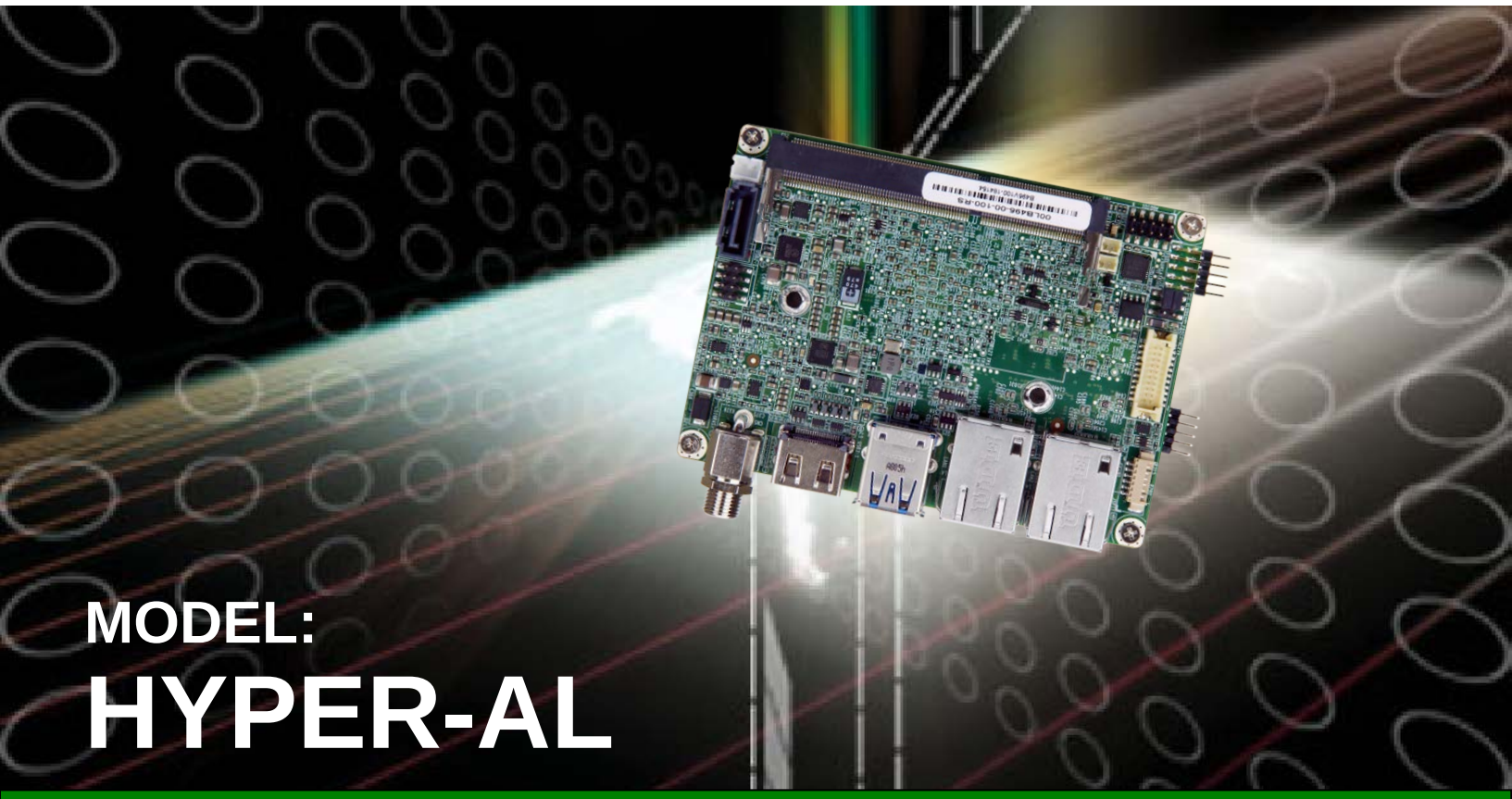
IEI Integration Corp.



