software API:** Advantech iManager and SUSIAccess

1.2.2 Display

- **Controller:** Intel® Atom™ N2600 / D2550
- **Resolution:**
 - VGA: Supports up to 1920 x 1200
 - HDMI: Supports up to 1920 x 1200, Supports HDMI 1.3, Max data rate up to 1.65Gb/s
 - LVDS (support by request):
 - N2600: 24-bit LVDS1, resolution up to 1366 x 768
 - D2550: 24-bit LVDS1, resolution up to 1440 x 900, 48-bit LVDS2, resolution up to 1920 x 1080
- **Dual Display:**
 - VGA+HDMI, VGA+LVDS, HDMI+LVDS

1.2.3 Ethernet

- **Chipset:**
 - LAN1 Intel 82583V
 - LAN2 Intel 82583V
- **Speed:** 10/100/1000 Mbps
- **Interface:** 2 x RJ45

1.3 Mechanical Specifications

1.3.1 Dimensions

284.6[11.2] x 151.6[5.96] x 74.5[2.9] Unit: mm [Inch]

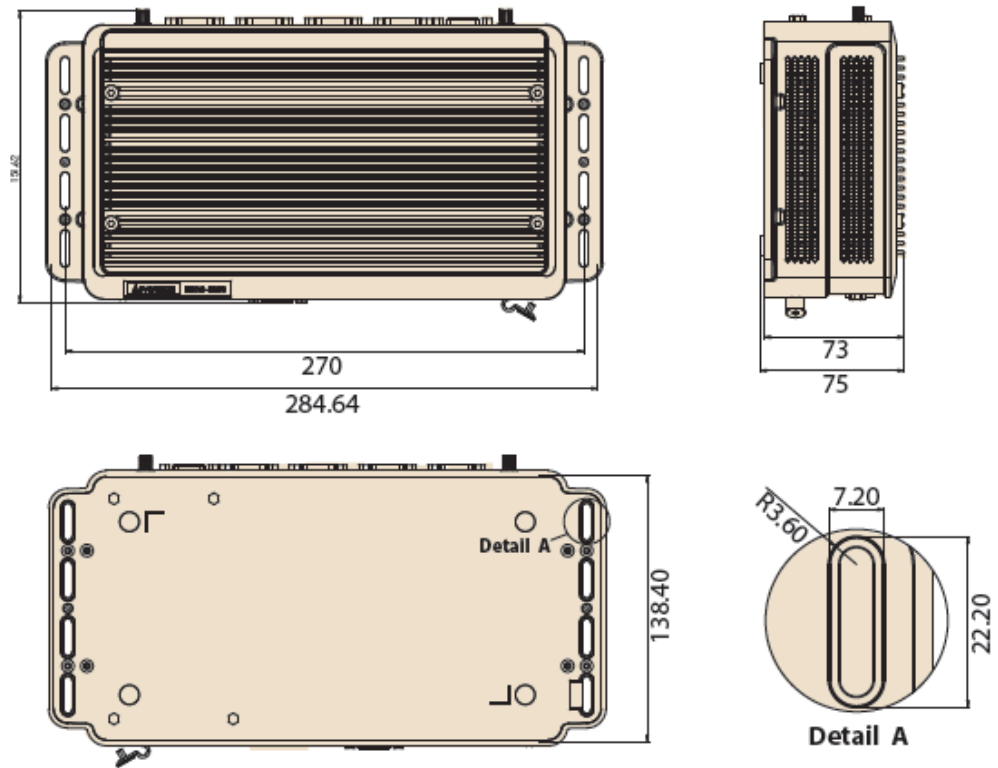


Figure 1.1 MIOS-5250 Mechanical dimension drawing

1.3.2 Weight

2.3 kg (5.07 lb)

1.4 Power Requirement

1.4.1 System Power

- Minimum power input: MIOS-5250: DC12 V 5A

1.4.2 RTC Battery

- Lithium 3 V/210 mAH

1.5 Environment Specification

1.5.1 Operating Temperature

- With 2.5-inch hard disk 0 to 45 °C (32~113° F), with air flow, speed=0.7 m/sec

1.5.2 Relative Humidity

- 95% @ 40 °C (non-condensing)

1.5.3 Storage Temperature

- -40 ~ 85 °C (-40 ~ 185° F)

1.5.4 Vibration during Operation

- When system is equipped with SSD: 3Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1hr/axis, x,y,z 3 axes.

1.5.5 Shock during Operation

- When system is equipped with SSD: 10G, IEC 60068-2-27, half sine, 11 ms duration.

1.5.6 Safety

- UL, CCC, CB

1.5.7 EMC

- CE, FCC, CCC

Chapter 2

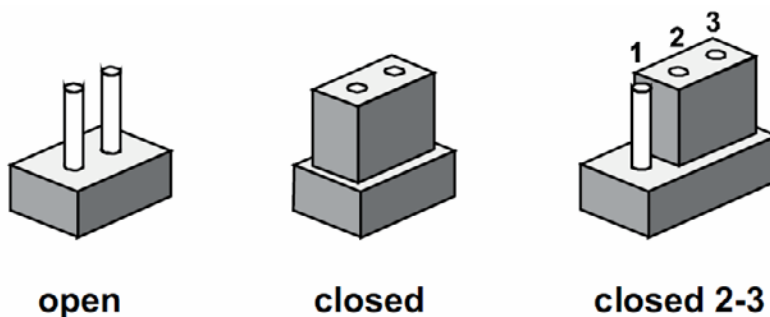
H/W Installation

This chapter introduces external IO and the installation of MIOS-5250 hardware.

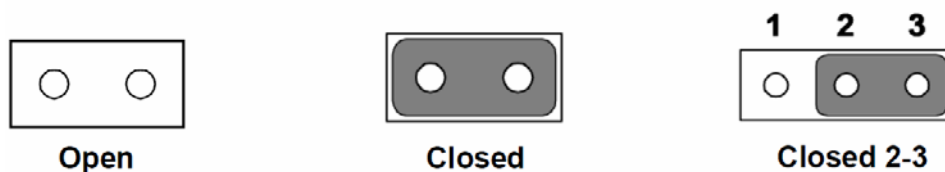
2.1 Jumpers

2.1.1 Jumper Description

Cards can be configured by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper, you connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



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



A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

Warning! To avoid damaging the computer, always turn off the power supply before setting jumpers to clear CMOS. Before turning on the power supply, set the jumper back to 3.0 V Battery On.



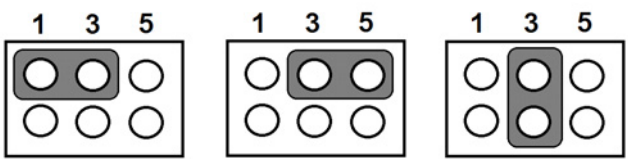
2.1.2 Jumper List

Table 2.1: Jumpers

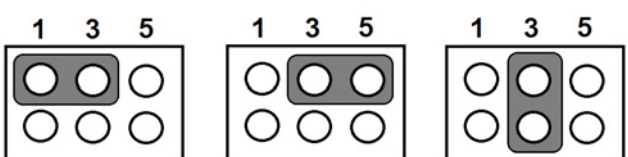
Label	Function
J1	24-bit LVDS1 Power
J2	48-bit LVDS2 Power
J3	Auto Power on setting
J4	COM2 Setting
J5	COM3 setting
J6	Clear CMOS

2.1.3 Jumper Settings

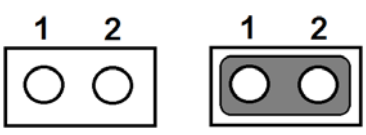
J1	24 bits LVDS1 Power
Part Number	1653003260
Footprint	HD_3x2P_79
Description	PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050
Setting	Function
(1-3)*	+3.3V (default)
(3-5)	+5V
(3-4)	+12V



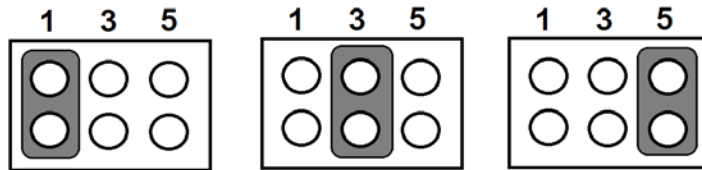
J2	48-bit LVDS2 Power
Part Number	1653003260
Footprint	HD_3x2P_79
Description	PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050
Setting	Function
(1-3)*	+3.3V (default)
(3-5)	+5V
(3-4)	+12V



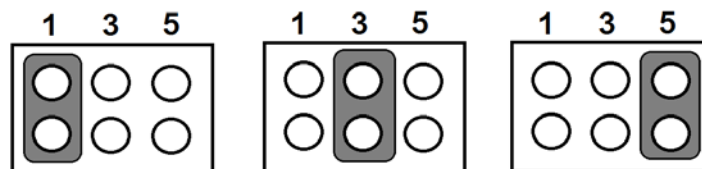
J3	Auto Power On Setting
Part Number	1653002101
Footprint	HD_2x1P_79_D
Description	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
Setting	Function
NC	Power Button for Power On
(1-2)*	Auto Power On (default)



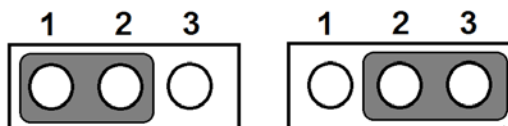
J4	COM2 Setting
Part Number	1653003260
Footprint	HD_3x2P_79
Description	PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050
Setting	Function
(1-2)*	RS232 (default)
(3-4)	RS485
(5-6)	RS422



J5	COM3 Setting
Part Number	1653003260
Footprint	HD_3x2P_79
Description	PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050
Setting	Function
(1-2)*	RS232 (default)
(3-4)	RS485
(5-6)	RS422



J6	Clear CMOS
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)*	Normal (default)
(2-3)	Clear COMS



2.2 Connectors

2.2.1 Connector List

Table 2.2: Connectors

Label	Function
CN1	12V Power Input
CN2	DC JACK
CN3	DDR3 SO-DIMM
CN5	Power Switch
CN7	Reset
CN9	GPIO
CN10	VGA
CN11	CFast
CN12	SIM Holder
CN13	Full-size Mini PCIe
CN14	SATA
CN15	SATA Power
CN16	USB 3/4
CN17	Internal USB
CN18	USB 1/2
CN19	COM1/COM2 RS-232
CN20	RS422/485 1
CN22	RS422/485 2
CN24	COM3/COM4 RS-232
CN25	SMBus
CN26	System FAN
CN28	LAN
CN30	Audio
CN31	MIOe
CN33	24 bits LVDS1 Panel
CN34	48 bits LVDS2 Inverter Power
CN35	48 bits LVDS2 Panel
CN36	HDMI
CN38	LVDS1 Inverter Power

2.3 Mechanical

2.3.1 Jumper and Connector Location

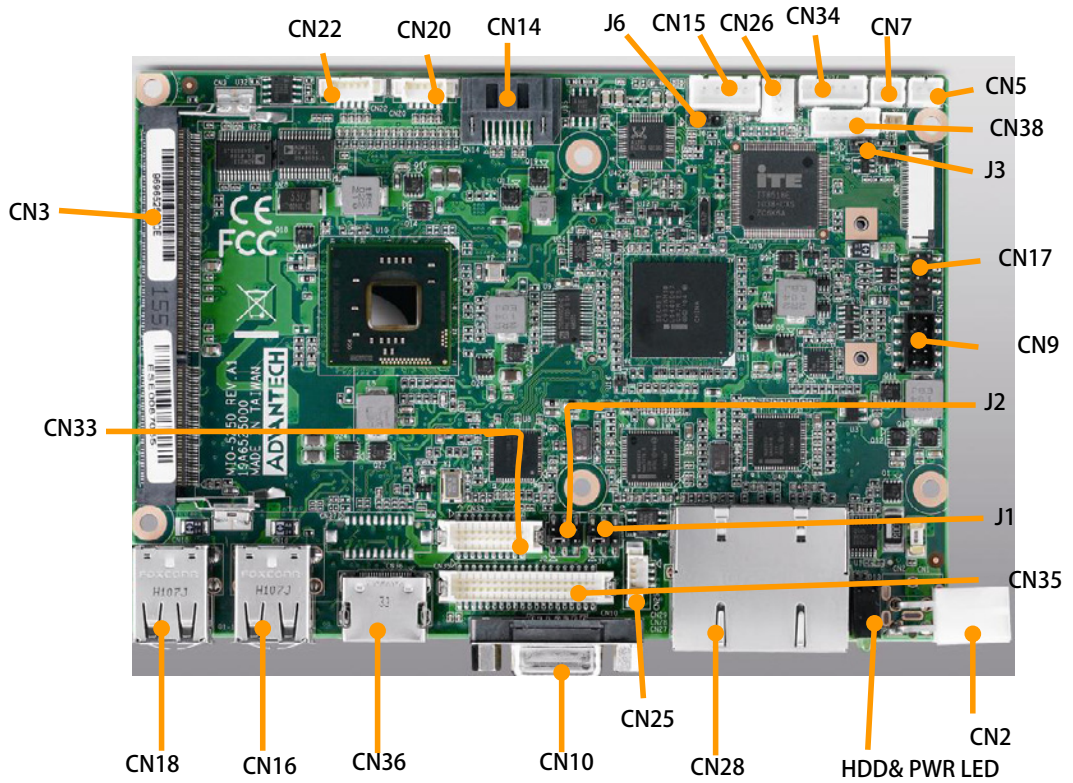


Figure 2.1 Jumper and Connector Layout (Top Side)

