Contents

Chapter 1: Product Introduction

Overview

Key Features

- Onboard Intel® Celeron® processor J1900 quad core, 2.42GHz
- Dual independent display from DVI-I and HDMI
- 2 x Intel® I210AT GbE LAN ports; support WoL, teaming and PXE
- 2 x USB 2.0, 1 x USB 3.0
- 4 x COM ports (COM1 & COM2 with RS232/422/485, jumper-free setting)
- 1 x Optional interface for optional Wi-Fi/3.5G
- Support -5 to 55 degrees Celsius operating temperature
- Support 9-30VDC input

Hardware Specifications

CPU Support

- Onboard Intel® Celeron® processor J1900 quad core, 2.42GHz

Main Memory

- 1 x DDR3L SO-DIMM socket, supports DDR3L 1066/1333 8GB RAM max., un-buffered and non-ECC

Display Option

- Dual independent display
  - HDMI and DVI-D
  - HDMI and VGA (via DVI-I to VGA converter)

I/O Interface - Front

- ATX power on/off switch
- 1 x Power status/1 x HDD access/1 x battery low/1 x programming LEDs
- 2 x Intel® I210AT GbE LAN ports; support WoL, teaming and PXE
- 1 x HDMI
- 1 x USB 3.0 (900mA per each)
- 2 x USB 2.0 (500mA per each)
- 1 x DB9 for COM1, supports RS232/422/485 with auto flow control
  - Jumper-free setting on RS232/422/485
- 1 x 2-pin DC input, supports +9 to 30VDC input

I/O Interface - Rear

- 1 x Remote power on/off switch
- DVI-I display output
- 1 x DB9 for COM2, supports RS232/422/485 with auto flow control
  - Jumper-free setting on RS232/422/485
- 2 x DB9 for COM3 & COM4, support RS232 only
- 1 x Mic-in & 1 x Line-out
- 2 x Antenna holes for optional Wi-Fi/3.5G antenna
- 1 x Optional I/F for optional mini-PCIe Wi-Fi/3.5G

I/O Interface - Internal

- 4 x GPI and 4 GPO (5V, TTL type)

Storage Device

- 1 x M.2 supports B & B+M key module
- 1 x 2.5" HDD (SATA 2.0)

Expansion Slot

- 1 x mini-PCIe socket for optional Wi-Fi/3.5G

Power Requirements

- Power input: +9VDC to +30VDC
- 1 x Optional 24V, 60W power adapter

Support OS

- Windows 7, 32-bit/64-bit
- Windows Embedded Standard 7, 32-bit/64-bit
- Windows Embedded Compact 7, 32-bit
- Windows 10 IoT Enterprise, 64-bit
- Linux Kernel version 3.8.0

Dimensions

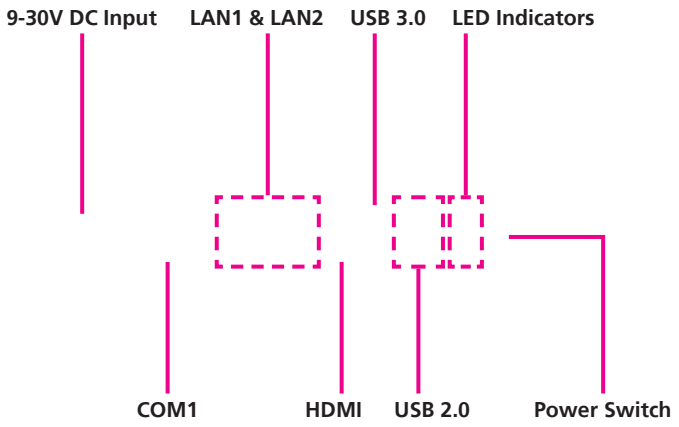
- 185mm (W) x 131mm (D) x 54mm (H) without wall-mount bracket

Construction

- Aluminum and metal chassis with fanless design

Environment

- Operating temperature
  Ambient with air flow: -5°C to 55°C
  (according to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14)
- Storage temperature: -30°C to 85°C
- Relative humidity: 10% to 95% (non-condensing)
- Shock protection
  - HDD: 20G, half sine, 11ms, IEC60068-2-27
  - M.2: 50G, half sine, 11ms, IEC60068-2-27
- Vibration protection w/HDD condition
  - Random: 0.5Grms @ 5~500Hz, IEC60068-2-64
  - Sinusoidal: 0.5Grms @ 5~500Hz, IEC60068-2-6
- Vibration protection w/M.2 & SSD condition
  - Random: 2Grms @ 5~500Hz, IEC60068-2-64
  - Sinusoidal: 2Grms @ 5~500Hz, IEC60068-2-6



9-30V DC Input

Used to plug a DC power cord.

COM1

DB9 port used to connect RS232/422/485 compatible devices.

LAN1 & LAN2

Used to connect the system to a local area network.

HDMI Port

Used to connect a high-definition display.

USB 3.0 & USB 2.0

Used to connect the system with USB 3.0/2.0 devices.

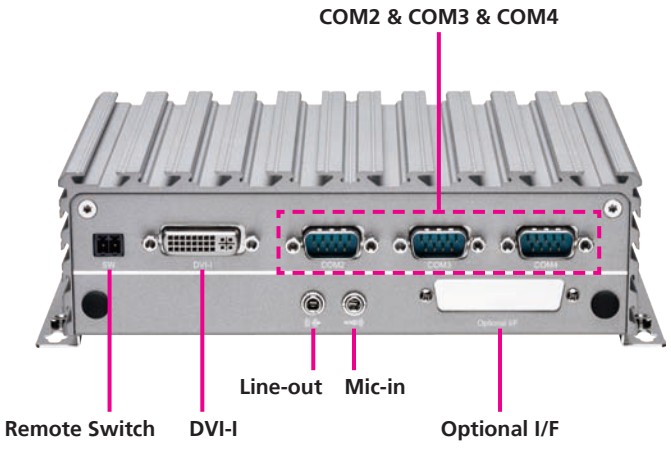
LED Indicators

Indicates the power status, RTC battery status, storage activity and GPO activity of the system.

Power Switch

Press to power-on or power-off the system.

Rear Panel



Remote Switch

Used to connect a remote to power on/off the system.

DVI-I

Used to connect a DVI-I interface monitor.

Line-out

Used to connect a headphone or a speaker.

Mic-in

Used to connect an external microphone.

COM2

DB9 port used to connect RS232/422/485 compatible devices.

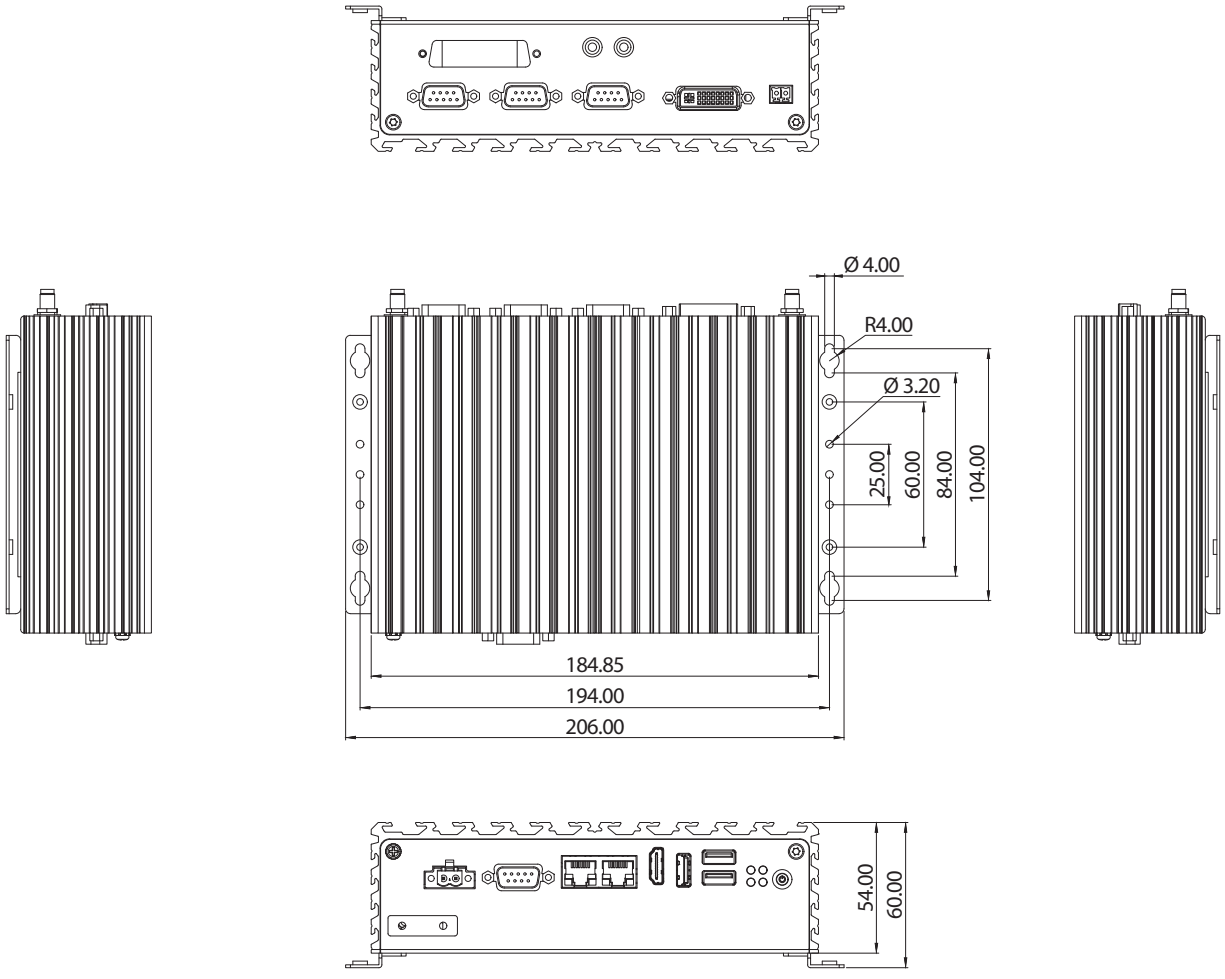
COM3 & COM4

Two DB9 ports used to connect RS232 compatible devices.

Optional I/F

Expansion slot for optional function output or module interface use.