MODEL:

HYPER-AL

Pico-ITX SBC with 14nm Intel® Celeron® N3350 SoC, HDMI, LVDS, Dual PCIe GbE, USB 3.2 Gen 1, M.2 Slots, SATA 6Gb/s, RS-232, HD Audio and RoHS

User Manual

Rev. 1.04 - September 28, 2020

RoHS Lead Free

Revision

Date	Version	Changes
September 28, 2020	1.04	Modified Appendix D
June 16, 2020	1.03	Modified Table 3-3: Audio Connector Pinouts Modified Figure 3-8: Front Panel Connector Location
September 11, 2019	1.02	Added Section 4.5.3: Flash Descriptor Security Override Jumper
September 10, 2018	1.01	Modify Section 3.2.5: LVDS LCD Connector
June 8, 2018	1.00	Initial release

Copyright

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TRADEMARKS

Manual Conventions

WARNING

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

CAUTION

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

NOTE

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

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1

Introduction

1.1 Introduction

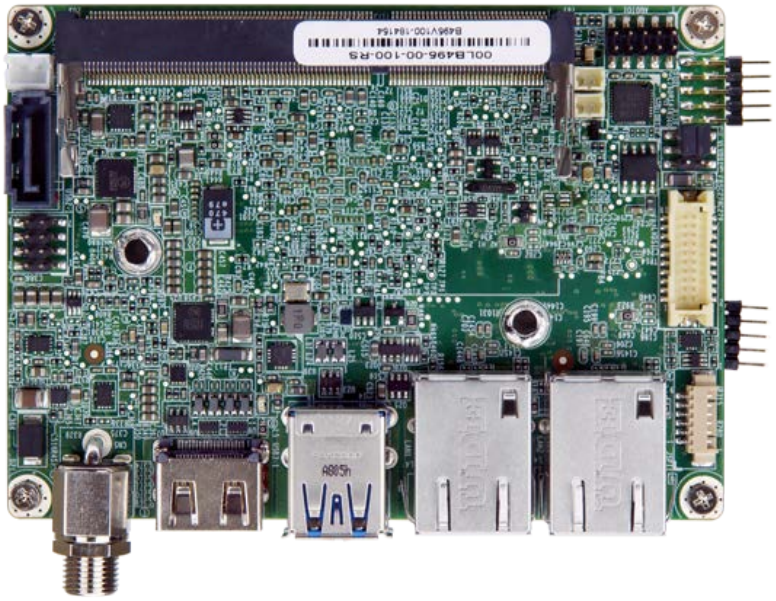


Figure 1-1: HYPER-AL

The HYPER-AL series is a single bard computer in Pico-ITX form factor. It has an on-board 14nm Intel® Celeron® N3350 processor, and supports one 204-pin 1867/1600 MHz single-channel DDR3 Low Voltage (DDR3L) SDRAM SO-DIMM slot with up to 8.0 GB of memory.

The HYPER-AL series includes one HDMI connector and one 18-bit/24-bit LVDS connector for display. Two RJ-45 GbE connectors provide the system with smooth connections to an external LAN.

Expansion and I/O include two M.2 slots, two USB 3.2 Gen 1 (5Gb/s) connectors on the rear panel, two USB 2.0 connectors by pin header and one SATA 6Gb/s connector. Serial device connectivity is provided by the internal RS-232 connector.

1.2 Features

Some of the HYPER-AL motherboard features are listed below:

- Pico-ITX motherboard supports 14nm Intel® Celeron® N3350 on-board SoC
- HDMI and internal LVDS support independent display
- One 1867/1600 MHz DDR3L SO-DIMM slot supports up to 8 GB of memory
- Dual GbE LAN support
- One SATA 6Gb/s connector with 5 V power output
- Two USB 3.2 Gen 1 (5Gb/s) external connectors
- Flexible expansions by M.2 A-key 2230 slot and M.2 B-key 2242 slot
- One internal RS-232 connector
- 12 V only single voltage design for AT/ATX power by DC-IN jack

1.3 Connectors

The connectors on the HYPER-AL are shown in the figure below.