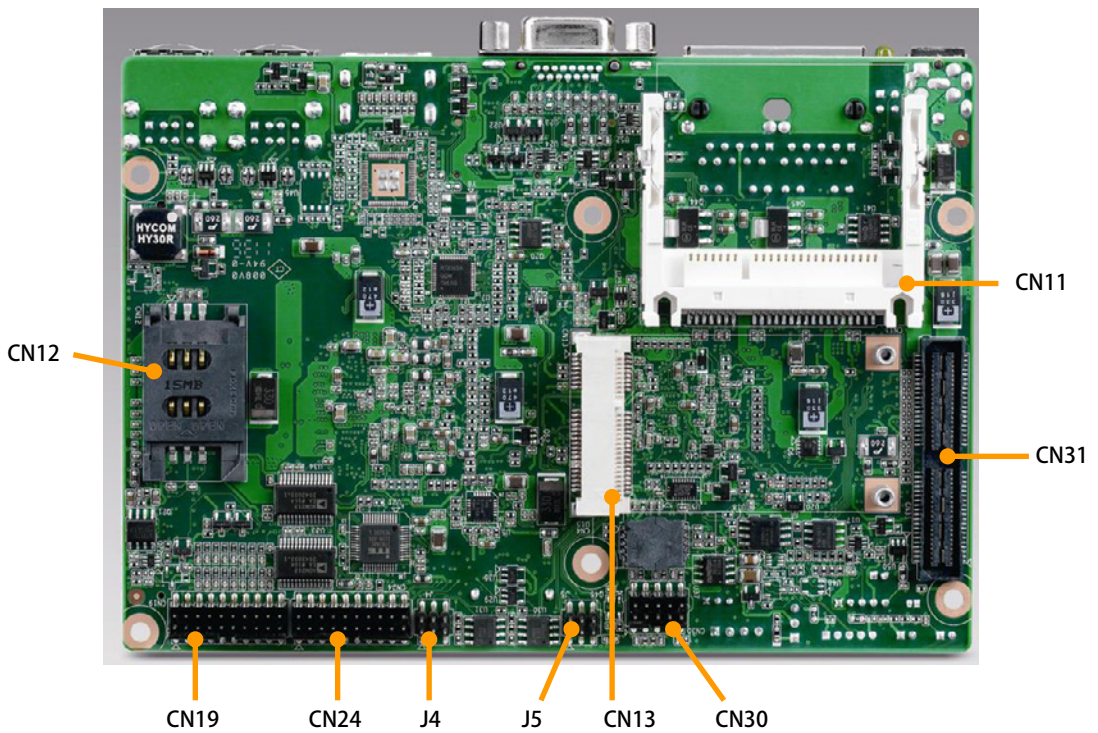


Figure 2.2 Jumper and Connector Layout (Bottom Side)

2.4 Connectors

2.4.1 MIOS-5250 External I/O Connectors

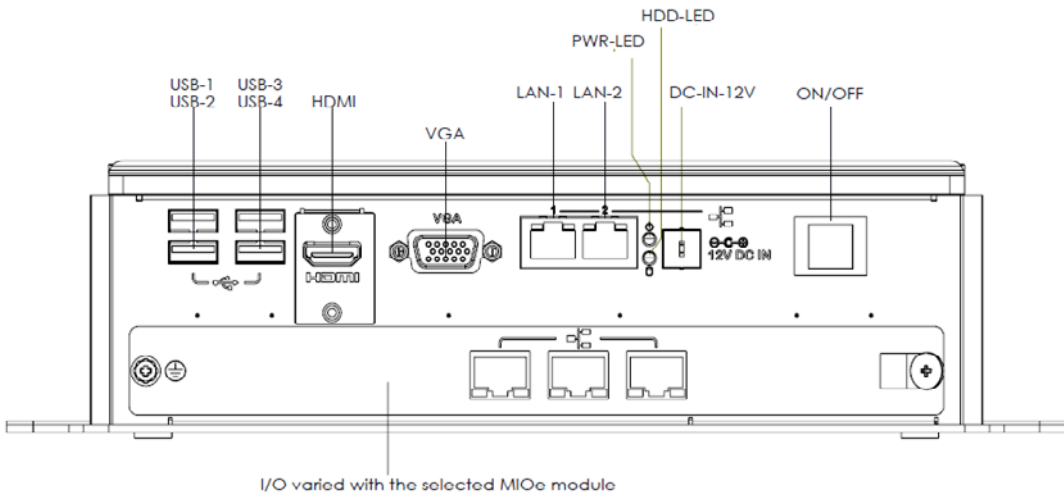


Figure 2.3 MIOS-5250 External Connector Locations (Front Side)

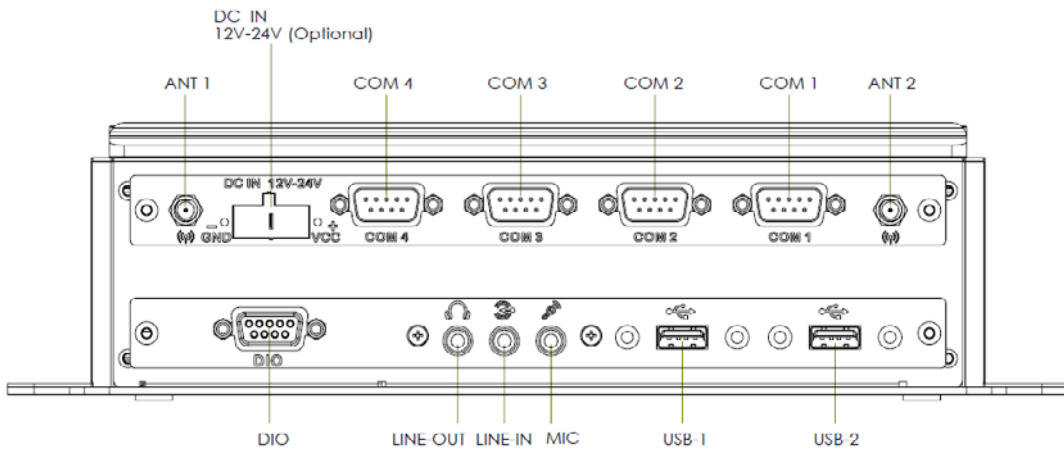


Figure 2.4 MIOS-5250 External Connector Locations (Back Side)

2.4.1.1 COM Connector

MIOS-5250 provides up to 4 D-SUB 9-pin connectors, which offers 2 RS-232 and 2 RS232/422/485 serial communication interface ports. Default setting is RS-232. The RS-422/485 mode of COM2 & COM3 can be supported via BIOS setting and cable.

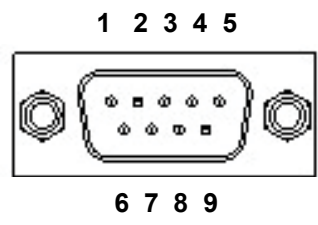


Figure 2.5 COM connector

Table 2.3: COM Connector Pin Assignments

	RS-232	RS-422 (By request)	RS-485 (By request)
Pin	Signal Name	Signal Name	Signal Name
1	DCD	Tx-	DATA-
2	RxD	Tx+	DATA+
3	TxD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

Note! NC represents “No Connection”.



2.4.1.2 Ethernet Connector (LAN)

MIOS-5250 is equipped with 2 Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. LAN1 and LAN2 are all equipped with Intel 82583V Ethernet controller. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (Yellow LED).

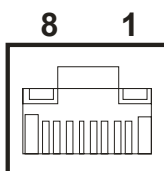


Figure 2.6 Ethernet connector

Table 2.4: Ethernet Connector Pin Assignments

Pin	10/100/1000BaseT Signal Name
1	TX+
2	TX-
3	RX+
4	MDI2+
5	MDI2-
6	RX-
7	MDI3+
8	MDI3-

2.4.1.3 Audio Connector

MIOS-5250 offers stereo audio ports by three phone jack connectors of Line_Out, Line_In, Mic_In. The audio chip is controlled by ALC892, and it's compliant with Azalea standard.

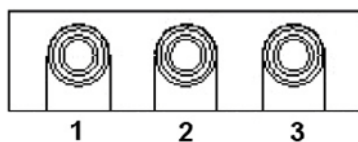


Figure 2.7 Audio connector

Table 2.5: Audio Connector Pin Assignments

Pin	Audio Signal Name
1	Line_Out
2	Line_In
3	MIC

2.4.1.4 DIO Connector

MIOS-5250 provides one DSUB 9-pin female connectors, which offer Digital Input/Output communication interface. If client wants to use DIO, please find the pin assignment as following.

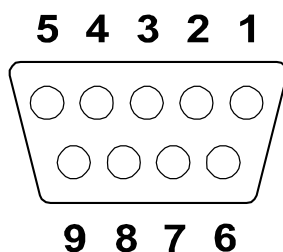


Figure 2.8 DIO Connector (MIOS-5250)

Table 2.6: DIO Connector Pin Assignments (MIOS-5250L)

Pin	Signal Name
1	DIO bit0
2	DIO bit1
3	DIO bit2
4	DIO bit3
5	DIO bit4
6	DIO bit5
7	DIO bit6
8	DIO bit7
9	GND

2.4.1.5 USB Connector

MIOS-5250 provides up to six USB interface connectors, which give complete Plug & Play and hot swapping function. The USB interface complies with USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. Please refer to Table. 2.7 for its pin assignments. The USB connectors are used to connect any device that conforms to the USB interface. Most digital devices conform to this standard. The USB interface supports Plug and Play.

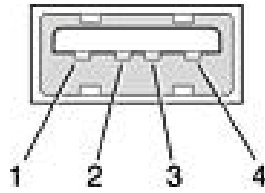


Figure 2.9 USB connector

Table 2.7: USB Connector

Pin	Signal name	Pin	Signal name
1	VCC	2	USB_data-
3	USB_data+	4	GND

2.4.1.6 VGA Connector

The MIOS-5250 provides a high resolution VGA interface connected by a D-SUB 15-pin connector to support a VGA CRT monitor. It supports display resolutions of up to 1900 x 1200.

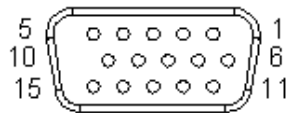


Figure 2.10 VGA Connector

Table 2.8: VGA Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	NC	10	GND
11	NC	12	DDAT
13	H-SYNC	14	V-SYNC
15	DCLK		

2.4.1.7 Power Input Connector

MIOS-5250 comes with a lockable DC Jack that carries 12 VDC external power input or comes with a two pins header that carries 12 VDC or 24 VDC (supported by request) external power input.



Figure 2.11 Power Input Connector

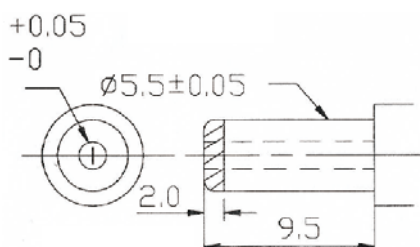


Figure 2.12 Compatible dimension of DC Plug

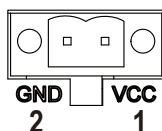


Figure 2.13 Power Input Connector (MIOS-5250)

Table 2.9: Power connector Pin Assignments (MIOS-5250)

Pin	Signal Name
1	+12~24 VDC
2	GND

2.4.1.8 LED Indicators

There are two LEDs on MIOS-5250 front metal face plate for indicating system status: PWR LED is for power status; and HDD LED is for HDD & Cfast flash disk status.



Figure 2.14 LED Indicators

2.5 Installation

2.5.1 Memory and Thermal Pad Assembly

- Note!**
1. If your system bundles memory, you can skip this procedure.
 2. Each thermal pad is for one-time only. As long as heatsink is removed, please paste new thermal pad when you assemble heat-sink back.



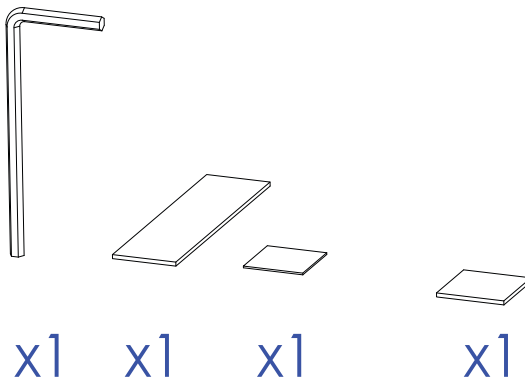


Figure 2.15 Tool and component list

1. Unpack heatsink wrench and thermal pads from accessory pack.
2. Unscrew the four screws on heatsink by using wrench. (Figure 2.16)
3. Remove original thermal pads (to protect CPU/ South Bridge) and paste new thermal pads on heatsink. (Figure 2.17)
4. Install memory on single board computer and screw back the heatsink. (Figure 2.16)