Mechanical Dimensions



Chapter 2: Jumpers and Connectors

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environments tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

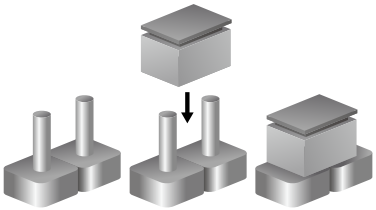
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

Jumper Settings

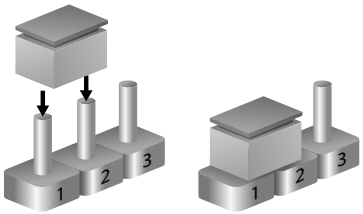
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

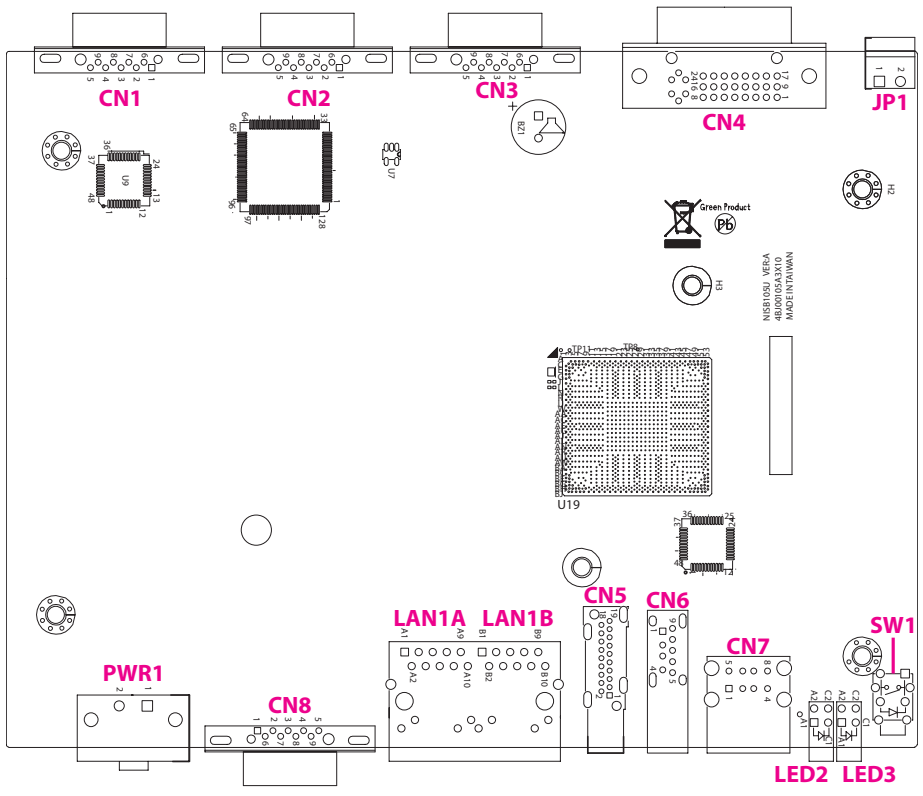
Two-Pin Jumpers: Open (Left) and Short (Right)



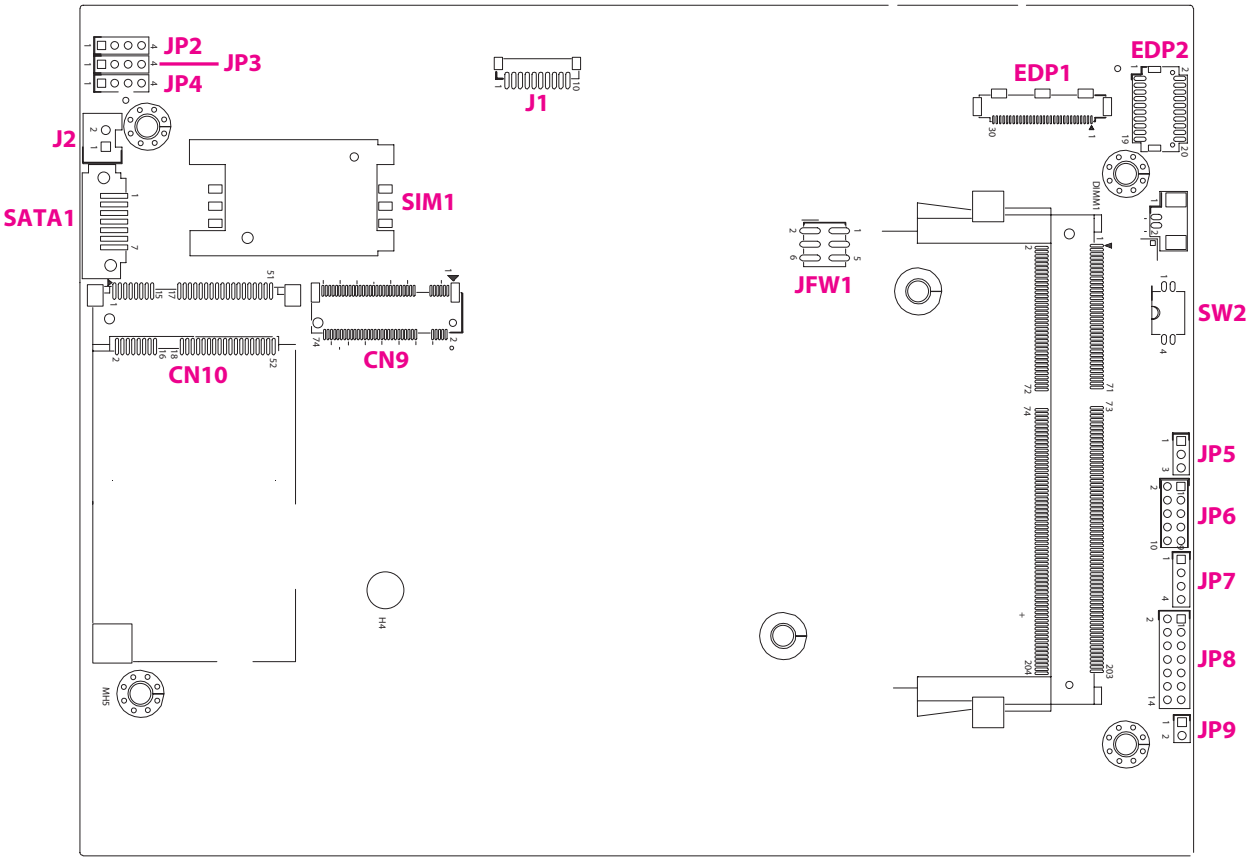
Three-Pin Jumpers: Pins 1 and 2 are Short



Top View


CN1
CN2
CN3
CN4
JP1
Green Product
Pb
H1
H2
U19
CN5
CN6
CN7
SW1
LAN1A
LAN1B
PWR1
CN8
LED2
LED3

Bottom View


JP2
JP3
JP4
J2
SATA1
SIM1
J1
EDP1
EDP2
JFW1
SW2
CN10
CN9
JP5
JP6
JP7
JP8
JP9

Jumpers and DIP Switches

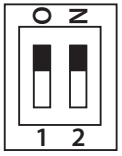
AT/ATX Pin Header

Connector type: 1x3 3-pin header, 2.0mm pitch
Connector location: JP5

Pin	Function
1-2	AT
2-3*	ATX

RTC Switch (Default All Off)

Connector type: 2x2 DIP switch
Connector location: SW2



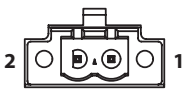
Pin	Function
1	SRTC_TEST#
2	RTC_TEST#
3	GND
4	GND

Connector Pin Definitions

External I/O Interfaces - Front Panel

9V – 30V DC Power Input

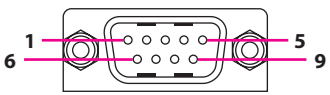
Connector type: 2-pin terminal block
Connector location: PWR1



Pin	Definition
1	VIN_1_GND
2	VIN_1

COM1 Port

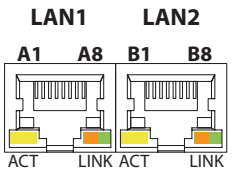
Connector type: DB-9 port, 9-pin D-Sub
Connector location: CN8



RS232		RS485		RS422	
Pin	Definition	Pin	Definition	Pin	Definition
1	SP1_DCD	1	SP1_DATA-	1	SP1_TX-
2	SP1_RXD	2	SP1_DATA+	2	SP1_TX+
3	SP1_TXD	3	NC	3	SP1_RX+
4	SP1_DTR	4	NC	4	SP1_RX-
5	GND	5	GND	5	GND
6	SP1_DSR	6	NC	6	SP1_RTS-
7	SP1_RTS	7	NC	7	SP1_RTS+
8	SP1_CTS	8	NC	8	SP1_CTS+
9	SP1_RI	9	NC	9	SP1_CTS-

LAN1 and LAN2 Ports

Connector type: Dual RJ45 port with LEDs
Connector location: LAN1A (LAN1) and LAN1B (LAN2)



Act	Status
Flashing Yellow	Data activity
Off	No activity

Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	No link

LAN1

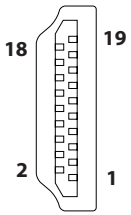
Pin	Definition	Pin	Definition
A1	LAN1_MDI0P	A2	LAN1_MDI0N
A3	LAN1_MDI1P	A4	LAN1_MDI1N
A5	LAN1_MDI2P	A6	LAN1_MDI2N
A7	LAN1_MDI3P	A8	LAN1_MDI3N
A9	V1P5_LAN	A10	GND
A11	LAN1_LINK100#	A12	LAN1_LINK1G#
A13	LAN1_LED_ACT#	A14	3VSB
MH1	CHASSIS_GND		

LAN2

Pin	Definition	Pin	Definition
B1	LAN2_MDI0P	B2	LAN2_MDI0N
B3	LAN2_MDI1P	B4	LAN2_MDI1N
B5	LAN2_MDI2P	B6	LAN2_MDI2N
B7	LAN2_MDI3P	B8	LAN2_MDI3N
B9	V1P5_LAN2	B10	GND
B11	LAN2_LINK100#	B12	LAN2_LINK1G#
B13	LAN2_LED_ACT#	B14	3VSB
MH2	CHASSIS_GND		

HDMI

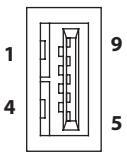
Connector type: HDMI port
Connector location: CN5