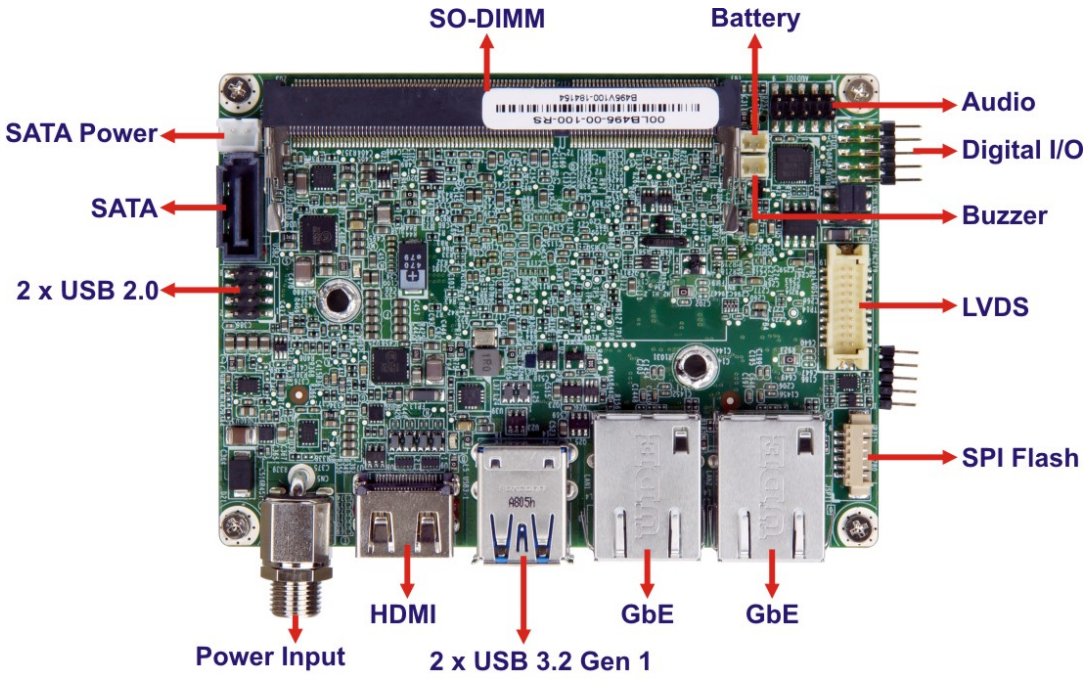


Figure 1-2: Connectors (Front Side)

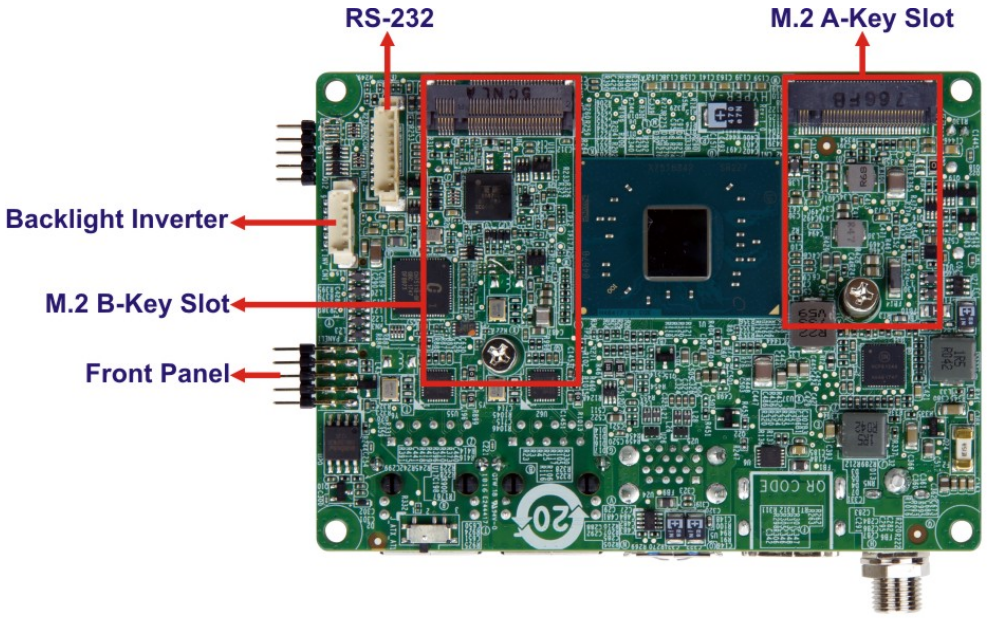


Figure 1-3: Connectors (Solder Side)

1.4 Dimensions

The dimensions of the HYPER-AL series are listed in **Figure 1-4**.