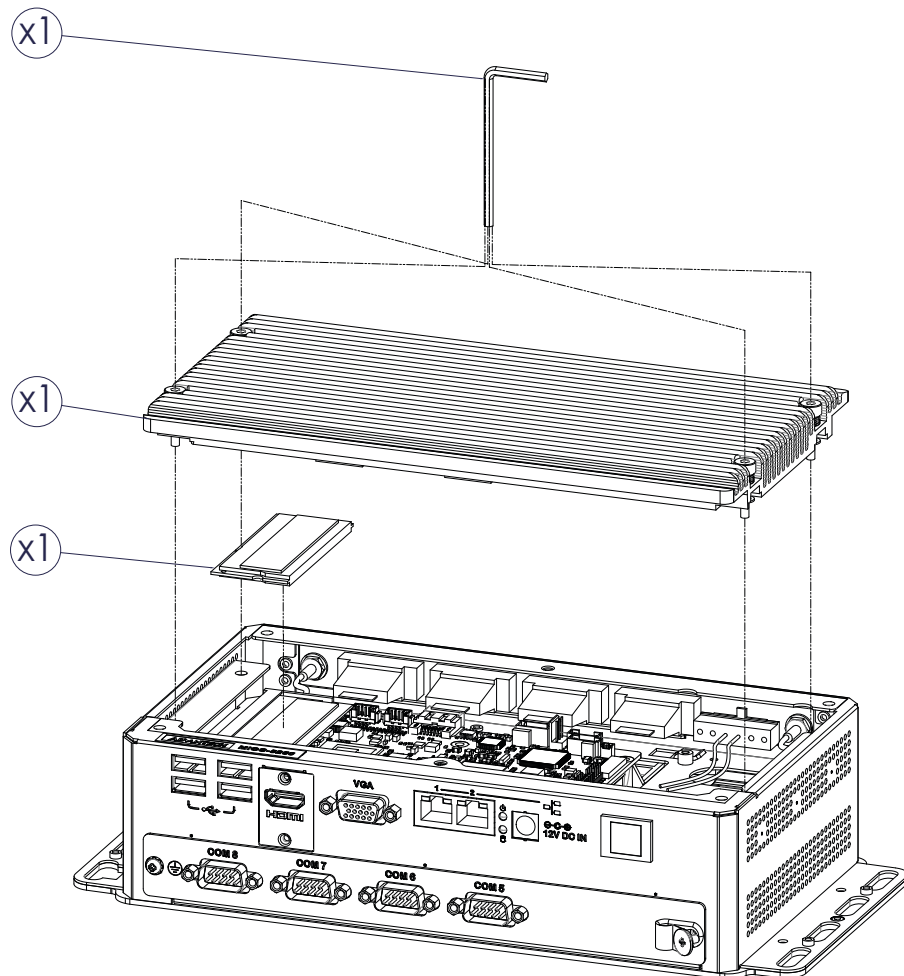


Figure 2.16 Illustration for step 2 and step 4

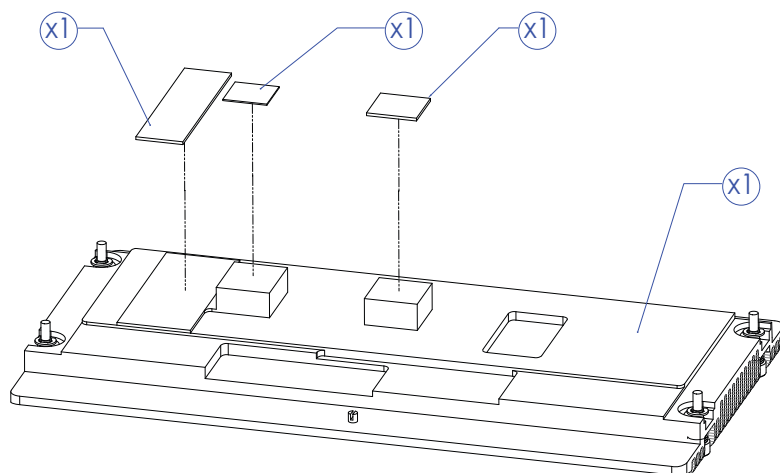


Figure 2.17 Illustration for step 3

2.5.2 2.5" HDD/SSD Assembly

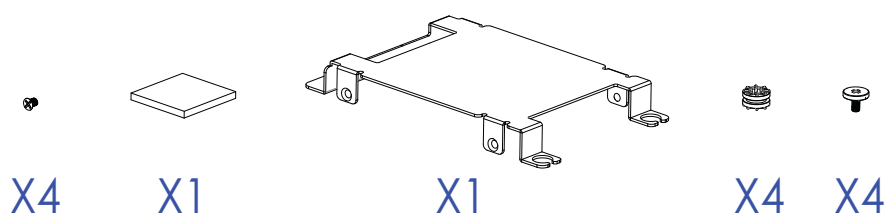


Figure 2.18 Components list

1. Unscrew the four screws on bottom cover. (Figure 2.19)
2. Assemble 4 screws from both side of HDD bracket to fasten HDD/SSD and blue dampers and damper screws. (Figure 2.20)
3. Paste HDD thermal pad on bottom cover, and assemble HDD with HDD bracket onto bottom cover. (Figure 2.21)
4. Screw the four screws on bottom cover back. (Figure 2.19)

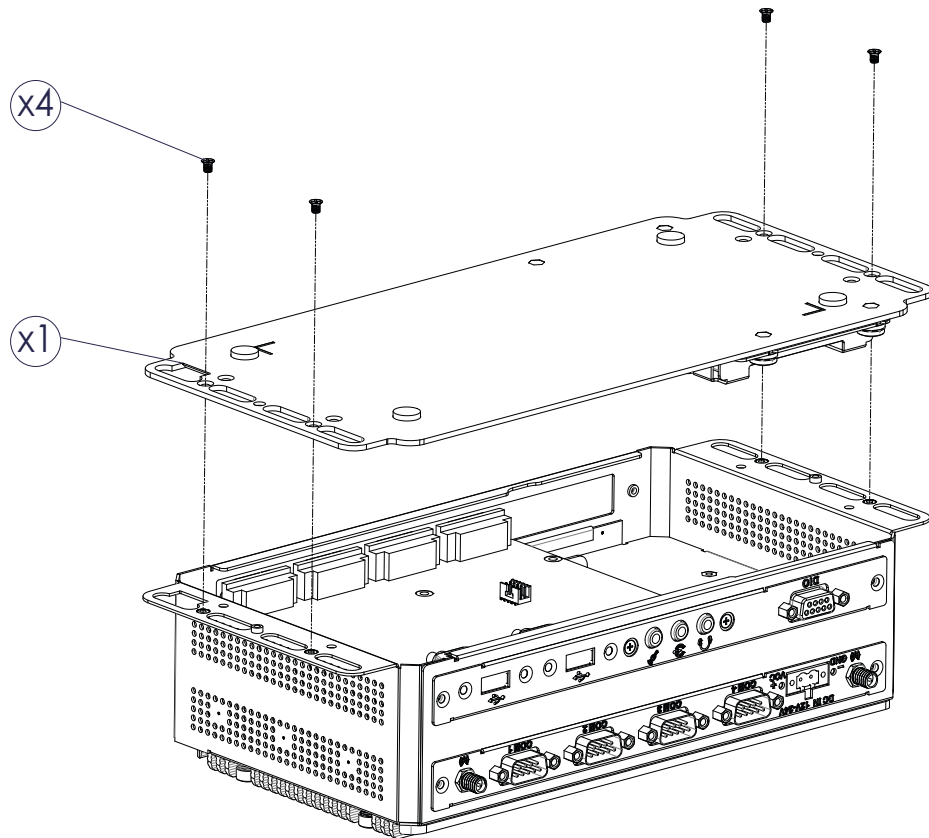


Figure 2.19 Illustration for step 1 and step 4

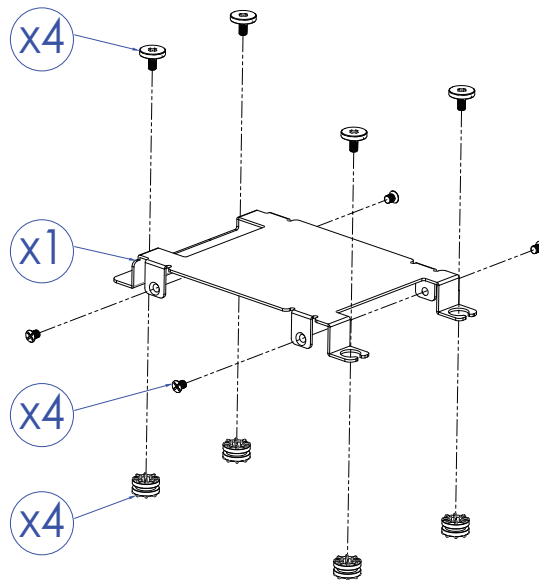


Figure 2.20 Illustration for step 2

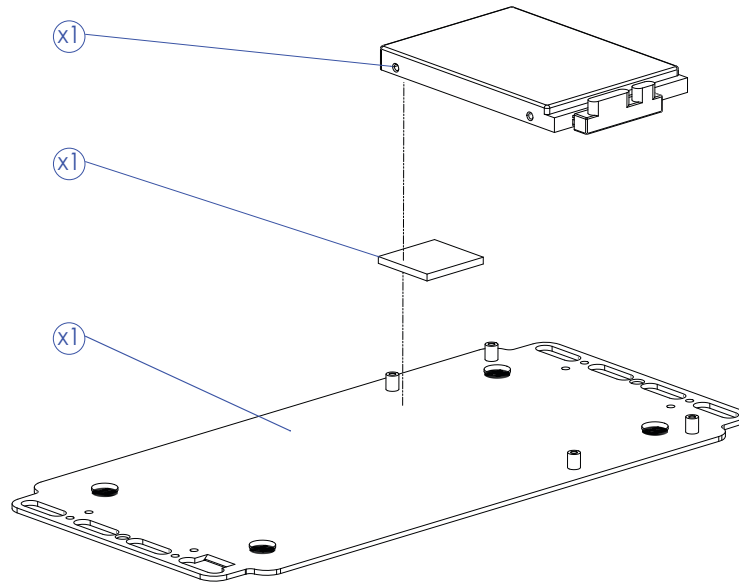


Figure 2.21 Illustration for step 3

Chapter 3

BIOS Settings

3.1 BIOS Setup

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS setup program, you can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the MIO-5250 BIOS setup screens.



Figure 3.1 Setup program initial screen

AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in flash ROM so it retains the Setup information when the power is turned off.

3.2 Entering Setup

Turn on the computer and then press <F2> or to enter the Setup menu.

3.3 Main Setup

When users first enter the BIOS Setup Utility, users will enter the Main setup screen. Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



Figure 3.2 Main setup screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

3.3.1 System date / System time

Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.4 Advanced BIOS Features Setup

Select the Advanced tab from the MIO-5250 setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

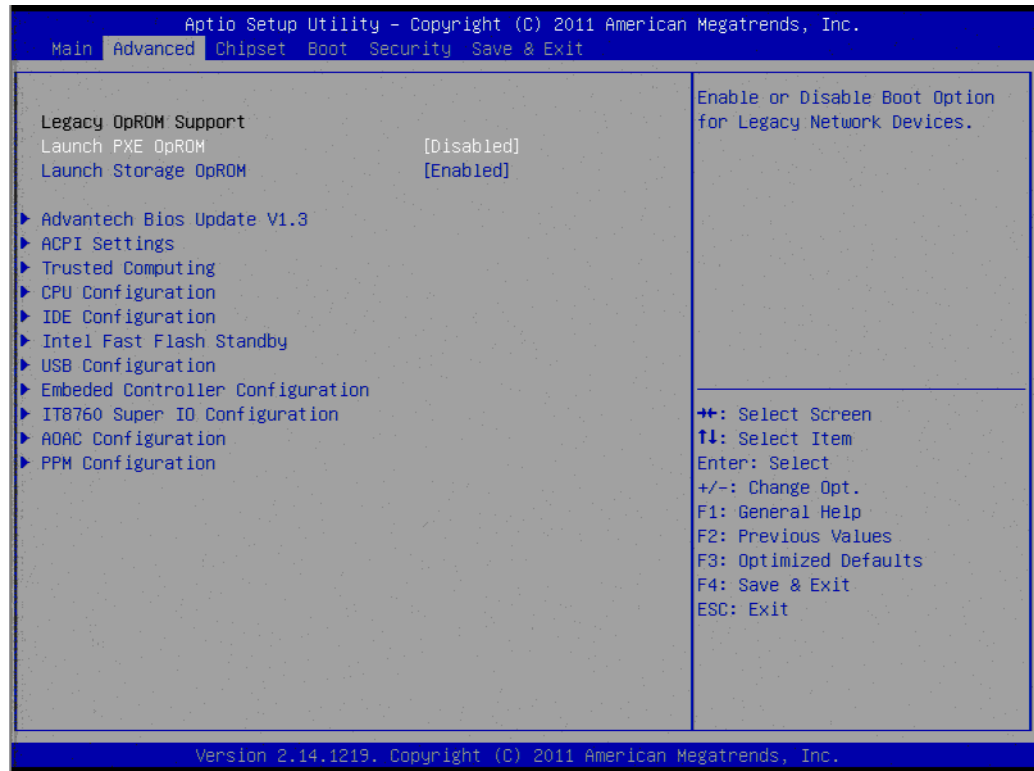


Figure 3.3 Advanced BIOS features setup screen

- **Launch PXE OpROM**
This item allows users to enable or disable launch PXE OpROM if available.
- **Launch Storage OpROM**
This item allows users to enable or disable launch storage OpROM if available.

3.4.1 Advantech BIOS Update V1.3

This item allows users to flash BIOS.

3.4.2 ACPI Settings

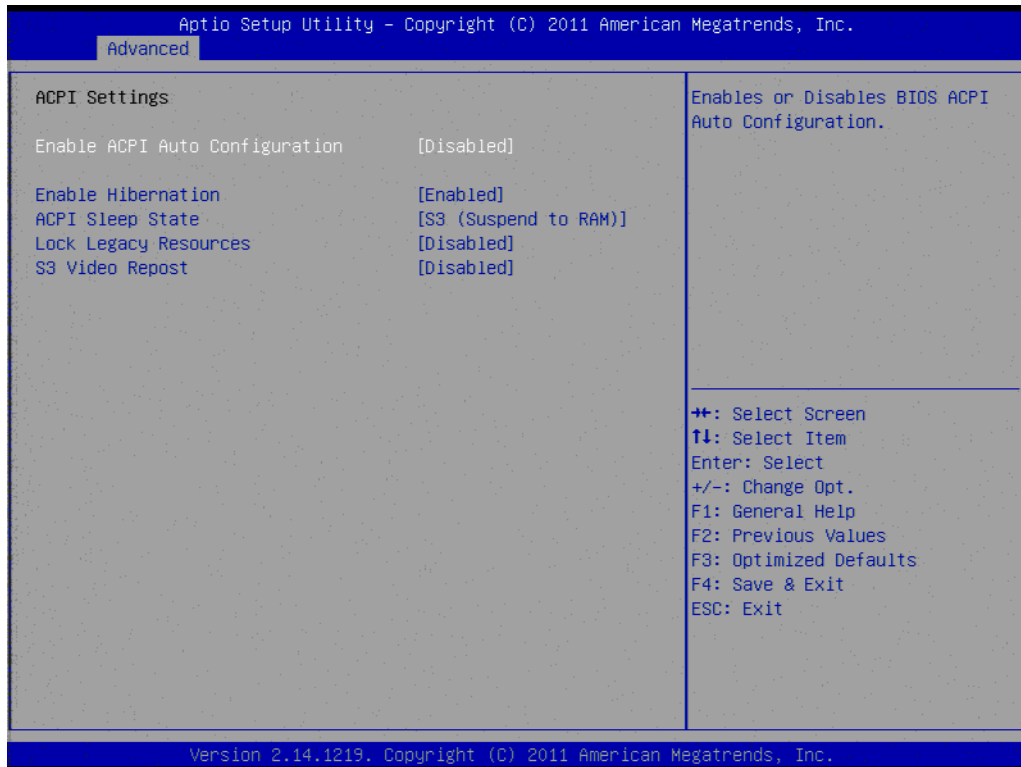


Figure 3.4 ACPI Setting

- **Enable ACPI Auto Configuration**
This item allows users to enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
This item allows users to enable or disable hibernation.
- **ACPI Sleep State**
This item allows users to set the ACPI sleep state.
- **Lock Legacy Resources**
This item allows users to lock legacy devices' resources.
- **S3 Video Report**
This item allows users to enable or disable S3 resume for VBIOS.