Pin	Definition	Pin	Definition
1	HDMI_DATA2_P	2	GND
3	HDMI_DATA2_N	4	HDMI_DATA1_P
5	GND	6	HDMI_DATA1_N
7	HDMI_DATA0_P	8	GND
9	HDMI_DATA0_N	10	HDMI_CLK_P
11	GND	12	HDMI_CLK_N
13	NC	14	NC
15	HDMI_CTRL_CLK	16	HDMI_CTRL_DATA
17	GND	18	VCC5_HDMI
19	HDMI_HPD_R		
MH1	CHASSIS_GND	MH2	CHASSIS_GND
MH3	CHASSIS_GND	MH4	CHASSIS_GND

USB 3.0 Port

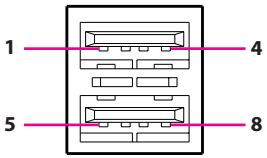
Connector type: USB 3.0 port, Type A
Connector location: CN6



Pin	Definition	Pin	Definition
1	USB3_5V	2	HUBUSB_DM1_C
3	HUBUSB_DP1_C	4	GND
5	USB3_RX0_N_C	6	USB3_RX0_P_C
7	GND	8	USB3_TX0_N_C
9	USB3_TX0_P_C	10	P5V_OC01_C
11	USB_1N_C	12	USB_1P_C
13	GND		
MH1	FRONT_GND	MH2	FRONT_GND
MH3	FRONT_GND	MH4	NC

Dual USB 2.0 Port

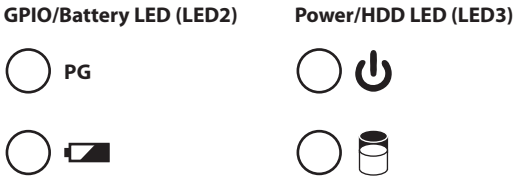
Connector type: USB 2.0 ports, Type A
Connector location: CN7



Pin	Definition	Pin	Definition
1	USB2_5V	2	USB_0N_C
3	USB_0P_C	4	GND
5	USB2_5V	6	USB_1N_C
7	USB_1P_C	8	GND
MH1	FRONT_GND	MH2	FRONT_GND
MH3	FRONT_GND	MH4	FRONT_GND

LED Indicators

Connector location: LED2 and LED3



LED2

Pin	Definition
A1	VCC5
A2	BAT_LED
C1	GND
C2	GPIO_LED_N

LED3

Pin	Definition
A1	VCC5
A2	VCC5
C1	HDD_LED_N
C2	PWR_LED_N

Power Switch

Connector location: SW1

Pin	Definition	Pin	Definition
1	GND	2	3VSB
3	3VSB	4	GND
A1	PWRLED_N	C1	PWRLED_P
MH1	NC	MH2	NC

External I/O Interfaces - Rear Panel

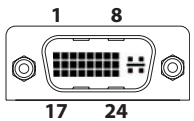
Remote Power Button

Connector type: 2-pin switch
Connector location: JP1

Pin	Definition
1	GND
2	REMO_PWRBTN#

DVI-I Connector

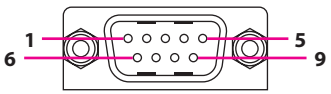
Connector type: 24-pin D-Sub, 2.0mm-M-180 (DVI)
Connector location: CN4



Pin	Definition	Pin	Definition
1	TX2-	2	TX2+
3	GND	4	NC
5	NC	6	DDC_CLK
7	DDC_DATA	8	VSYNC_VGA
9	TX1-	10	TX1+
11	GND	12	NC
13	NC	14	DVI_VCC(+5V)
15	GND	16	HotPlugDet
17	TX0-	18	TX0+
19	GND	20	DDCCLK_VGA
21	DDCDATA_VGA	22	GND
23	TXCLK+	24	TXCLK-
C1	RED	C2	GREEN
C3	BLUE	C4	HSYNC_VGA
C5A	VGADET	C5B	GND
MH1	CHASSIS_GND	MH2	CHASSIS_GND

COM2 Port

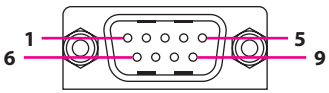
Connector type: DB-9 port, 9-pin D-Sub
Connector location: CN3



RS232		RS485		RS422	
Pin	**Definition**	**Pin**	**Definition**	**Pin**	**Definition**
1	SP2_DCD	1	SP2_DATA-	1	SP2_TX-
2	SP2_RXD	2	SP2_DATA+	2	SP2_TX+
3	SP2_TXD	3	NC	3	SP2_RX+
4	SP2_DTR	4	NC	4	SP2_RX-
5	GND	5	GND	5	GND
6	SP2_DSR	6	NC	6	SP2_RTS-
7	SP2_RTS	7	NC	7	SP2_RTS+
8	SP2_CTS	8	NC	8	SP2_CTS+
9	SP2_RI	9	NC	9	SP2_CTS-

COM3 Port

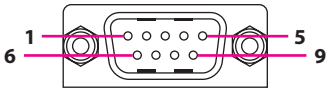
Connector type: DB-9 port, 9-pin D-Sub
Connector location: CN2



RS232			
Pin	**Definition**	**Pin**	**Definition**
1	SP3_DCD	2	SP3_RXD
3	SP3_TXD	4	SP3_DTR
5	GND	6	SP3_DSR
7	SP3_RTS	8	SP3_CTS
9	SP3_RI		

COM4 Port

Connector type: DB-9 port, 9-pin D-Sub
Connector location: CN1

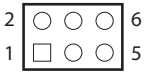


RS232			
Pin	**Definition**	**Pin**	**Definition**
1	SP4_DCD	2	SP4_RXD
3	SP4_TXD	4	SP4_DTR
5	GND	6	SP4_DSR
7	SP4_RTS	8	SP4_CTS
9	SP4_RI		

Internal Connectors

BIOS Pin Header

Connector type: 2x3 6-pin header, 2.0mm
Connector location: JFW1



Pin	Definition	Pin	Definition
1	VCC	2	GND
3	CS#0	4	CLK
5	SO	6	SI

Line-out Connector

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: JP2

Pin	Definition
1	OUT_L
2	NC
3	AGND
4	OUT_R

Line-in Connector

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: JP3

Pin	Definition
1	FLIN_L
2	JD
3	GND
4	FLIN_R

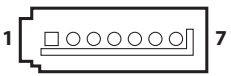
Mic-in Connector

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: JP4

Pin	Definition
1	MIC1_L3
2	NC
3	MIC_GND
4	MIC1_R3

SATA Connector

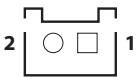
Connector type: Standard Serial ATA 7P (1.27mm, SATA-M-180)
Connector location: SATA1



Pin	Definition	Pin	Definition
1	GND	2	SATA_TXP0_C
3	SATA_TXN0_C	4	GND
5	SATA_RXN0_C	6	SATA_RXP0_C
7	GND		

SATA Power Connector

Connector type: 1x2 2-pin header, JST 2.5mm pitch
Connector location: J2



Pin	Definition
1	VCC5
2	GND

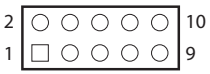
Port 80 Connector

Connector type: 10-pin header, 1.0mm pitch
Connector location: J1

Pin	Definition	Pin	Definition
1	GND	2	PLTRST_3P3#
3	LPC_CLK0_DEBUG	4	LPC_FRAME#
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	VCC3	10	VCC3
MH1	GND	MH2	GND

GPIO Pin Header

Connector type: 2x5 10-pin header, 2.0mm pitch
Connector location: JP6



Pin	Definition	Pin	Definition
1	VCC5	2	GND
3	ICH_GPO0_OUT	4	ICH_GPI0_IN
5	ICH_GPO1_OUT	6	ICH_GPI1_IN
7	ICH_GPO2_OUT	8	ICH_GPI2_IN
9	ICH_GPO3_OUT	10	ICH_GPI3_IN

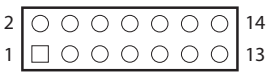
Reset Pin Header

Connector type: 1x2 2-pin header, 2.0mm pitch
Connector location: JP9

Pin	Definition
1	PM_RESET#_J
2	GND

PWR_LED/HDD_LED/SMB_BUS/S3/SW_ON/RESET

Connector type: 2x7 14-pin header, 2.0mm pitch
Connector location: JP8



Pin	Definition	Pin	Definition
1	PWR_LED_N	2	POWER_LED_PWR
3	HDD_LED_N	4	HDD_LED_PWR
5	SMB_CLK	6	SMB_DATA
7	3VSB	8	GND
9	SLP_S3#	10	PSON
11	PBT_SW	12	GND
13	PM_RESET#_J	14	GND

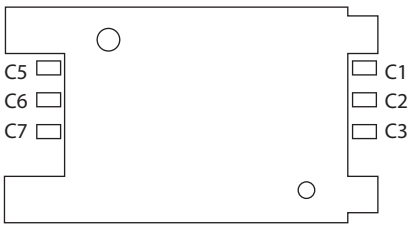
Flash MCU Pin Header

Connector type: 1x4 4-pin header, 2.0mm pitch
Connector location: JP7

Pin	Definition
1	3VSB
2	SBW_TCK
3	SBW_TDIO
4	GND

SIM Card Slot

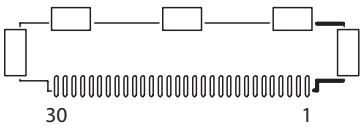
Connector location: SIM1



Pin	Definition	Pin	Definition
C1	UIM_PWR	C2	UIM_RESET
C3	UIM_CLK	C5	GND
C6	UIM_VPP	C7	UIM_DATA

EDP1 Connector

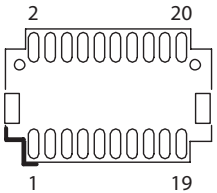
Connector type: 1x30 30-pin header, 0.5mm pitch
Connector location: EDP1



Pin	Definition	Pin	Definition
1	EDP_TX0N	2	EDP_TX0P
3	GND	4	EDP_TX1N
5	EDP_TX1P	6	GND
7	EDP_AUXP	8	EDP_AUXN
9	GND	10	EDP_SMB_CLK
11	EDP_SMB_DAT	12	GND
13	EDP_HPD	14	EDP_PWM_CTRL
15	EDP_BKL_EN	16	PLTRST
17	VCC3	18	VCC3
19	VCC3	20	GND
21	GND	22	VCC5
23	VCC5	24	VCC5
25	GND	26	GND
27	EDP_12V	28	EDP_12V
29	EDP_12V	30	GND
MH1	GND	MH2	GND
MH3	GND	MH4	GND
MH5	GND		