3.4.3 TPM Configuration

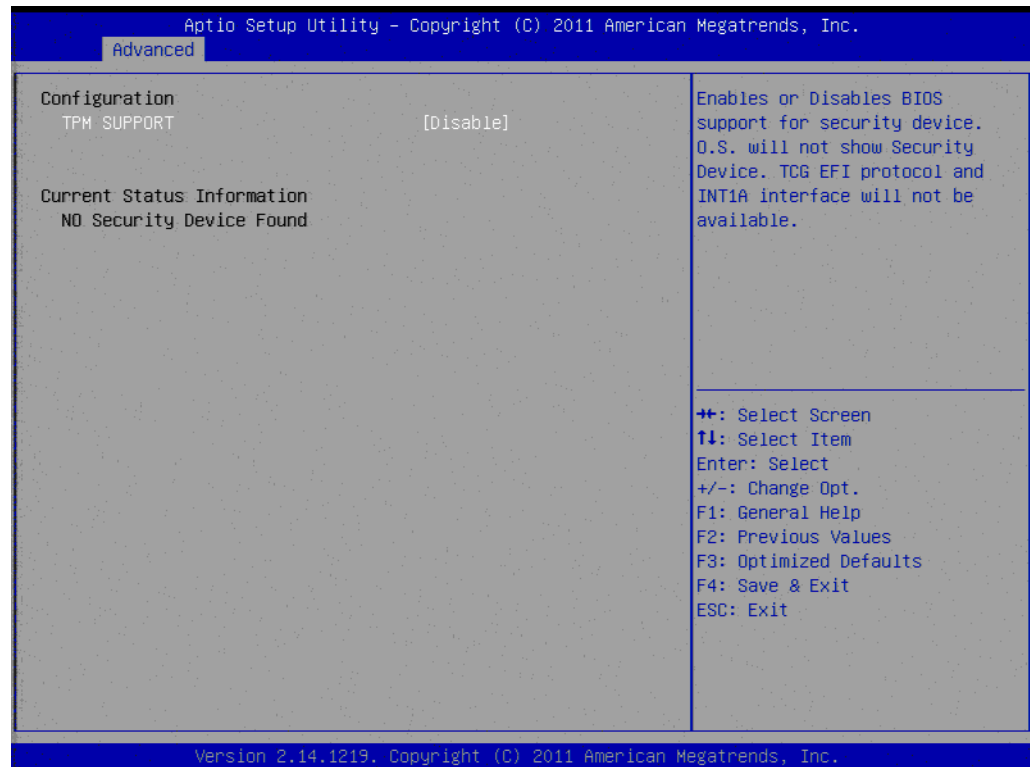


Figure 3.5 TPM Configuration

- **TPM Support**
Disable/Enable TPM if available.

3.4.4 CPU Configuration



Figure 3.6 CPU Configuration

- **Hyper Threading Technology**
This item allows users to enable or disable Intel Hyper Threading technology.
- **Execute Disable Bit**
This item allows users to enable or disable the No-Execution page protection
- **Limit CPUID Maximum**
This item allows users to enable or disable limit CPUID maximum for Windows XP.

3.4.5 SATA Configuration

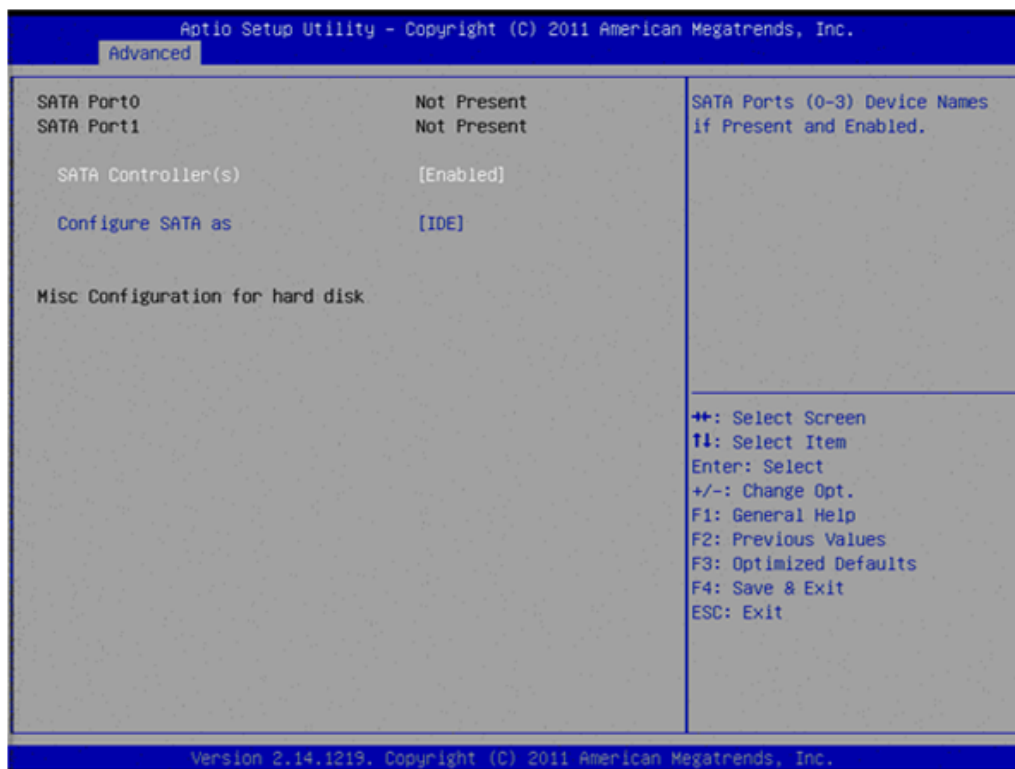


Figure 3.7 SATA Configuration

- **SATA Controller(s)**
This item allows users to enable or disable the SATA controller(s).
- **SATA Mode Selection**
This item allows users to select mode of SATA controller(s).

3.4.6 Intel Fast Flash Standby

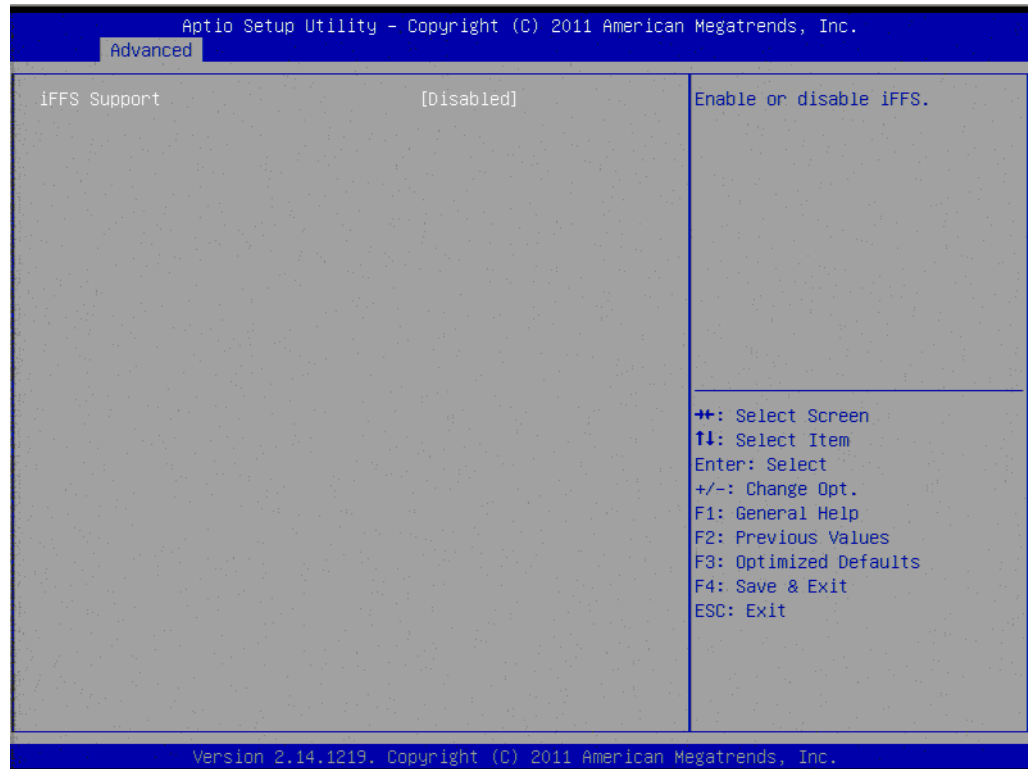


Figure 3.8 Intel Fast Flash Standby

- **IFFS Support**
This item allows users to enable or disable IFFS.

3.4.7 USB Configuration

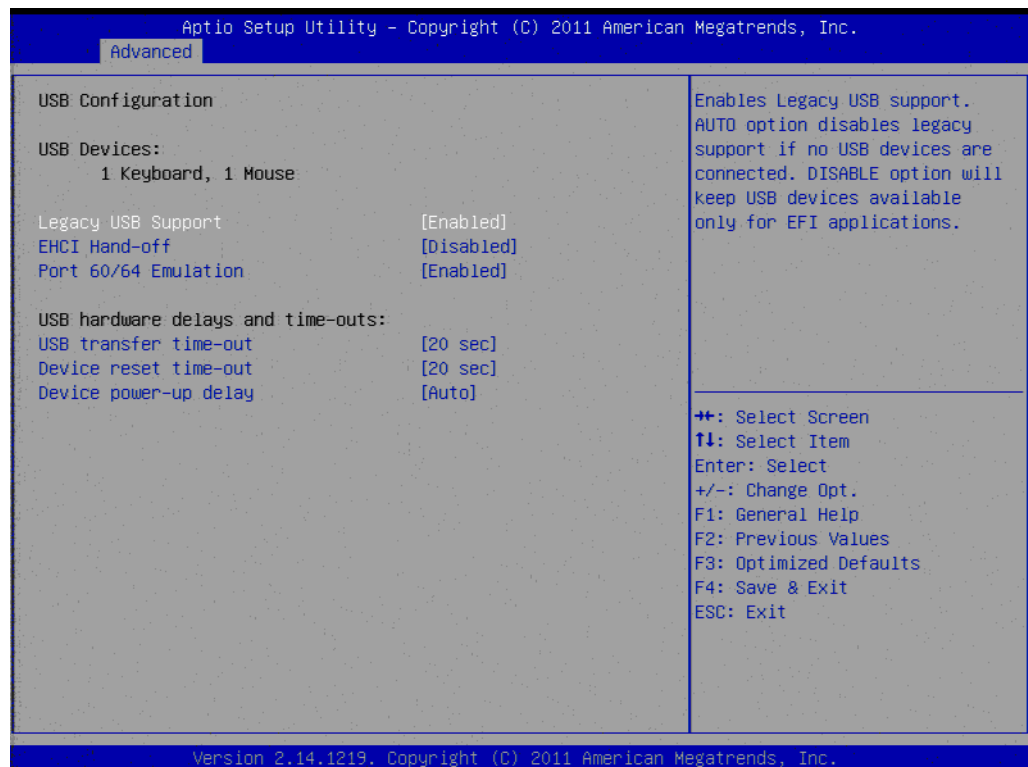


Figure 3.9 USB Configuration

- **Legacy USB Support**
Enable support for legacy USB. Auto option disables legacy support if no USB devices are connected.
- **EHCI Hand-Off**
This is a workaround for the OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
- **Port 60/64 Emulation**
Enable or disable I/O port 60h/64h emulation support.
- **USB transfer time-out**
Set the time-out value for Control, Bulk, and Interrupt transfers.
- **Device reset time-out**
Set USB mass storage device Start Unit command time-out value.
- **Device power-up delay**
Sets the maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses a default value: for a Root port it is 100 ms, for a Hub port the delay is taken from the Hub descriptor.

3.4.8 Embedded Controller Configuration



Figure 3.10 Embedded Controller Configuration

- **EC iManager WatchDog IRQ**
This item allows users to set the IRQ number of EC watchdog.
- **EC Power Saving Mode**
This item allows users to set board's power saving mode when off.
- **Backlight Enable Polarity**
This item allows users to set backlight enable polarity.
- **Backlight Mode**
This item allows users to set backlight mode.
- **Backlight Mode 1**
This item allows users to set backlight mode 1.