EDP2 Connector

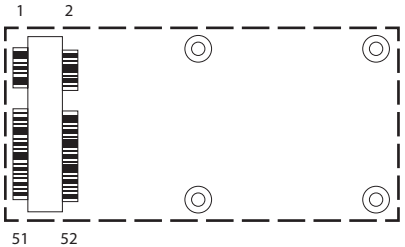
Connector type: 2x10 20-pin header, 1.0mm pitch
Connector location: EDP2



Pin	Definition	Pin	Definition
1	HUBUSB_DP3	2	GND
3	HUBUSB_DN3	4	HUB_OC34
5	GND	6	USB_DP3_GPIO
7	HUBUSB_DP4	8	USB_DP4_GPIO
9	HUBUSB_DN4	10	GND
11	GND	12	3VSB
13	VCC3	14	3VSB
15	VCC5	16	5VSB
17	EDP_12v	18	5VSB
19	EDP_12v	20	GND
NH1	NA	NH2	NA
MH1	GND	MH2	GND

Mini-PCIe Slot

Connector location: CN10



Pin	Definition	Pin	Definition
1	PCIEWAKE#	2	+3VSB
3	N/A	4	GND
5	N/A	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REF CLK-	12	UIM_CLK
13	REF CLK+	14	UIM_RESET
15	GND	16	UIM_VPP
17	N/A	18	GND
19	N/A	20	Disable#
21	GND	22	RST#
23	PCIERX0-	24	+3VSB
25	PCIERX0+	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+1.5V
29	GND	30	SMBCLK
31	PCIETX0-	32	SMBDATA
33	PCIETX0+	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3VSB	40	GND
41	+3VSB	42	N/A
43	GND	44	N/A
45	N/A	46	N/A
47	N/A	48	+1.5V
49	N/A	50	GND
51	N/A	52	+3VSB

M.2 Key Connector

Connector location: CN9

Pin	Definition	Pin	Definition
1	GND	2	3VSB
3	GND	4	3VSB
5	GND	6	NA
7	HUBUSB_DP2	8	N36291448
9	HUBUSB_DM2	10	NA
11	N36291047	20	NA
21	NA	22	NA
23	NA	24	NA
25	NA	26	NA
27	GND	28	NA
29	NA	30	NA
31	NA	32	NA
33	GND	34	NA
35	NA	36	NA
37	NA	38	NA
39	GND	40	NA
41	SATA_RXP1_C	42	NA
43	SATA_RXN1_C	44	NA
45	GND	46	NA

Pin	Definition	Pin	Definition
47	SATA_TXN1_C	48	NA
49	SATA_TXP1_C	50	PLTRST_3P3#
51	GND	52	NA
53	NA	54	
55	NA	56	NA
57	GND	58	NA
59	NA	60	NA
61	NA	62	NA
63	NA	64	NA
65	NA	66	NA
67	M.2_RESET	68	M2_SUSCLK
69	PCIE_mSATA_SEL	70	3VSB
71	GND	72	3VSB
73	GND	74	3VSB
75	USB3_OTHER_SEL		
MH1	GND	MH2	GND
NH1	NA	NH2	NA

Chapter 3: System Setup

Removing the Chassis Cover

1. Locate the 6 screws on the bottom side of the chassis cover.

2. Remove the 6 screws on the bottom side of the chassis cover.

3. Remove the chassis cover.

Installing a SO-DIMM Memory Module

Remove the bottom cover before installing a SO-DIMM.

1. Locate the SO-DIMM socket.

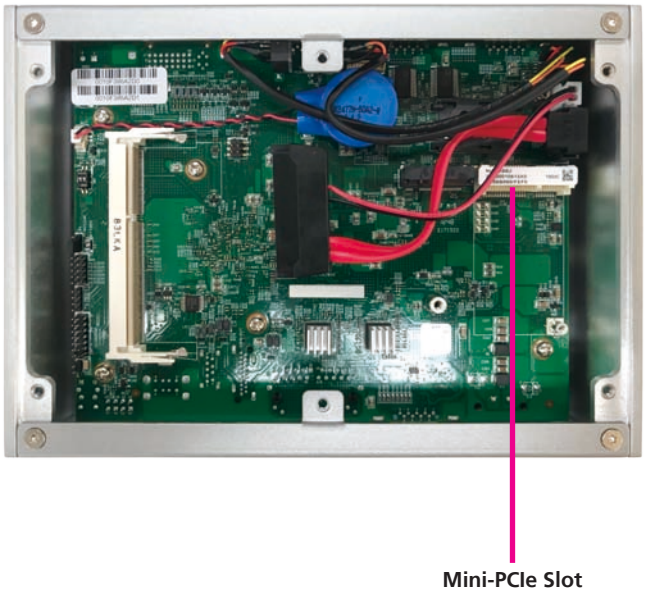
SO-DIMM Socket

2. Insert the module into the socket at an approximately 30-degree angle. The ejector tabs at the ends of the socket will automatically snap into the locked position to hold the module in place.

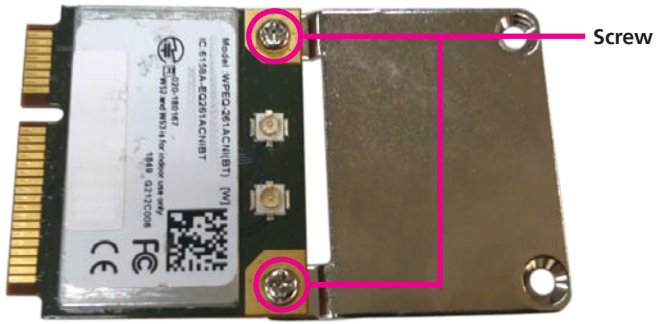
Memory Module

Installing a Wireless LAN Module (Half-size)

1. Locate the mini-PCIe slot on the board.



2. Install the mini-PCIe bracket to the mini-PCIe module.

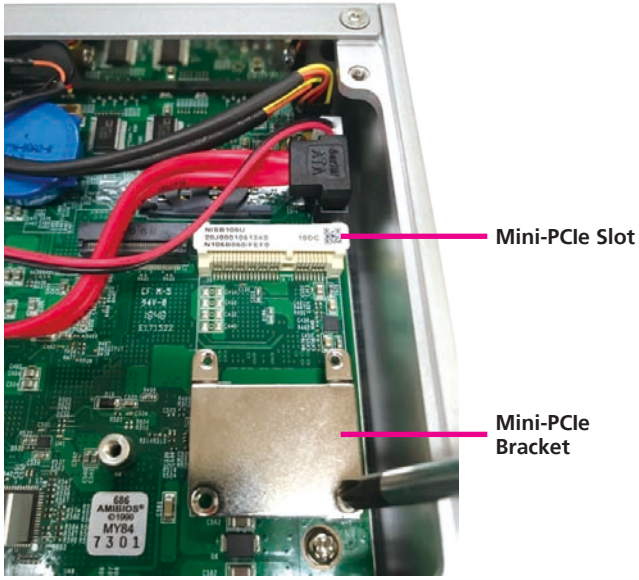


3. Insert the mini-PCIe module into the mini-PCIe slot at a 45-degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.

4. Push the module down and secure it with a screw.

Installing a Wireless LAN Module (Full-size)

1. Locate the mini-PCIe slot on the board, and remove the mini-PCIe bracket from the board.

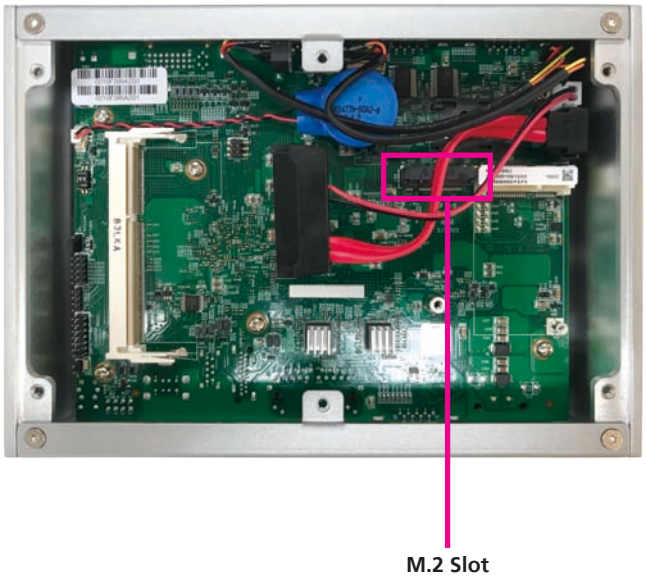


2. Insert the mini-PCIe module into the mini-PCIe slot at a 45-degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.

3. Push the module down and secure it with a screw.

Installing an M.2 Card

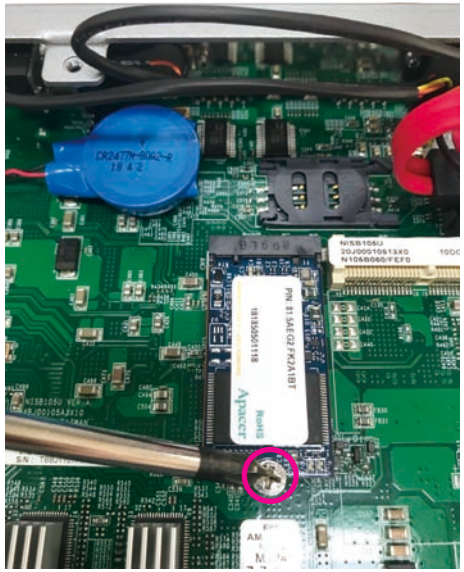
1. Locate the M.2 B Key slot on the board.



2. Make sure the gold-plated six-pin connector on the edge of the module is on the left, while the five-pin connector is on the right.