3.4.9 Super I/O Configuration

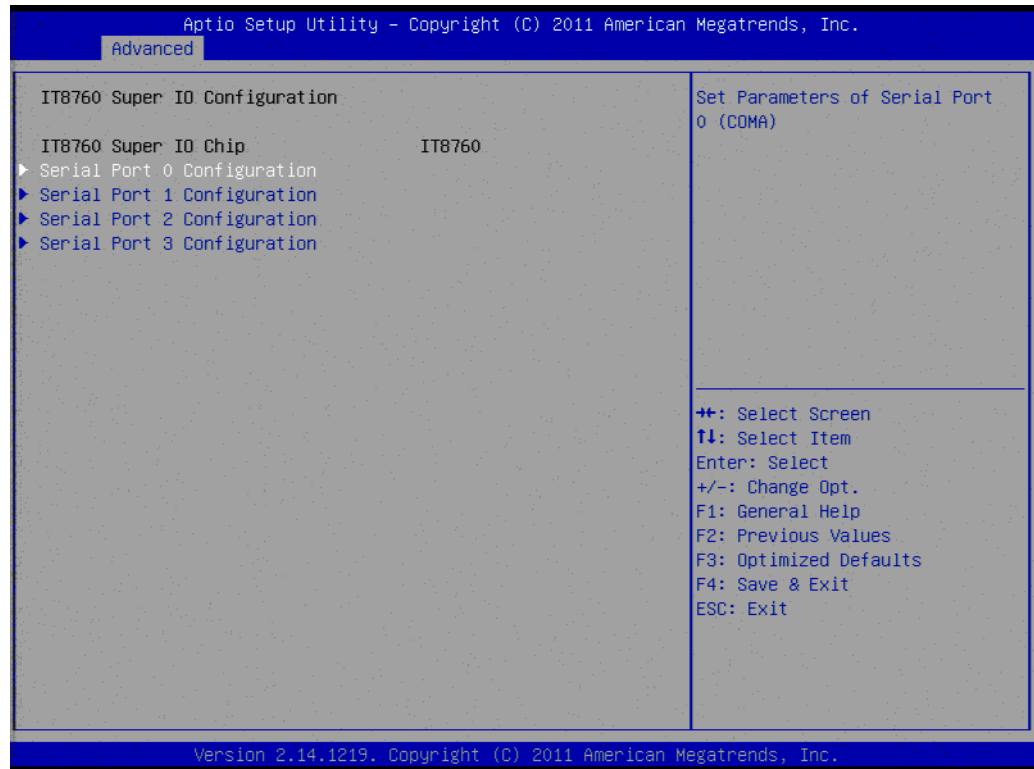


Figure 3.11 Super IO Configuration

- **Serial Port 0 Configuration**
This item allows users to configure serial port 0.
- **Serial Port 1 Configuration**
This item allows users to configure serial port 1.
- **Serial Port 2 Configuration**
This item allows users to configure serial port 2.
- **Serial Port 3 Configuration**
This item allows users to configure serial port 3.

3.4.10 AOAC Configuration

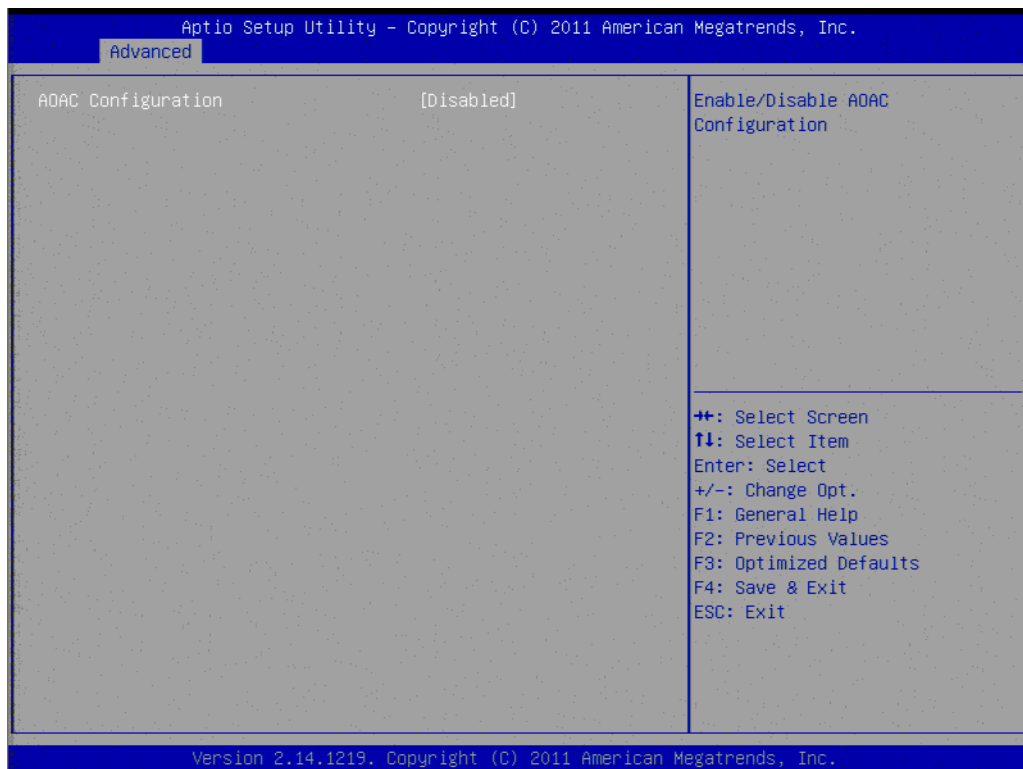


Figure 3.12 AOAC Configuration

- AOAC Configuration
This item allows users to enable or disable AOAC function.

3.4.11 PPM Configuration

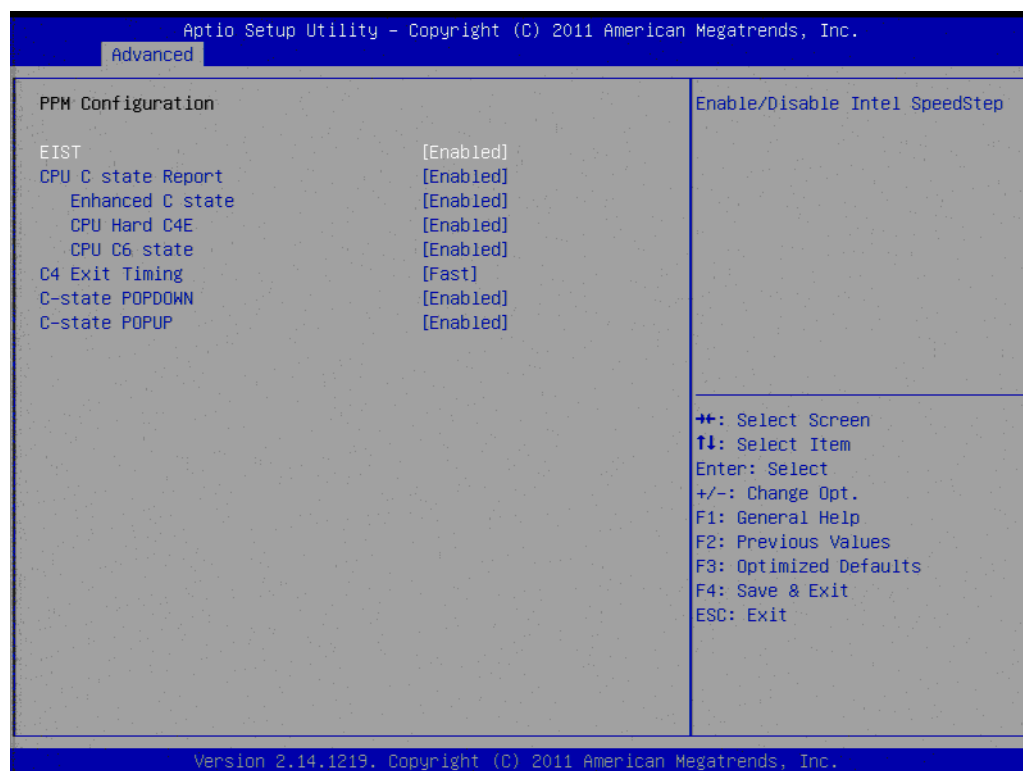


Figure 3.13 PPM Configuration

- **EIST**
This item allows users to enable or disable Intel SpeedStep function.
- **CPU C state Report**
This item allows users to enable or disable CPU C state report to OS.
- **Enhanced C state**
This item allows users to enable or disable Enhanced CPU C state.
- **CPU Hard C4E**
This item allows users to enable or disable CPU Hard C4E function.
- **CPU C6 state**
This item allows users to enable or disable CPU C6 state.
- **C4 Exit Timing**
This item allows users to control a programmable time for the CPU voltage to stabilize when exiting from a C4 state.
- **C-state POPDOWN**
This item allows users to enable or disable Intel C-state POPDOWN function.
- **C-state POPUP**
This item allows users to enable or disable Intel C-state POPUP function.

3.5 Chipset Configuration

Select the Chipset tab from the MIO-5250 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section.

The Plug and Play BIOS Setup screen is shown below.

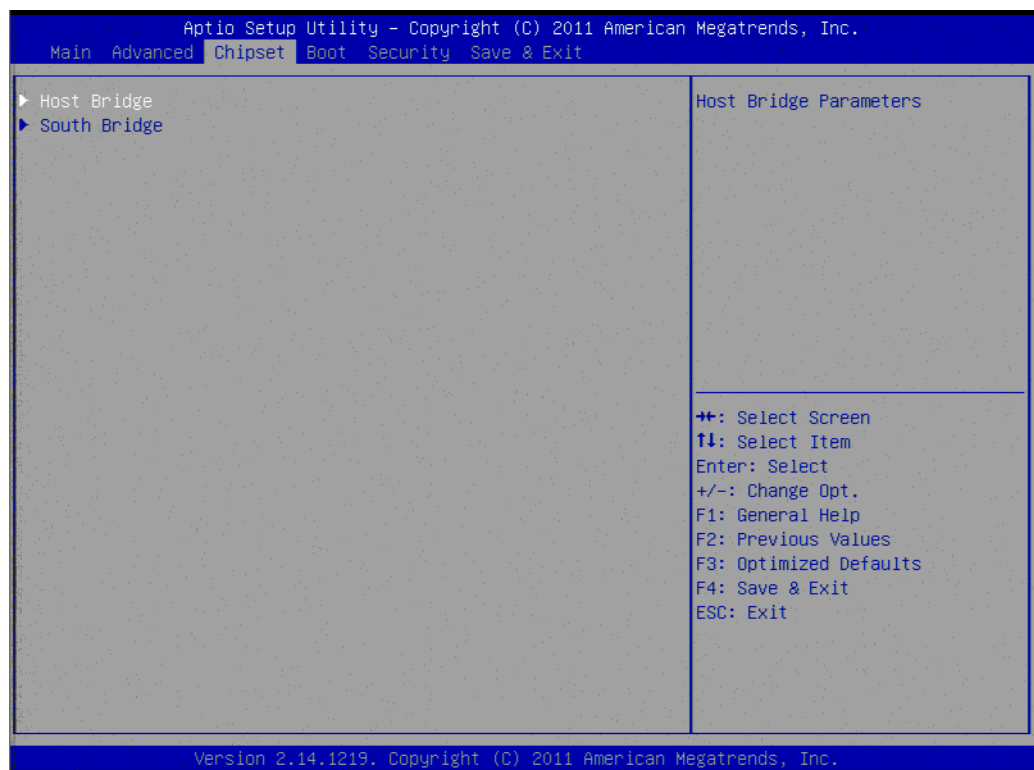


Figure 3.14 Chipset Setup

3.5.1 Host Bridge/Intel IGD Configuration

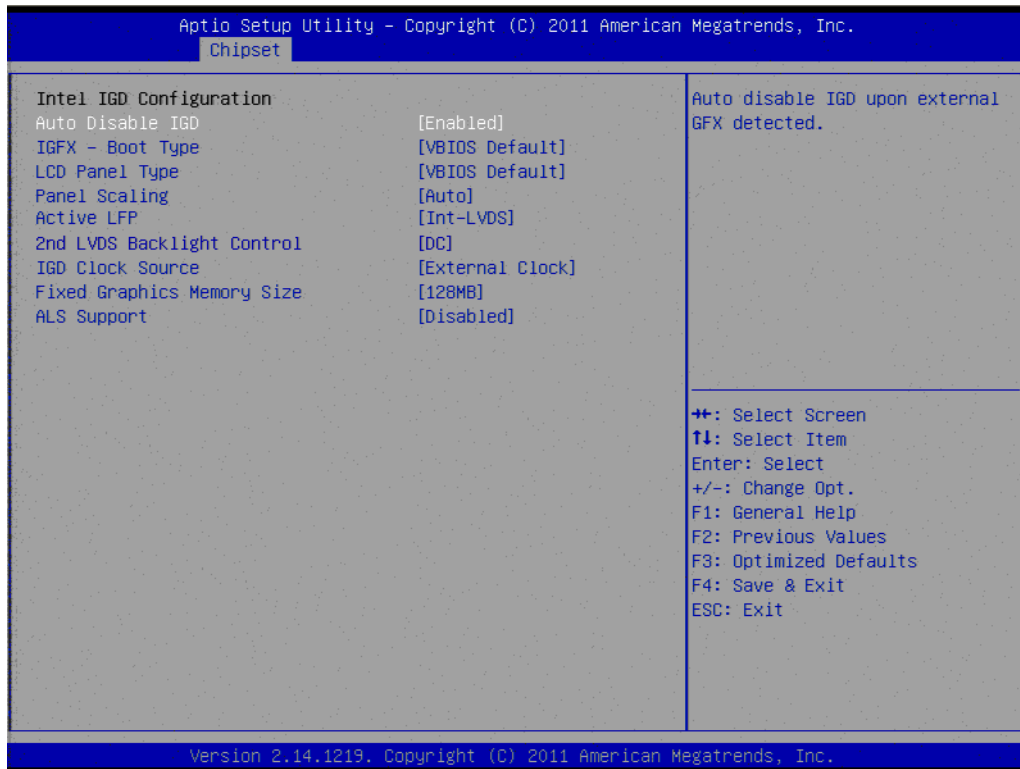


Figure 3.15 Intel IGD Configuration

- **Auto Disable IGD**
This item allows users to auto disable IGD upon external GFX detected.
- **IGFX - Boot Type***
This item allows users to select which output device during POST.
- **LCD Panel Type**
This item allows users to select LCD panel by internal graphic device.
- **Panel Scaling**
This item allows users to select LCD panel scaling by internal graphic device.
- **Active LFP***
This item allows users to select the active LFP configuration.
- **2nd LVDS Backlight Control**
This item allows users to select 2nd backlight control.
- **IGD Clock Source**
This item allows users to select IGD clock.
- **Fixed Graphics Memory Size**
This item allows users to configure fixed graphic memory size.
- **ALS Support**
This item allows users to select ASL support for ACPI.

*Since Intel Cedar Trail platform has some limitation on **Display Combination** (Refer to Boot Display Configuration on Intel® Atom™ Processor D2000 and N2000 Series (Cedar Trail Platform), Application Note 513764), the following selection items need to match with below table as display device attached.

Boot type display	Active_LFP	NOTE
CRT	#No_LVDS	
LFP(LVDS1)	#INT-LVDS	
EFP(HDMI)	#No_LVDS	It only supports Graphic Mode under DOS environment.
EFP1(LVDS2)	#LVDS 2	EFP1 will be item "built-in display" in driver device list
CRT+LFP	#INT-LVDS	Dual Display is only supported with Graphic Mode under DOS environment.
CRT+EFP	#No_LVDS	Dual Display is only supported with Graphic Mode under DOS environment.
CRT+EFP1	#LVDS 2	Dual Display is only supported with Graphic Mode under DOS environment.
LFP+EFP	#INT-LVDS	Dual Display is only supported with Graphic Mode under DOS environment.
EFP+EFP1	#LVDS 2	In BIOS setup menu, it only has display on EFP1. Dual Display is only supported with Graphic Mode under DOS environment.

3.5.2 South Bridge

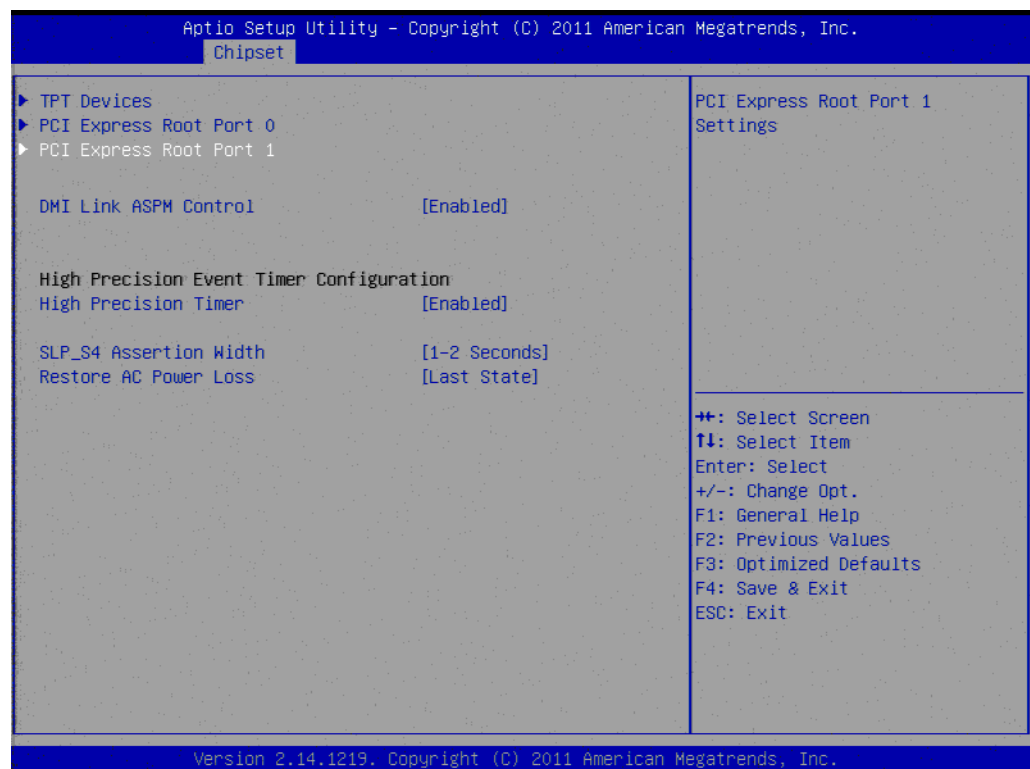


Figure 3.16 South Bridge

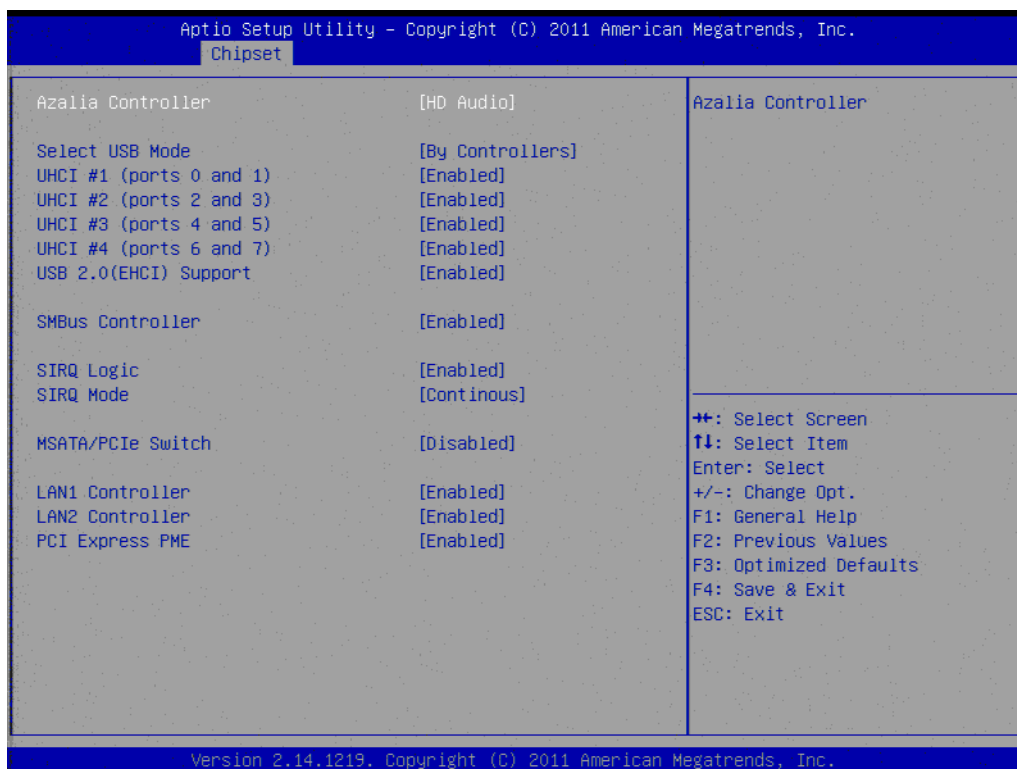


Figure 3.17 TPT Device

- **Azalia Controller**
Enables or disables the azalia controller.
- **Select USB Mode**
Select USB mode by controllers or ports.
- **SMBus Controller**
Enables or disables the onchip SMBus controller.
- **SIRQ Logic**
Enables or disables the SIRQ logic.
- **SIRQ Mode**
Set SIRQ mode.
- **MSATA/PCIe Switch**
Enables for MSATA disables for PCIe.
- **LAN1/LAN2 Controller**
This item allows users to enable or disable LAN device.
- **PCI Express PME**
This item allows users to enable or disable PCIe PME function.
- **PCI Express Root Port 0/1**
This item allows users to config PCIe port 0/1 settings.
- **DMI Link ASPM Control**
This item enable or disable control of active state power management on both NB and SB side of DMI link.
- **High Precision Timer**
Enables or disables the high precision timer.
- **SLP_S4 Assertion Width**
This item allows users to set a delay of sorts.
- **Restore AC Power Loss**

3.6 Boot Settings

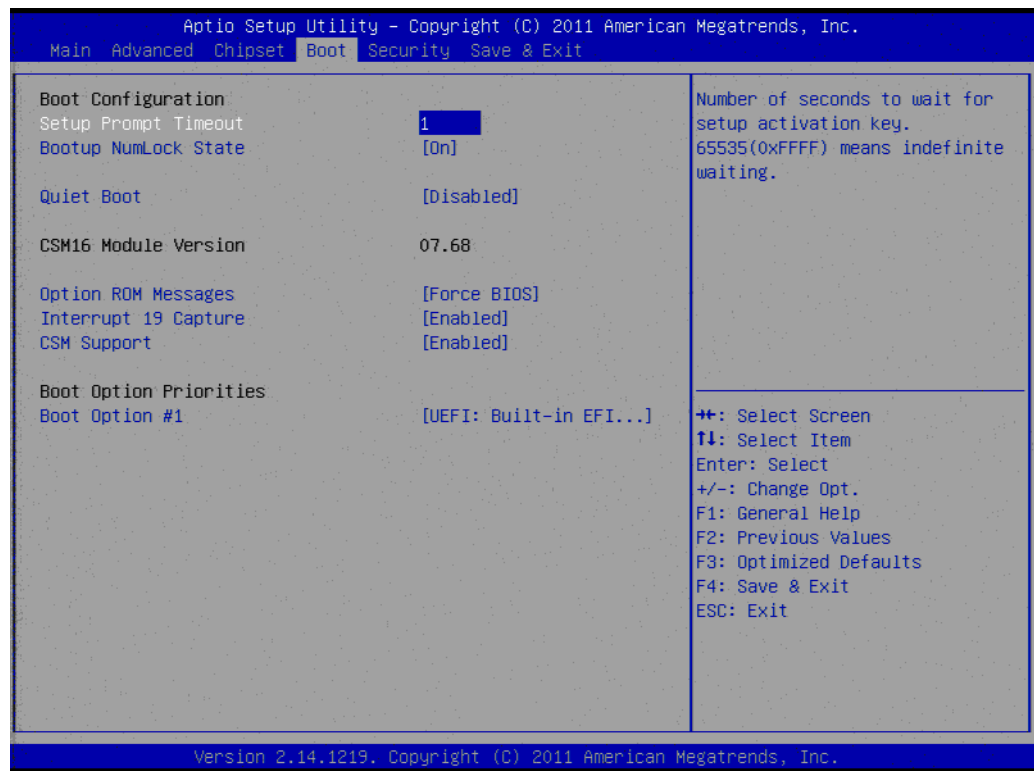


Figure 3.18 Boot Setup Utility

- **Setup Prompt Timeout**
This item allows users to select the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
Select the Power-on state for Numlock.
- **Quiet Boot**
If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Option ROM Message**
Set display mode for option ROM.
- **Interrupt 19 Capture**
This item allows option ROMs to trap interrupt 19.
- **1st/2nd/3rd/4th/5th/6th/7th Boot**
This item allows users to set boot device priority.

3.7 Security Setup

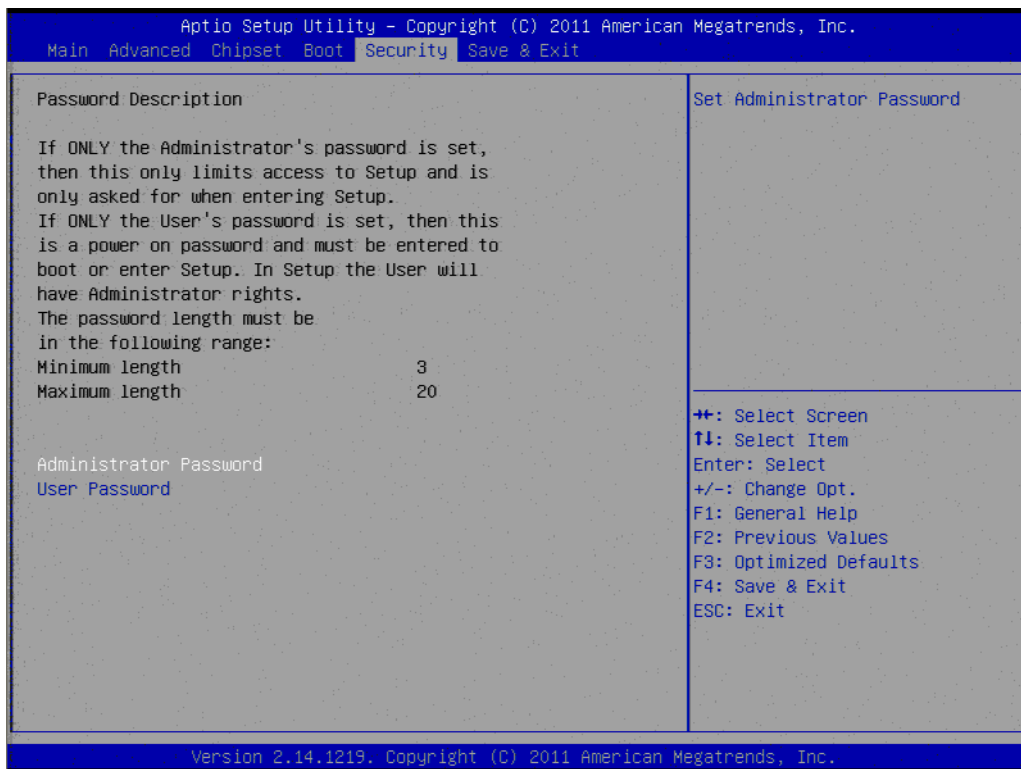


Figure 3.19 Password Configuration

Select Security Setup from the MIO-5250 setup main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>:

- **Change Administrator / User Password**
Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.8 Save & Exit

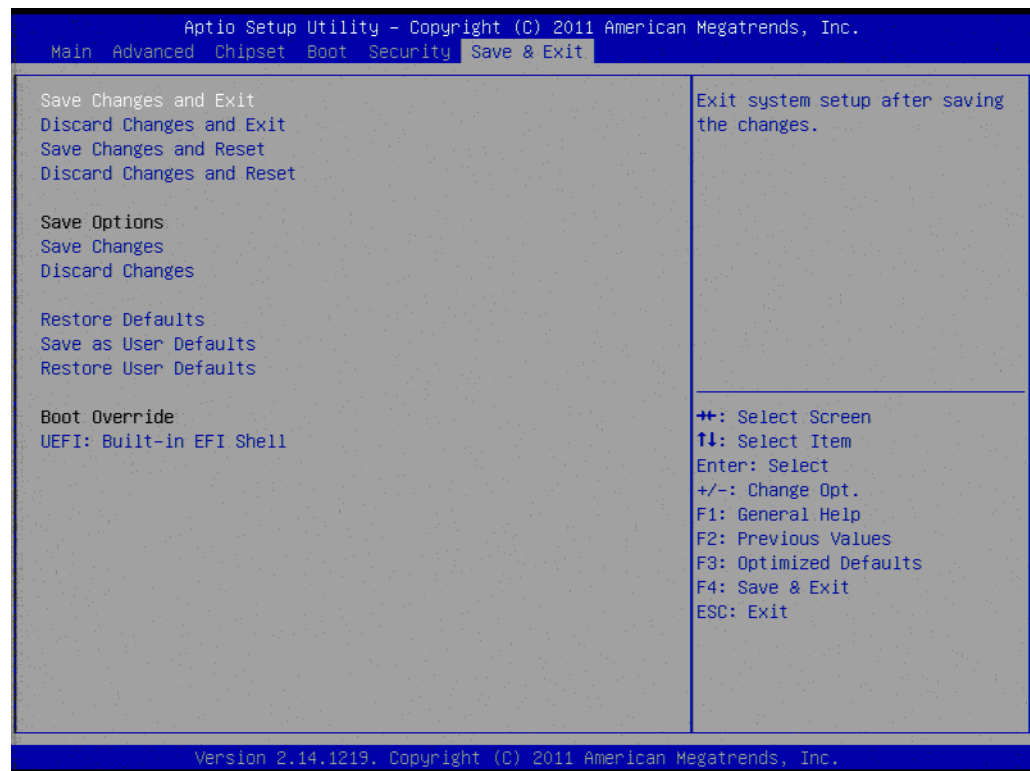


Figure 3.20 Save & Exit

3.8.1 Save Changes and Exit

When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer if necessary to take effect of all system configuration parameters.