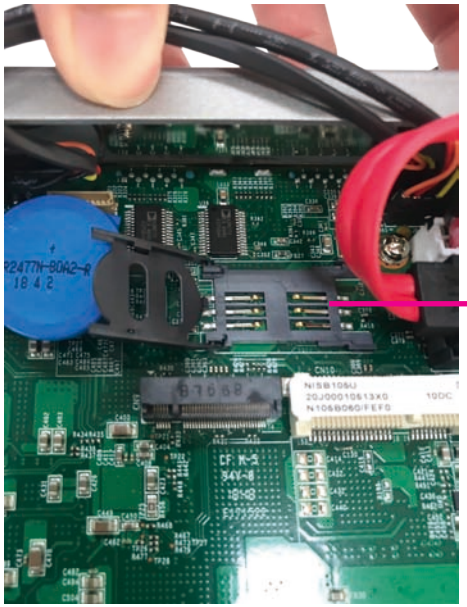
3. Insert the M.2 module into the M.2 slot at a 45-degree angle until the gold-plated connector on the edge of the module completely disappears into the slot.

4. Push the module down and secure it with a screw.

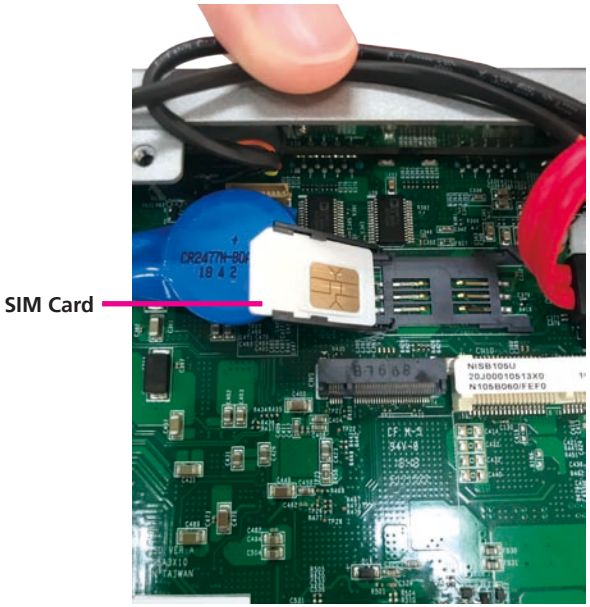


Installing a SIM Card

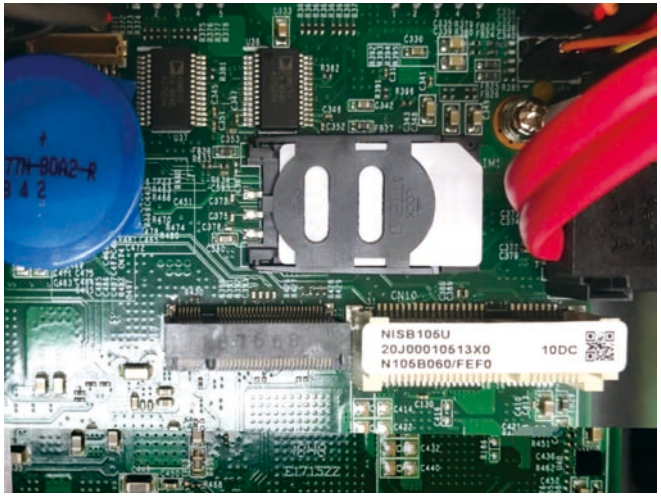
1. Locate the SIM card holder and release the cover.



2. Place the SIM card into the holder.



3. Close the cover and secure it to the original position.



Installing a SATA Storage Drive

1. The inner side of the bottom cover is where you will install the SATA drive. Align the mounting holes of the SATA drive with the mounting holes on the cover.

2. While supporting the SATA drive, turn the cover to the other side. This will be the outer side of the cover. Use the provided screws to secure the drive in place.

3. Connect the SATA data/power cable to the SATA drive.

4. Connect the SATA data/power cable to connectors SATA1 and J2 on the motherboard respectively.

Wall Mounting Instructions

To mount the system on to a wall or some other surface using the two mounting brackets, please follow the steps below.

1. Turn the system over. Align the two retention screw holes in each bracket with the retention screw holes on the sides of the bottom surface.
2. Secure the brackets to the system by inserting two retention screws into each bracket.
3. Drill holes in the intended installation surface.
4. Align the mounting holes on the sides of the mounting brackets with the predrilled holes on the mounting surface.
5. Insert four retention screws, two in each bracket, to secure the system to the wall.

Specification of the wall mount screw:
Round Head Screw Long Fei:P6#32Tx 1/4/SW7*0.8 w/Spring+Flat Washer

Chapter 4: BIOS Setup

The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure such items as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

When to Configure the BIOS

- This program should be executed under the following conditions:
- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the setup program
- When resetting the system clock
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering Setup

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup.

Press the 

key to enter Setup:

Legends

Key	Function
	Moves the highlight left or right to select a menu.
	Moves the highlight up or down between sub-menus or fields.

Exits the BIOS Setup Utility.

Scrolls forward through the values or options of the highlighted field.

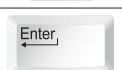
Scrolls backward through the values or options of the highlighted field.

Selects a field.

Displays General Help.

Load previous values.

Load optimized default values.

Saves and exits the Setup program.

Press <Enter> to enter the highlighted sub-menu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press 

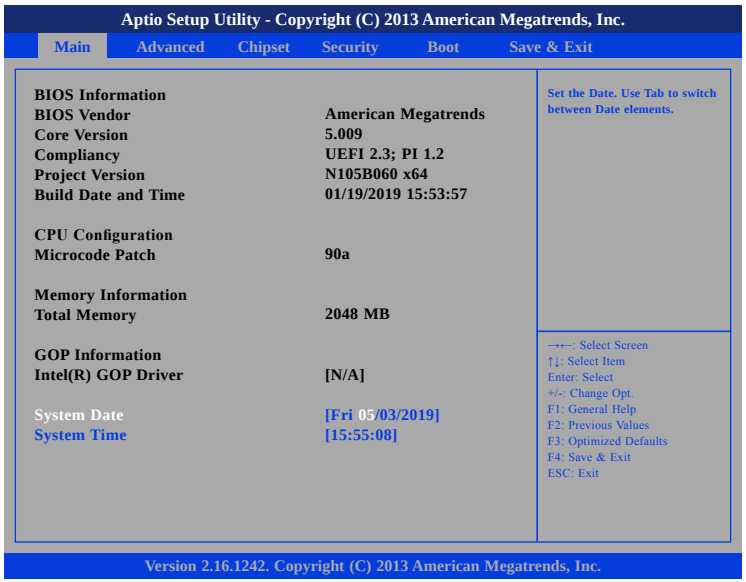
.

BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from several setup functions and one exit. Use arrow keys to select among the items and press Enter to accept or enter the submenu.

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Monday to Sunday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1999 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

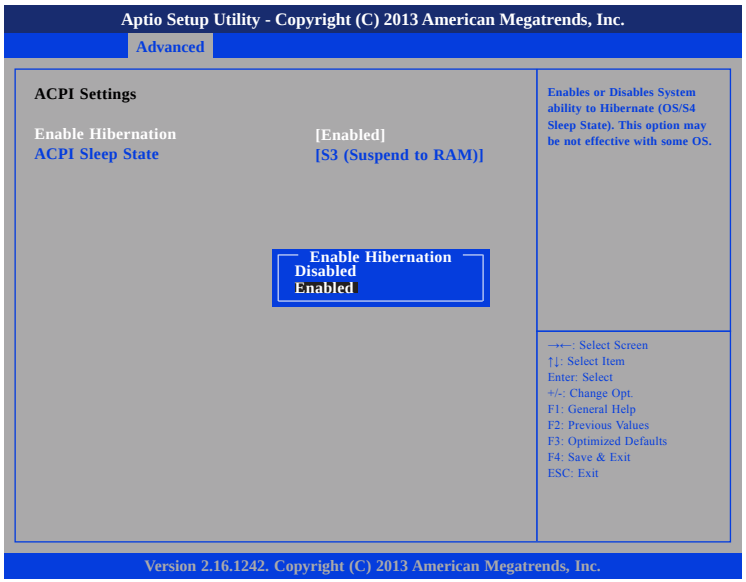
Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Setting incorrect field values may cause the system to malfunction.

ACPI Settings

This section is used to configure ACPI settings.



Enable Hibernation

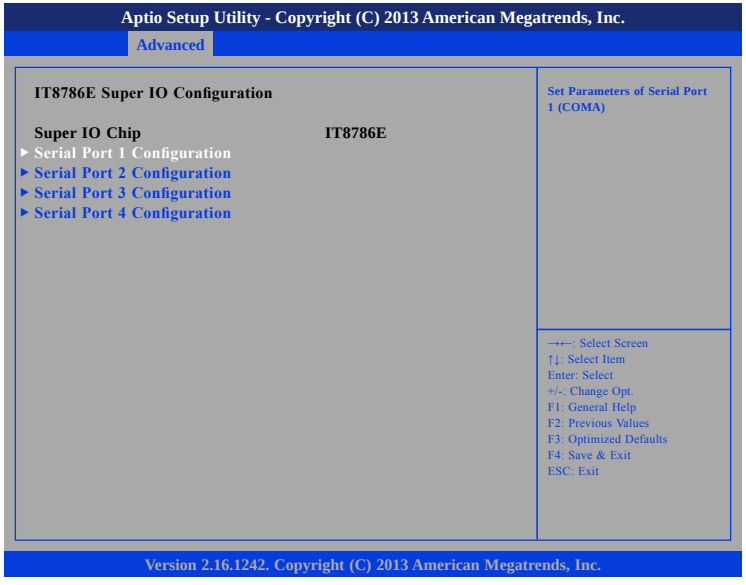
Enables or disables system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.

ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the suspend button is pressed. The options are Suspend Disabled and S3 (Suspend to RAM).

IT8786E Super IO Configuration

This section is used to configure the serial ports.



Super IO Chip

Displays the Super I/O chip used on the board.

Serial Port 1 Configuration

This section is used to configure serial port 1.

Serial Port

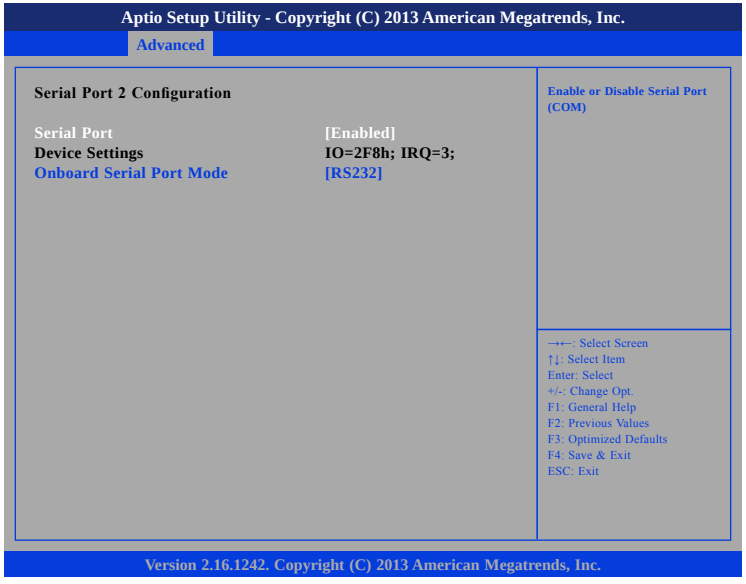
Enables or disables the serial port.

Onboard Serial Port Mode

Select this to change the serial port mode to RS232, RS422, RS485 or RS485 Auto.

Serial Port 2 Configuration

This section is used to configure serial port 2.



Serial Port

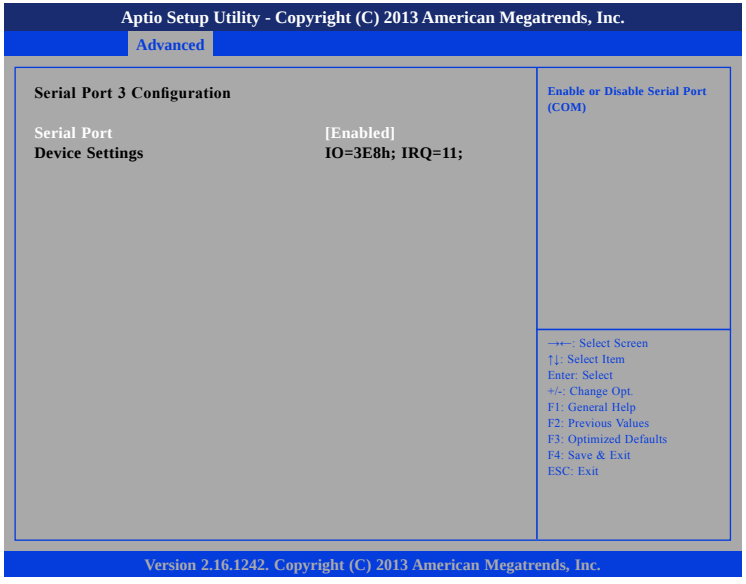
Enables or disables the serial port.

Onboard Serial Port Mode

Select this to change the serial port mode to RS232, RS422, RS485 or RS485 Auto.

Serial Port 3 Configuration

This section is used to configure serial port 3.

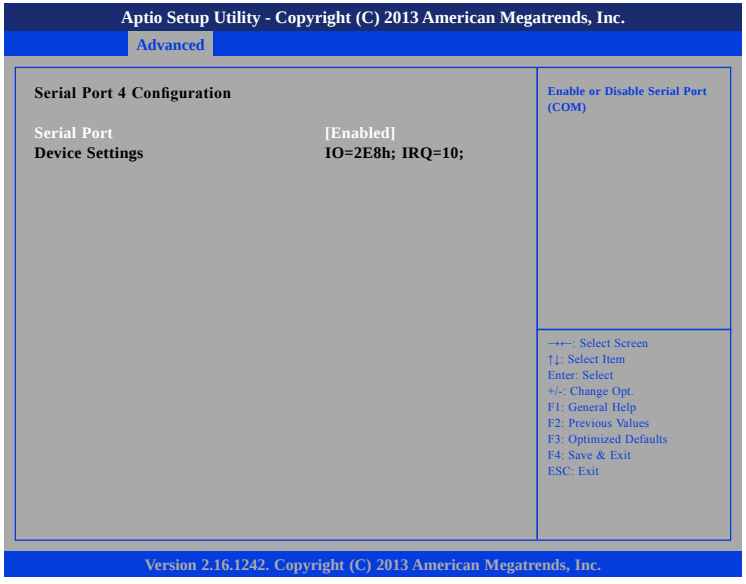


Serial Port

Enables or disables the serial port.

Serial Port 4 Configuration

This section is used to configure serial port 4.

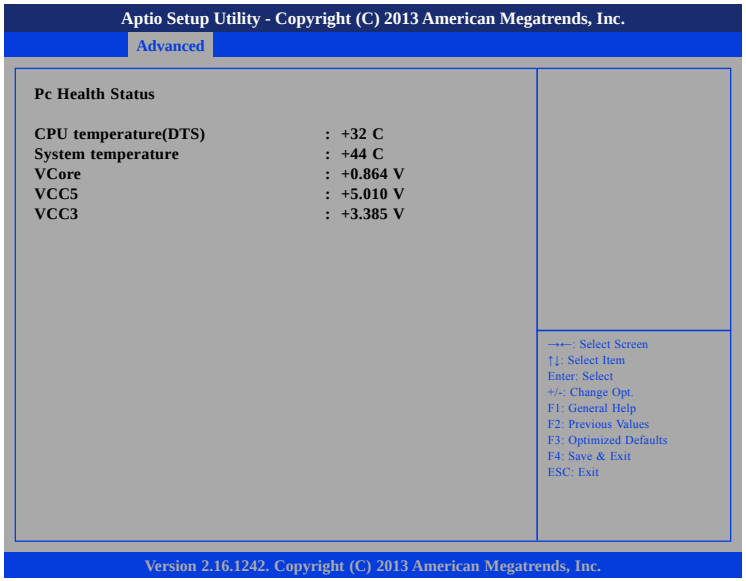


Serial Port

Enables or disables the serial port.

Hardware Monitor

This section is used to monitor hardware status such as temperature, fan speed and voltages.



CPU temperature(DTS)
Detects and displays the current CPU temperature.

System temperature
Detects and displays the current system temperature.

VCore
Detects and displays the VCore CPU voltage.

VCC5
Detects and displays 5V voltage.

VCC3
Detects and displays 3.3V voltage.

CPU Configuration

This section is used to configure the CPU.

Active Processor Cores

Select the number of cores to enable in each processor package.

Limit CPUID Maximum

The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or lesser than 3.

Execute Disable Bit

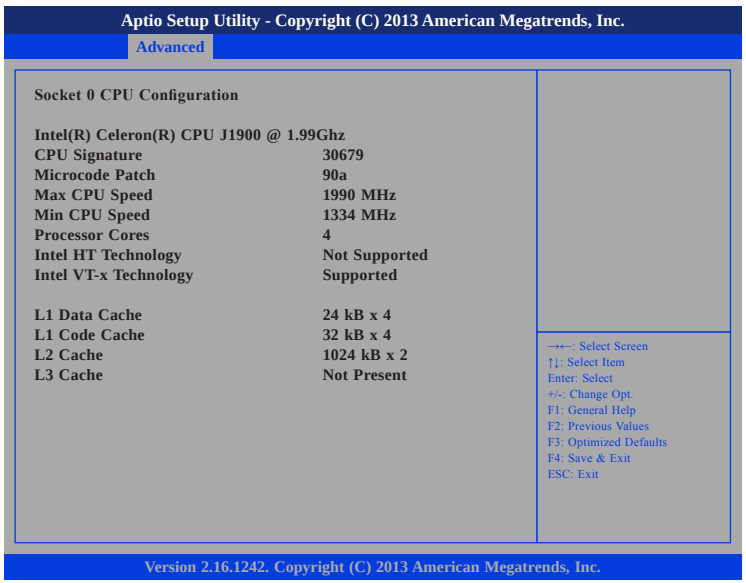
When this field is set to Disabled, it will force the XD feature flag to always return to 0. XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3).

Intel® Virtualization Technology

Enables or disables Intel® Virtualization technology.

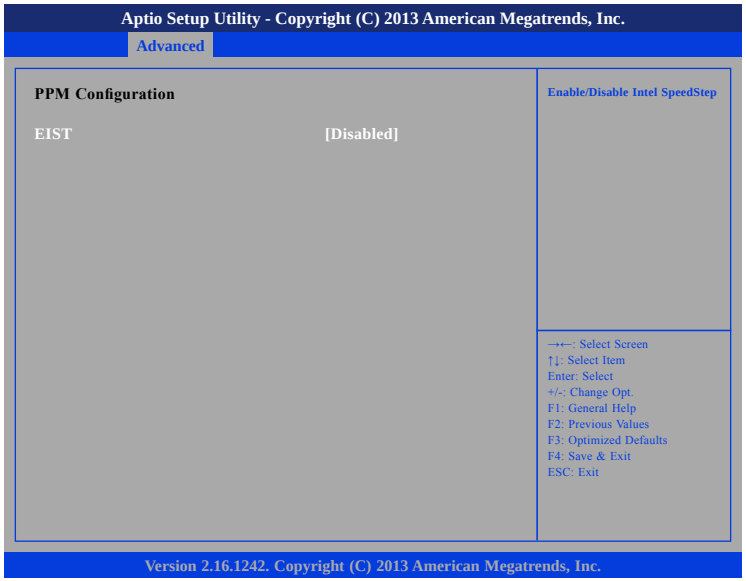
Socket 0 CPU Information

This section displays the information of the CPU installed in Socket 0.



PPM Configuration

This section is used to configure the Processor Power Management (PPM) configuration.

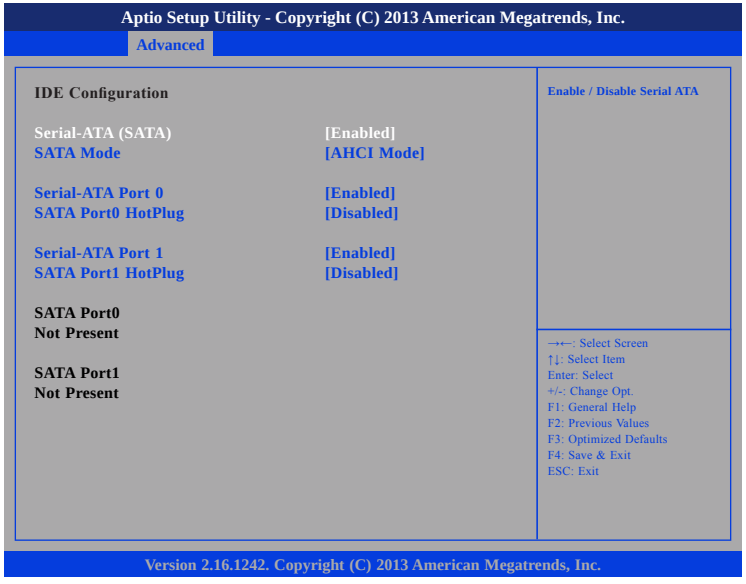


EIST

Enables or disables Intel® SpeedStep.