3.8.2 Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

3.8.3 Save Changes and Reset

When users have completed system configuration, select this option to save changes, exit the BIOS setup menu and reboot the computer to take effect of all system configuration parameters.

3.8.4 Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer.

3.8.5 Save Changes

When users have completed system configuration, select this option to save changes without exiting the BIOS setup menu.

3.8.6 Discard Changes

Select this option to discard any current changes and load previous system configuration.

3.8.7 Restore Defaults

The MIO-5250 automatically configures all setup items to optimal settings when users select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if the user's computer is experiencing system configuration problems.

3.8.8 Save User Defaults

When users have completed system configuration, select this option to save changes as user defaults without exit BIOS setup menu.

3.8.9 Restore User Defaults

The users can select this option to restore user defaults.

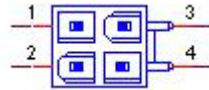
3.8.10 Boot Override

You select device you want to boot override.

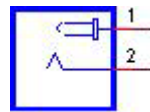
Appendix **A**

Pin Assignments

CN1	12V Power Input
Part Number	1655003865
Footprint	WF_2x2P_165_BOX_RA_D_740SP
Description	
Pin	Pin Name
1	GND
2	GND
3	+12V
4	+12V

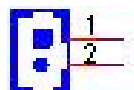


CN2	DC JACK
Part Number	1652005624
Footprint	PJ_2P_2DC-G213B200
Description	
Pin	Pin Name
1	+VIN
2	GND

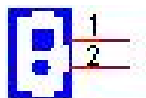


CN3	SODIMMDDR3RVS_204
Part Number	1651001648
Footprint	DDR3_204P_2-2013311-1
Description	
Pin	Pin Name

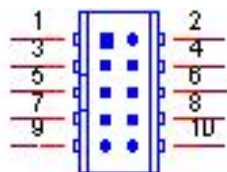
CN5	Power Switch
Part Number	1655302020
Footprint	WF_2P_79_BOX_R1_D
Description	
Pin	Pin Name
1	PSIN
2	GND



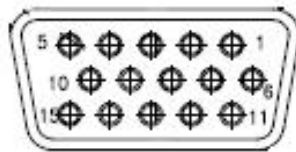
CN7	Reset
Part Number	1655302020
Footprint	WF_2P_79_BOX_R1_D
Description	WAFER BOX 2P 2.0mm 180D(M) DIP A2001WV2-2P
Pin	Pin Name
1	RESET#
2	GND



CN9	GPIO
Part Number	1653004099
Footprint	HD_5x2P_79_23N685B-10M10
Description	BOX HEADER 5x2P 2.00mm 180D(M) SMD 23N685B-10M10
Pin	Pin Name
1	+5V
2	GPIO4
3	GPIO0
4	GPIO5
5	GPIO1
6	GPIO6
7	GPIO2
8	GPIO7
9	GPIO3
10	GND

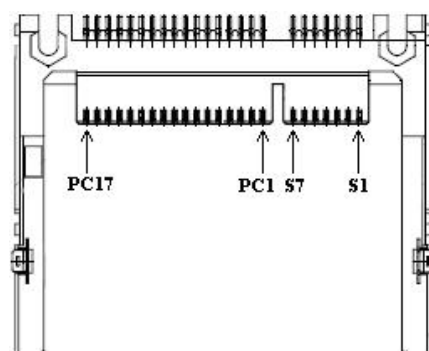


CN10	VGA
Part Number	1654000055
Footprint	DBVGA-VF5MS
Description	D-SUB Conn. 15P 90D(F) DIP 070242FR015S200ZU
Pin	Pin Name
1	RED
2	GREEN
3	BLUE
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	GND
11	NC
12	DDAT
13	HSYNC
14	VSYNC
15	DCLK

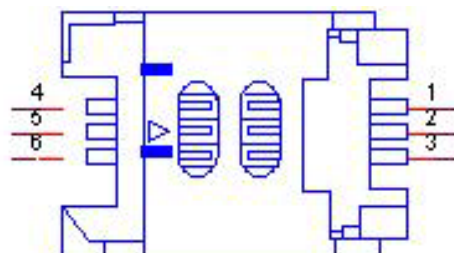


CN11	CFast
Part Number	1653004849
Footprint	CFAST_24P_N7G24
Description	CFast 24P 1.27mm 90D(M) SMD N7G24-A0B2RA-10-0HT-
Pin	Pin Name
PC1	CDI
PC2	GND
PC3	NC
PC4	NC
PC5	NC
PC6	NC
PC7	GND
PC8	NC
PC9	NC
PC10	NC
PC11	NC
PC12	NC

PC13	+3.3V
PC14	+3.3V
PC15	GND
PC16	GND
PC17	CDO
S1	GND
S2	TX+
S3	TX-
S4	GND
S5	RX-
S6	RX+
S7	GND

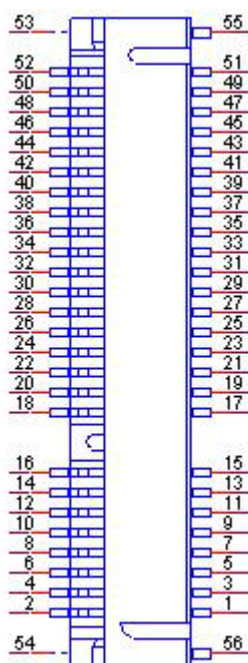


CN12	SIM
Part Number	1654000639
Footprint	SIM-WL608C
Description	SIM card conn 6p 90D(F)SMD WO/Pb WL608C3-M04-7F
Pin	Pin Name
1	UIM_PWR
2	UIM_RESET
3	UIM_CLK
4	GND
5	UIM_VPP
6	UIM_DATA

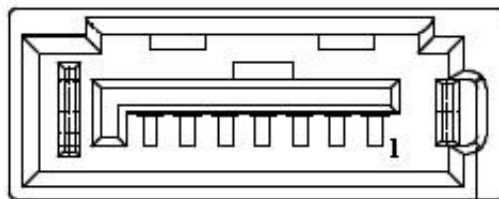


CN13	Mini PCIE
Part Number	1654006715
Footprint	MINIPCI_52P_88911-5204M
Description	
Pin	Pin Name
1	WAKE#
2	+3.3VSB
3	NC
4	GND
5	NC
6	+1.5V
7	MINI_CLKREQ#
8	+VUIM_PWR
9	GND
10	UIM_DATA
11	REFCLK-
12	UIM_CLK
13	REFCLK+
14	UIM_RESET
15	GND
16	+VUIM_VPP
17	NC
18	GND
19	NC
20	NC
21	GND
22	PERST#
23	PERn0
24	+3.3VSB
25	PERp0
26	GND
27	GND
28	+1.5V
29	GND
30	SMB_CLK
31	PETn0
32	SMB_DAT
33	PETp0
34	GND
35	GND
36	USB D-
37	GND
38	USB D+
39	+3.3VSB
40	GND
41	+3.3VSB
42	NC
43	GND

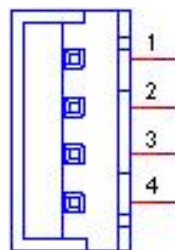
44	NC
45	NC
46	NC
47	NC
48	+1.5V
49	NC
50	GND
51	NC
52	+3.3VSB
H3	GND
H4	GND
H5	NC
H6	NC



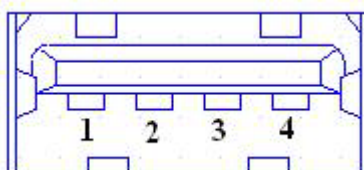
CN14	SATA
Part Number	1654004118
Footprint	SATA_7P_50_WATA-07DPLH4U
Description	Serial ATA 7P 1.27mm 90D(M) SMD WATA-07DPLH4U
Pin	Pin Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



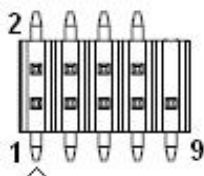
CN15	SATA Power
Part Number	1655001154
Footprint	WF_4P_98_BOX_R1_D
Description	WAFER BOX 4P 2.50mm 180D(M) DIP 24W1170-04S10-01
Pin	Pin Name
1	+5V
2	GND
3	GND
4	+12V



CN16	USB3/4
Part Number	1654009513
Footprint	USB_8P_UB1112C-8FDE-4F
Description	USB CONN. 8P 2.0mm 90D DIP UB1112C-8FDE-4F
Pin	Pin Name
1	+5V
2	D-
3	D+
4	GND

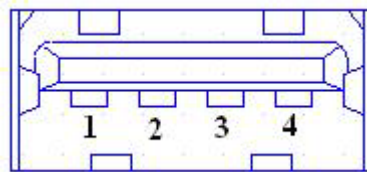


CN17	Internal USB
Part Number	1653005260
Footprint	HD_5x2P_79_N10
Description	PIN HEADER 2x5P 2.0mm 180D(M) SMD 21N22050
Pin	Pin Name
1	+5V
2	+5V
3	A_D-
4	B_D-
5	A_D+
6	B_D+
7	GND
8	GND
9	GND

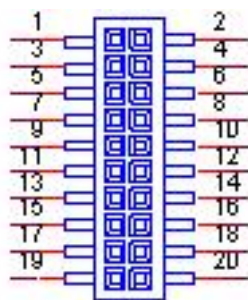


Matching Cable: 1703100260 1703100121

CN18	USB 1/2
Part Number	1654009513
Footprint	USB_8P_UB1112C-8FDE-4F
Description	USB CONN. 8P 2.0mm 90D DIP UB1112C-8FDE-4F
Pin	Pin Name
1	+5V
2	D-
3	D+
4	GND

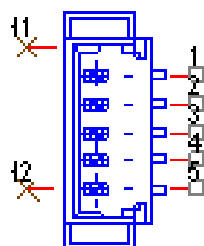


CN19	COM1/COM2 RS-232
Part Number	1653004793
Footprint	HD_10x2P_79_23N685B-20M10
Description	BOX HEADER 10x2P 2.0mm 180D(M)SMD 23N685B-20M10B
Pin	Pin Name
1	DCD1#
2	DSR1#
3	RXD1
4	RTS1#
5	TXD1
6	CTS1#
7	DTR1#
8	RI1#
9	GND
10	GND
11	DCD2#
12	DSR2#
13	RXD2
14	RTS2#
15	TXD2
16	CTS2#
17	DTR2#
18	RI2#
19	GND
20	GND



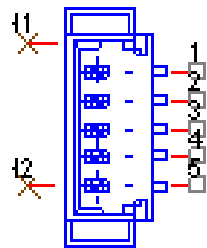
Matching Cable: 1701200220

CN20	RS422/485 1
Part Number	1655304032
Footprint	WF_5P_49_BOX_85205
Description	WAFER 5P 1.25mm 180D(M) SMD 85205-05701
Pin	Pin Name
1	422RX-
2	422RX+
3	422/485TX+
4	422/485TX-
5	GND



WB_5V_1.25mm

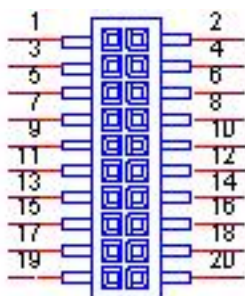
CN22	RS422/485 2
Part Number	1655304032
Footprint	WF_5P_49_BOX_85205
Description	WAFER 5P 1.25mm 180D(M) SMD 85205-05701
Pin	Pin Name
1	422RX-
2	422RX+
3	422/485TX+
4	422/485TX-
5	GND



WB_5V_1.25mm

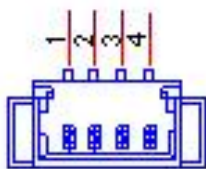
CN24	COM3/COM4 RS-232
Part Number	1653004793
Footprint	HD_10x2P_79_23N685B-20M10
Description	BOX HEADER 10x2P 2.0mm 180D(M)SMD 23N685B-20M10B
Pin	Pin Name
1	DCD3#
2	DSR3#
3	RXD3
4	RTS3#
5	TXD3
6	CTS3#
7	DTR3#
8	RI3#
9	GND
10	GND
11	DCD4#
12	DSR4#
13	RXD4
14	RTS4#
15	TXD4
16	CTS4#
17	DTR4#
18	RI4#
19	GND