IDE Configuration

This section is used to configure the SATA drives.



Serial-ATA (SATA)
Enables or disables SATA device.

SATA Mode
Configures the SATA as IDE or AHCI mode.

SATA Mode
Configures the SATA as IDE or AHCI mode.

IDE This option configures the Serial ATA drives as Parallel ATA physical storage device.

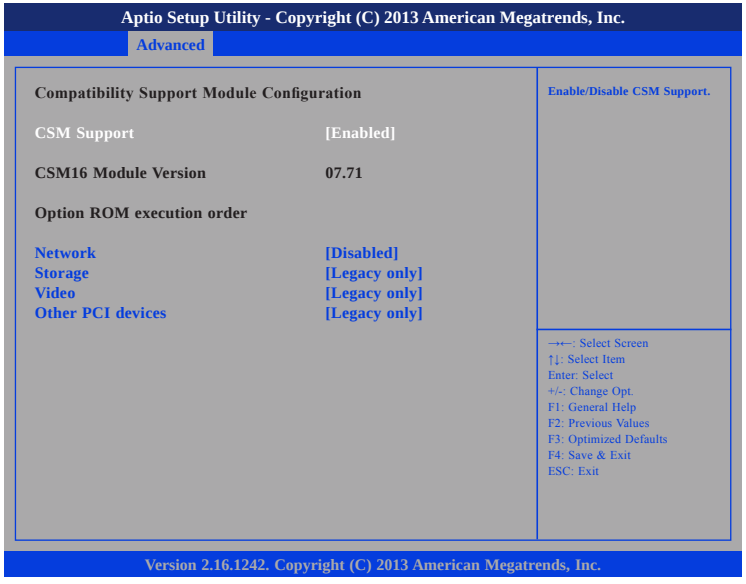
AHCI This option configures the Serial ATA drives to use AHCI (Advanced Host Controller Interface). AHCI allows the storage driver to enable the advanced Serial ATA features which will increase storage performance.

Serial-ATA Port 0 and Serial-ATA Port 1
Enables or disables SATA port 0 and SATA port 1.

SATA Port0 Hotplug and SATA Port1 Hotplug
Enables or disables hotplug support on SATA port 0 and SATA port 1.

CSM Configuration

This section is used to configure the compatibility support module features.



CSM Support

Enables or disables CSM support.

Network

Controls the execution of UEFI and legacy PXE OpROM.

Storage

Controls the execution of UEFI and legacy storage OpROM.

Video

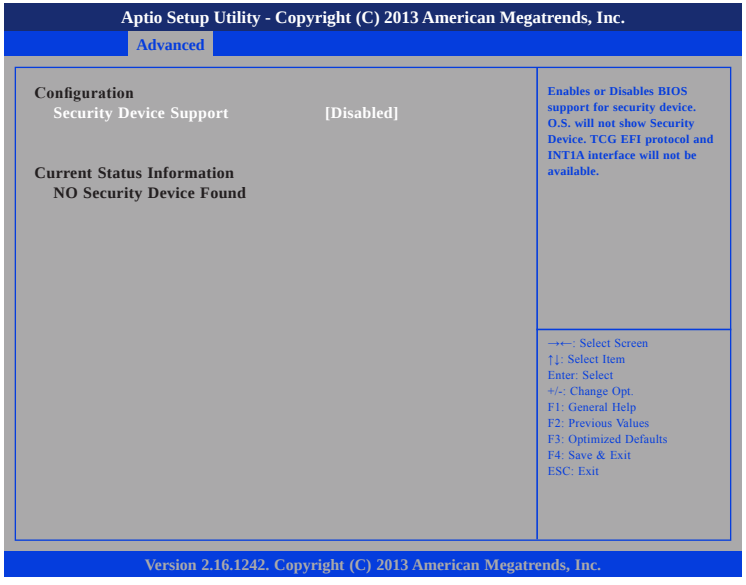
Controls the execution of UEFI and legacy video OpROM.

Other PCI Devices

Determines OpROM execution policy for devices other than network, storage or video.

Trusted Computing

This section is used to configure Trusted Platform Module (TPM) settings.

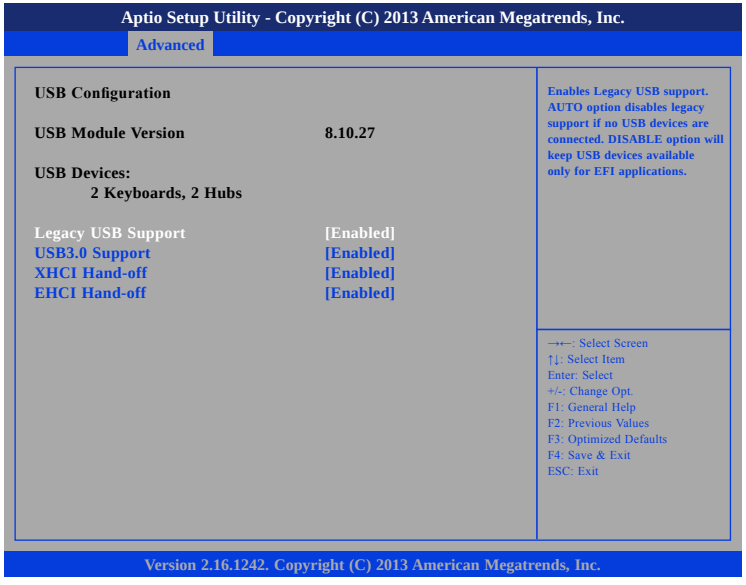


Security Device Support

Enables or disables BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

USB Configuration

This section is used to configure the USB.



Legacy USB Support

Enable Enables Legacy USB support.
Auto Disables support for Legacy when no USB devices are connected.
Disable Keeps USB devices available only for EFI applications.

USB3.0 Support

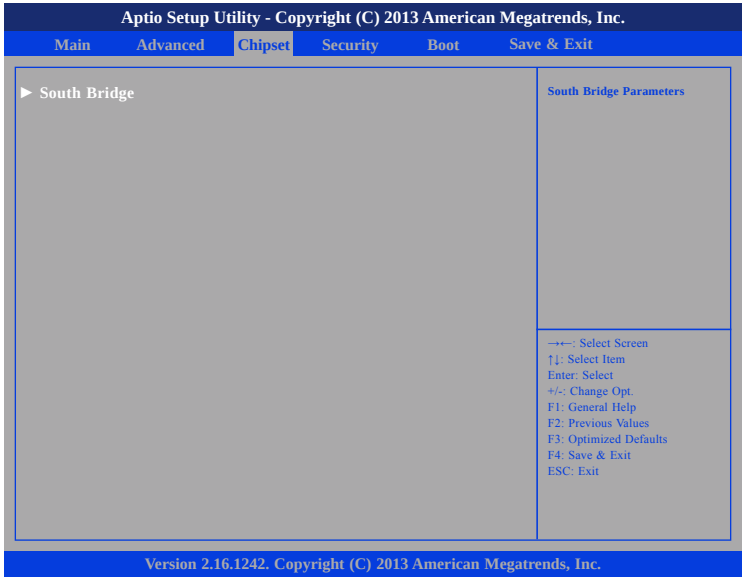
Enables or disables USB 3.0 controller support.

XHCI Hand-off and EHCI Hand-off

This is a workaround for OSs that does not support XHCI hand-off and EHCI hand-off. The XHCI and EHCI ownership change should be claimed by the XHCI and EHCI driver respectively.

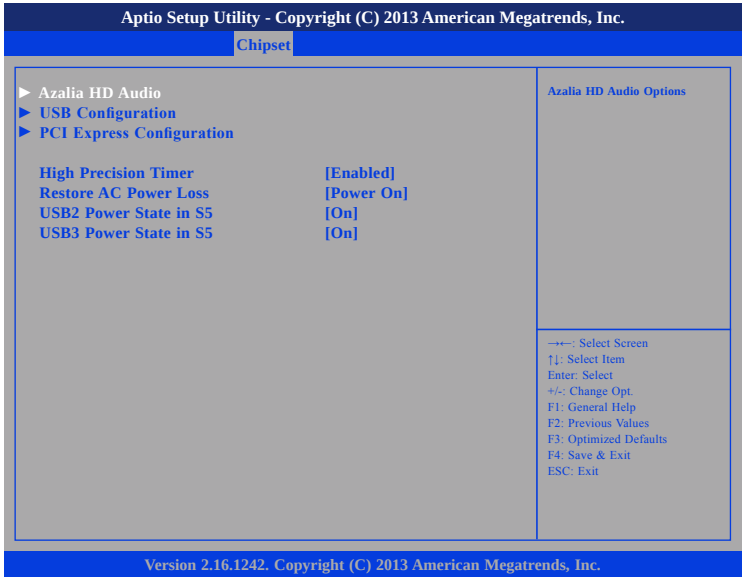
Chipset

This section gives you functions to configure the system based on the specific features of the chipset. The chipset manages bus speeds and access to system memory resources.



South Bridge

This section is used to configure the south bridge features.



High Precision Timer

Enables or disables the high precision event timer.

Restore AC Power Loss

Power Off	When power returns after an AC power failure, the system's power is off. You must press the power button to power-on the system.
Power On	When power returns after an AC power failure, the system will automatically power-on.
Last State	When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

USB2 Power State in S5

Configures USB2 power state in S5.

USB3 Power State in S5

Configures USB3 power state in S5.

Azalia HD Audio

Audio Controller

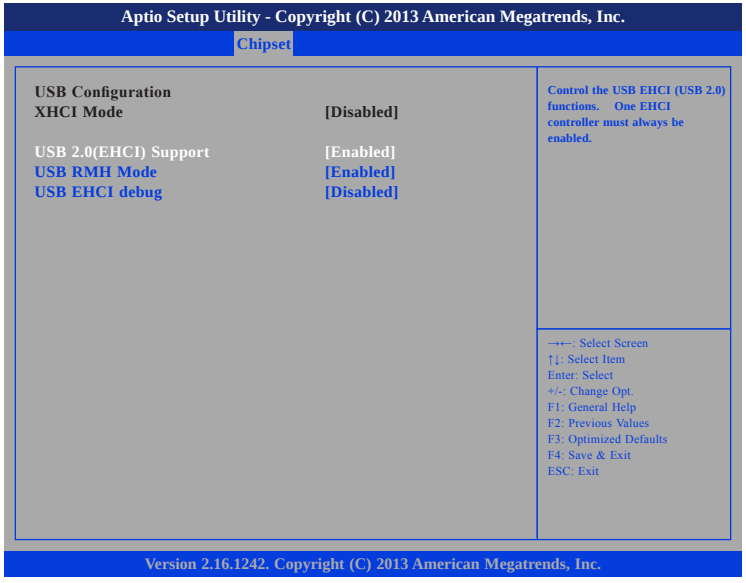
Control detection of the Azalia device.

Disabled	Azalia will be unconditionally disabled.
Enabled	Azalia will be unconditionally enabled.
Auto	Azalia will be enabled if present, disabled otherwise.

Azalia HDMI Codec

Enables or disables internal HDMI codec for Azalia.

USB Configuration



USB 2.0(EHCI) Support
Enables or disables the Enhanced Host Controller Interface (USB 2.0), one EHCI controller must always be enabled.

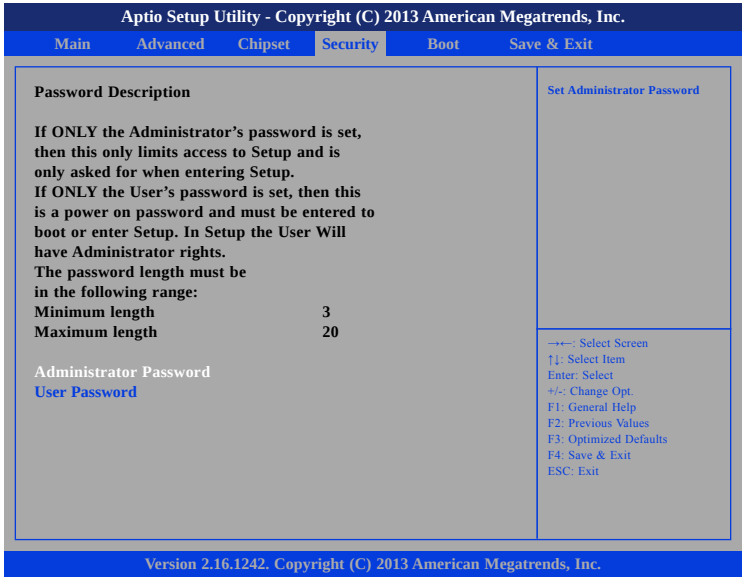
USB RMH Mode
Enables or disables PCH USB rate matching hubs mode.

USB EHCI Debug
Enables or disables PCH EHCI debug capability.

PCI Express Configuration

PCI Express Port 0 to PCI Express Port 2
Enables or disables the PCI Express ports 0 to 2 on the chipset.

Security

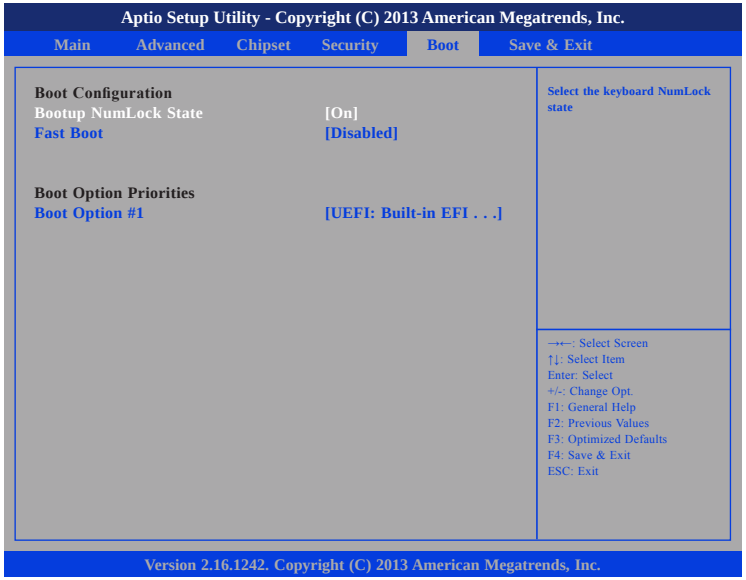


Administrator Password
Select this to reconfigure the administrator's password.

User Password
Select this to reconfigure the user's password.

Boot

This section is used to configure the boot features.

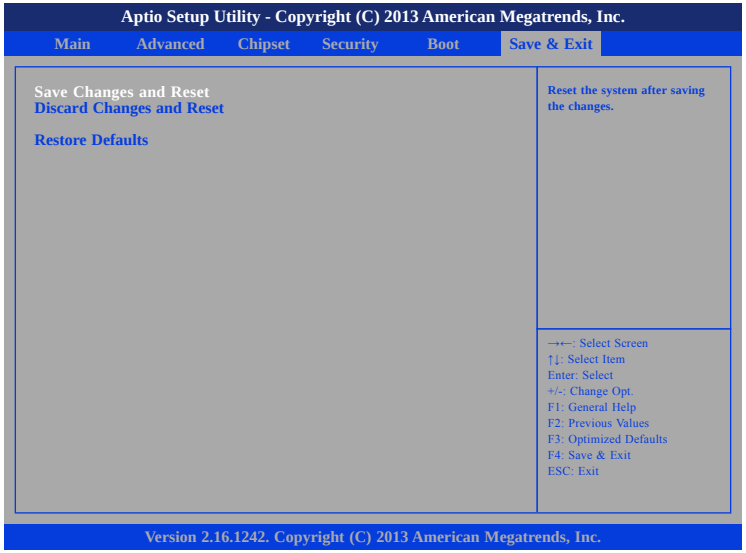


Bootup NumLock State
This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Fast Boot
When enabled, the BIOS will shorten or skip some check items during POST. This will decrease the time needed to boot the system.

Boot Option Priorities
Adjust the boot sequence of the system. Boot Option #1 is the first boot device that the system will boot from, next will be #2 and so forth.

Save & Exit



Save Changes and Reset
To save the changes and reset, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Discard Changes and Reset
To exit the setup utility and reset without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting.

Restore Defaults
To restore the BIOS to default settings, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

Appendix A: Power Consumption

Power Consumption Measurement Test

Purpose

The purpose of the power consumption test is to verify the power dissipation of system, and the loading of power supply.

Test Equipment/Software

Chroma 62006P-100-25

Device Under Test

CPU: Intel® Celeron® processor J1900 quad core, 2.00GHz
Memory: Innodisk 8GB DDR3L SODIMM
HDD: Innodisk 2.5" SATA SSD M3E4
M.2: Innodisk M.2 128GB
Power Supply: LABORATORY DC POWER SUPPLY GWINSTEK GPC-60300

Keyboard: Microsoft Wired Keyboard 600
Mouse: Microsoft Basic Optical Mouse

Test Procedure

1. Power up the DUT, boot into Windows 10 x64 Pro.
2. Entering standby mode (SSD power down).
3. Measure the power consumption and record it.
4. Run Burn-in test program to apply 100% full loading.
5. Measure the power consumption and record it.

Test Result

	Sys #1	Sys #1
	+30V	+9V
Full-Loading Mode	1.1A	3.1A
Total	33W	27.9W
Standby S3 Mode	0.17A	0.2A
Total	5.1W	1.8W

APPENDIX B: GPI/O PROGRAMMING GUIDE

GPI/O (General Purpose Input/Output) pins are provided for custom system design. This appendix provides definitions and its default setting for the ten GPI/O pins. The pin definition is shown in the following table:

Pin	GPI/O mode	PowerOn Default	Address	Pin	GPI/O mode	PowerOn Default	Address
1	VCC	-	-	2	GND	-	-
3	GPO0	Low	A03h (Bit6)	4	GPI0	High	A03h (Bit1)
5	GPO1	Low	A02h (Bit5)	6	GPI1	High	A05h (Bit5)
7	GPO2	Low	A07h (Bit0)	8	GPI2	High	A05h (Bit4)
9	GPO3	Low	A07h (Bit1)	10	GPI3	High	A00h (Bit1)

Control the GPO 0/1/2/3 level from I/O port A03h bit6/ A02h bit5/ A07h bit0/ A07h bit1.
The bit is Set/Clear, which indicates output High/Low.

GPIO programming sample code

```
#define GPO0                    (0x01 << 6)
#define GPO1                    (0x01 << 5)
#define GPO2                    (0x01 << 0)
#define GPO3                    (0x01 << 1)

#define GPO0_HI                 outportb(0xA03, GPO0)
#define GPO0_LO                 outportb(0xA03, 0x00)
#define GPO1_HI                 outportb(0xA02, GPO1)
#define GPO1_LO                 outportb(0xA02, 0x00)
#define GPO2_HI                 outportb(0xA07, GPO2)
#define GPO2_LO                 outportb(0xA07, 0x00)
#define GPO3_HI                 outportb(0xA07, GPO3)
#define GPO3_LO                 outportb(0xA07, 0x00)

void main(void)
{
  GPO0_HI;
  GPO1_LO;
  GPO2_HI;
  GPO3_LO;
}
```

Appendix C: Watchdog Timer Setting

ITE8786 WatchDog Programming Guide

```
#define SUPERIO_PORT    0x2E
#define WDT_SET         0x72
#define WDT_VALUE       0x73

void main(void)
{
  #Enter SuperIO Configuration
        outportb(SUPERIO_PORT, 0x87);
        outportb(SUPERIO_PORT, 0x01);
        outportb(SUPERIO_PORT, 0x55);
        outportb(SUPERIO_PORT, 0x55);

  # Set LDN
        outportb(SUPERIO_PORT, 0x07);
        outportb(SUPERIO_PORT+1 ,0x07);

  # Set WDT setting
        outportb(SUPERIO_PORT, WDT_SET);
        outportb(SUPERIO_PORT+1, 0x90);         # Use the second
                                                # Use the minute, change value to 0x10
  # Set WDT sec/min
        outportb(SUPERIO_PORT, WDT_VALUE);
        outportb(SUPERIO_PORT+1, 0x05);         # Set 5 seconds
}
```