20	GND
----	-----

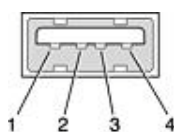


Matching Cable: 1701200220

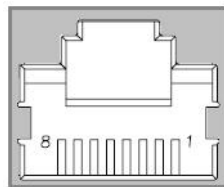
CN25	SMBus
Part Number	1655904020
Footprint	FPC4V-125M
Description	WAFER 4P 1.25mm 180D(M) SMD 85205-04001
Pin	Pin Name
1	GND
2	SMB_DAT
3	SMB_CLK
4	+5V



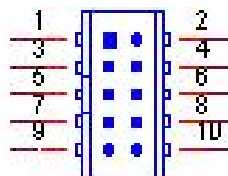
CN26	System FAN
Part Number	1655003010
Footprint	WHP3VA
Description	Wafer 2.54mm 3P 180D(M) DIP W/LOCK 22-27-2031
Pin	Pin Name
1	GND
2	+12V
3	Speed



CN28	LAN
Part Number	1652003274
Footprint	RJ45_28P_RTB-19GB9J1A
Description	PHONE JACK RJ45 28P DIP RTB-19GB9J1A
Pin	Pin Name
1	TX+(10/100), BI_DA+(GHz)
2	TX-(10/100), BI_DA-(GHz)
3	RX+(10/100), BI_DB+(GHz)
4	BI_DC+(GHz)
5	BI_DC-(GHz)
6	RX-(10/100), BI_DB-(GHz)
7	BI_DD+(GHz)
8	BI_DD-(GHz)



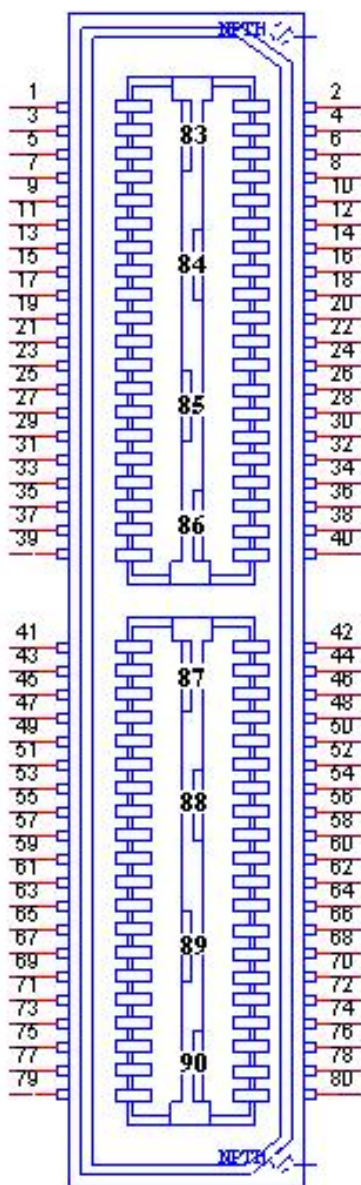
CN30	Audio
Part Number	1653004099
Footprint	HD_5x2P_79_23N685B-10M10
Description	BOX HEADER 5x2P 2.00mm 180D(M) SMD 23N685B-10M10
Pin	Pin Name
1	LOUTR
2	LINR
3	GND
4	GND
5	LOUTL
6	LINL
7	GND
8	GND
9	MIC1R
10	MIC1L



Matching Cable: 1703100152

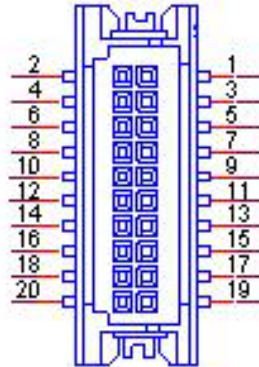
CN31		MIOe	
Part Number	1654006235		
Footprint	BB_40x2P_32_1625x285_2HOLD		
Description			
Pin	Pin Name		
1	GND		
2	GND		
3	PCIE_RX0+		
4	PCIE_TX0+		
5	PCIE_RX0-		
6	PCIE_TX0-		
7	GND		
8	GND		
9	PCIE_RX1+		
10	PCIE_TX1+		
11	PCIE_RX1-		
12	PCIE_TX1-		
13	GND		
14	GND		
15	PCIE_RX2+		
16	PCIE_TX2+		
17	PCIE_RX2-		
18	PCIE_TX2-		
19	GND		
20	GND		
21	PCIE_RX3+		
22	PCIE_TX3+		
23	PCIE_RX3-		
24	PCIE_TX3-		
25	GND		
26	GND		
27	PCIE_CLK+		
28	LOUTL		
29	PCIE_CLK-		
30	LOUTR		
31	GND		
32	AGND		
33	SMB_CLK		
34	NC		
35	SMB_DAT		
36	NC		
37	PCIE_WAKE#		
38	NC		
39	RESET#		
40	NC		
41	SLP_S3#		

42	CLK33M
43	SLP_S5#
44	LPC_AD0
45	DDP_HPD
46	LPC_AD1
47	GND
48	LPC_AD2
49	DDP_AUX+
50	LPC_AD3
51	DDP_AUX-
52	LPC_DRQ#0
53	GND
54	LPC_SERIRQ
55	DDP_D0+
56	LPC_FRAME#
57	DDP_D0-
58	GND
59	GND
60	USB0_D+
61	DDP_D1+
62	USB0_D-
63	DDP_D1-
64	GND
65	GND
66	USB1_D+/USB_SSTX+
67	DDP_D2+
68	USB1_D-/USB_SSTX-
69	DDP_D2-
70	GND
71	GND
72	USB2_D+/USB_SSRX+
73	DDP_D3+
74	USB2_D-/USB_SSRX-
75	DDP_D3-
76	GND
77	GND
78	USB_OC#
79	+12VSB
80	NC
83	GND
84	GND
85	GND
86	GND
87	+5VSB
88	+5VSB
89	+5VSB
90	+5VSB

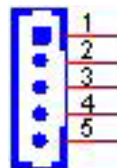


CN33	24 bits LVDS1 Panel
Part Number	1653910261
Footprint	SPH10X2
Description	B/B Conn 10x2P 1.25mm 180D(M)SMD DF13-20DP-1.25V
Pin	Pin Name
1	GND
2	GND
3	LVDS0_D0+
4	NC
5	LVDS0_D0-
6	NC
7	LVDS0_D1+
8	NC
9	LVDS0_D1-
10	NC
11	LVDS0_D2+

12	NC
13	LVDS0_D2-
14	NC
15	LVDS0_CLK+
16	LVDS0_D3+
17	LVDS0_CLK-
18	LVDS0_D3-
19	+5V or +3.3V
20	+5V or +3.3V

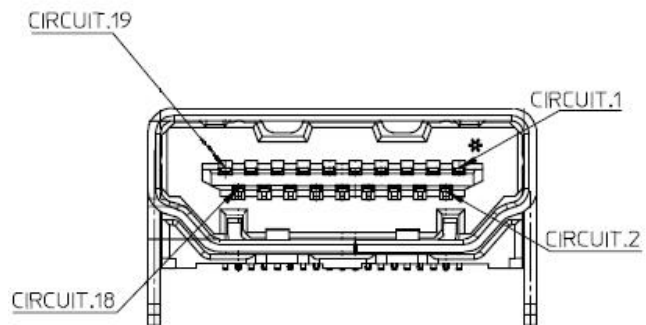


CN34	48 bits LVDS2 Inverter Power
Part Number	1655000453
Footprint	WHL5V-2M-24W1140
Description	WAFER BOX 2.0mm 5P 180D(M) DIP WO/Pb JIH VEI
Pin	Pin Name
1	+12V
2	GND
3	ENABKL
4	VBR
5	+5V

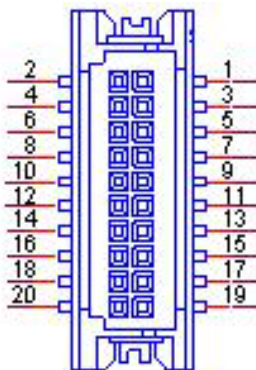


CN35	48 bits LVDS2 Panel
Part Number	1653920200
Footprint	SPH20X2
Description	B/B Conn. 40P 1.25mm 90D SMD DF13-40DP-1.25V(91)
Pin	Pin Name
1	+5V or +3.3V
2	+5V or +3.3V
3	GND
4	GND
5	+5V or +3.3V
6	+5V or +3.3V
7	LVDS0_D0-
8	LVDS1_D0-
9	LVDS0_D0+
10	LVDS1_D0+
11	GND
12	GND
13	LVDS0_D1-
14	LVDS1_D1-
15	LVDS0_D1+
16	LVDS1_D1+
17	GND
18	GND
19	LVDS0_D2-
20	LVDS1_D2-
21	LVDS0_D2+
22	LVDS1_D2+
23	GND
24	GND
25	LVDS0_CLK-
26	LVDS1_CLK-
27	LVDS0_CLK+
28	LVDS1_CLK+
29	GND
30	GND
31	NC
32	NC
33	GND
34	GND
35	LVDS0_D3-
36	LVDS1_D3-
37	LVDS0_D3+
38	LVDS1_D3+
39	NC
40	NC

CN36	HDMI
Part Number	1654009225
Footprint	HDMI_19P_QJ51193-FFD4-7F
Description	HDMI Conn 19P 0.5mm 90D(M) SMD QJ51193-FFB4-7F
Pin	Pin Name
1	TMDS Data2+
2	TMDS Data2 Shield
3	TMDS Data2@C
4	TMDS Data1+
5	TMDS Data1 Shield
6	TMDS Data1@C
7	TMDS Data0+
8	TMDS Data0 Shield
9	TMDS Data0@C
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock@C
13	Reserved
14	Reserved
15	SCL
16	SDA
17	DDC Ground
18	+5V Power
19	Hot Plug Detect



CN37		eDP	
Part Number	1653910261		
Footprint	SPH10X2		
Description	B/B Conn 10x2P 1.25mm 180D(M)SMD DF13-20DP-1.25V		
Pin		Pin Name	
1		GND	
2		GND	
3		D0-	
4		D3-	
5		D0+	
6		D3+	
7		GND	
8		NC	
9		D1-	
10		GND	
11		D1+	
12		SDAT	
13		GND	
14		SCLK	
15		D2-	
16		GND	
17		D2+	
18		Hot Plug Detect	
19		+5V or +3.3V	
20		+5V or +3.3V	



CN38	24 bits LVDS1 Inverter Power
Part Number	1655000453
Footprint	WHL5V-2M-24W1140
Description	WAFER BOX 2.0mm 5P 180D(M) DIP WO/Pb JIH VEI
Pin	Pin Name
1	+12V
2	GND
3	ENABKL
4	VBR
5	+5V



Appendix **B**

System Assignments

B.1 System I/O Ports

Table B.1: System I/O Ports

Addr. Range (Hex)	Device
000-01F	DMA Controller
20h-2Dh	Interrupt Controller
50h-52h	Timer/Counter
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI)mask
080-09F	DMA page register
0A0-0BF	0A0-0BF
0C0-0DF	DMA controller
170h-177h	IDE Controller
1F0h-1F7h	IDE Controller
299h-29Ah	EC HM Index port and Data port
29Ch-29Dh	EC Index port and Data port
2E8-2EF	Communications Port (COM4)
2F8-2FF	Communications Port (COM2)
3E8-3EF	Communications Port (COM3)
3F8-3FF	Communications Port (COM1)
0400 - 04FF	Motherboard resources
0500 - 053F	Motherboard resources

B.2 DMA Channel assignments

Table B.2: DMA Channel assignments

Channel	Function
0	Available
1	Available
2	Available
3	Available
4	Direct memory access controller
5	Available
6	Available
7	Available

B.3 1st MB memory map

Table B.3: 1st MB memory map

Addr. Range (Hex)	Device
E0000h - FFFFFh	System board
D0000h - DFFFFh	PCI Bus
C0000h - CFFFFh	System board
A0000h - BFFFFh	PCI Bus
A0000h - BFFFFh	Intel® HD Graphic
00000h - 9FFFFh	System board

B.4 Interrupt assignments

Table B.4: Interrupt assignments

Interrupt#	Interrupt source
NMI	Parity error detected
IRQ0	System timer
IRQ1	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ2	Interrupt from controller 2 (cascade)
IRQ3	Communications Port (COM2)
IRQ4	Communications Port (COM1)
IRQ5	EC Watch DOG
IRQ6	Available
IRQ7	Communications Port (COM3)
IRQ8	System CMOS/real time clock
IRQ9	Microsoft ACPI-Compliant System
IRQ10	Available
IRQ11	Communications Port (COM4)
IRQ12	PS/2 Compatible Mouse
IRQ13	Numeric data processor
IRQ14	Primary IDE
IRQ15	Secondary IDE

Appendix **C**

Watchdog Timer
Sample Code

C.1 EC Watchdog Timer sample code

```
EC_Command_Port = 0x29Ah
EC_Data_Port = 0x299h
Write EC HW ram = 0x89
Watch dog event flag = 0x57
Watchdog reset delay time = 0x5E (high byte), 0x5F (low byte)
Reset event = 0x04
Start WDT function = 0x28
Stop WDT function = 0x29
Reset WDT function = 0x2A
```

```
=====
.model small
.486p
.stack 256
.data
.code
org 100h
.STARTUp

mov dx, EC_Command_Port
mov al,89h ; Write EC HW ram.
out dx,al

mov dx, EC_Data_Port
mov al, 5Fh ; Watchdog reset delay time low byte (5Eh is high byte) index, Time-
base: 100ms
out dx,al

mov dx, EC_Data_Port
mov al, 64h ;Set 10 seconds delay time.
out dx,al

mov dx, EC_Command_Port
mov al,89h ; Write EC HW ram.
out dx,al

mov dx, EC_Data_Port
mov al, 57h ; Watch dog event flag.
out dx,al

mov dx, EC_Data_Port
mov al, 04h ; Reset event.
out dx,al

mov dx, EC_Command_Port
mov al,28h ; start WDT function. (Stop: 0x29, Reset: 0x2A)
out dx,al
```

```
.exit  
END
```

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