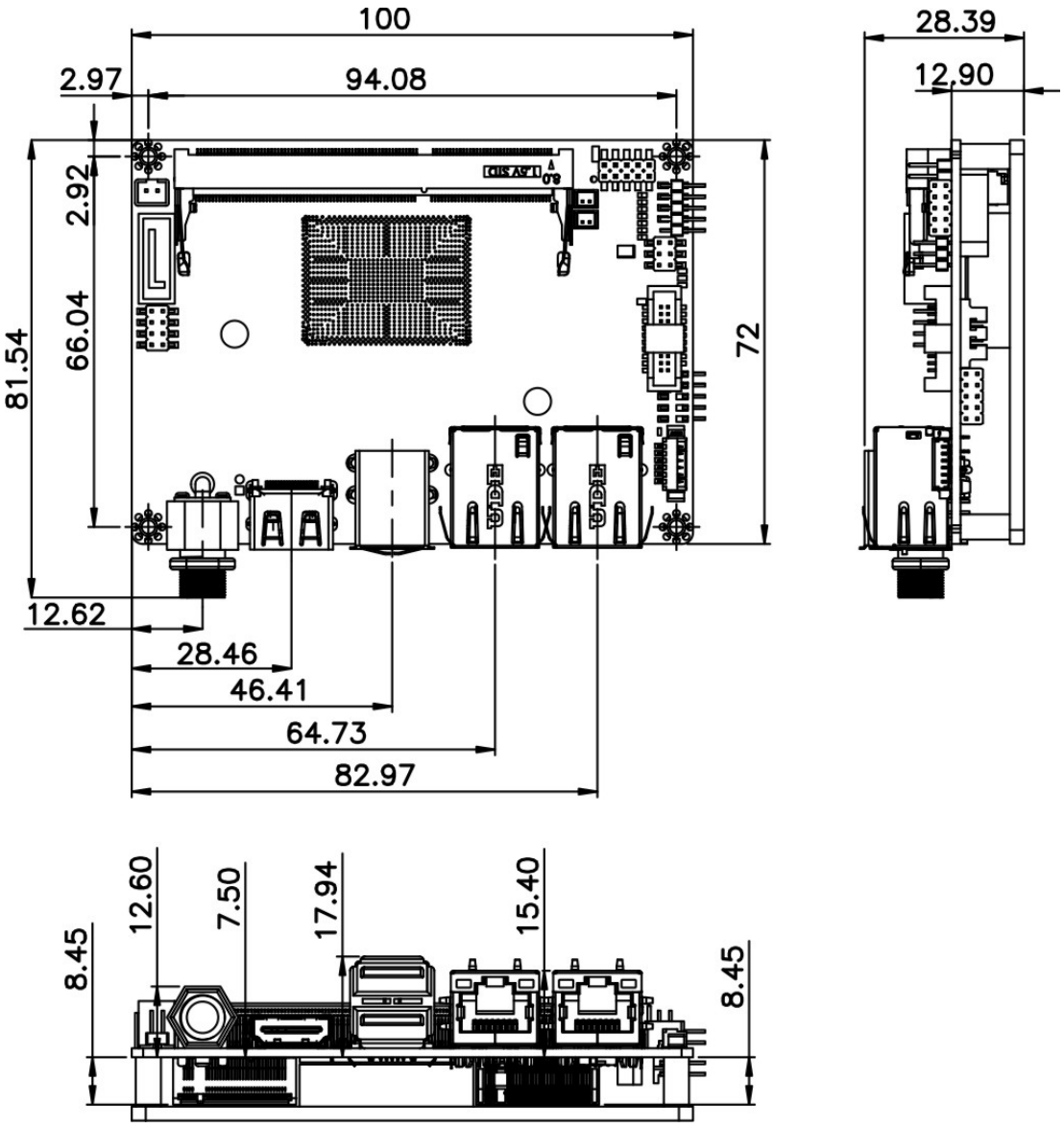
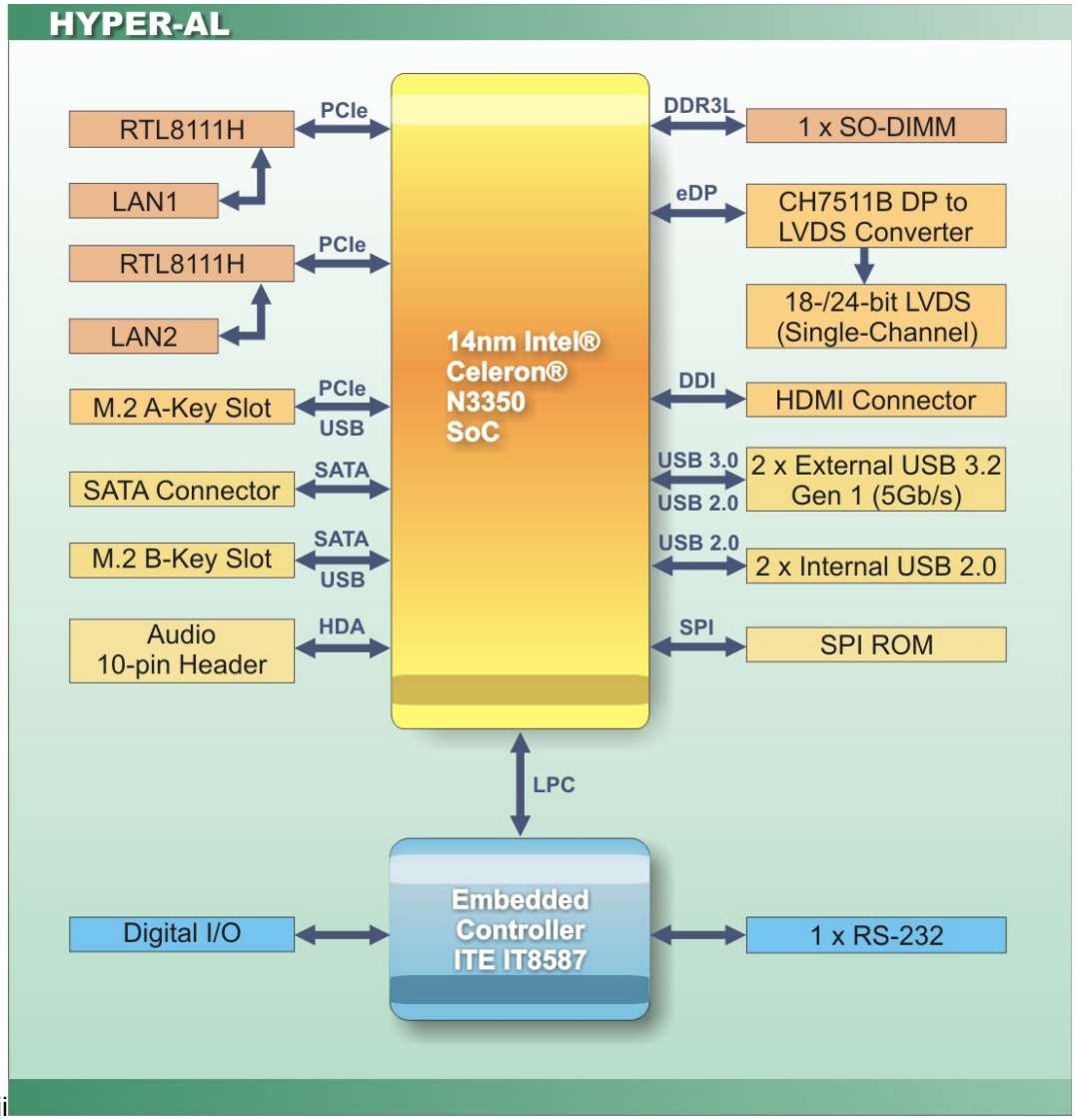


Figure 1-4: Dimensions with Heat Spreader (mm)

1.5 Data Flow

Figure 1-5 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.



ii

Figure 1-5: Data Flow Diagram

1.6 Technical Specifications

HYPER-AL technical specifications are listed below.

Specification	HYPER-AL
Form Factor	Pico-ITX
SoC	Intel® Celeron® N3350 on-board SoC (up to 2.4 GHz, dual-core, 2 MB cache, TDP=6 W)
BIOS	AMI UEFI BIOS
Memory	One 204-pin 1867/1600 MHz single-channel DDR3L SDRAM SO-DIMM slot (system max. 8 GB)
Graphics	9th generation Intel® HD Graphics with 18 execution units, supporting 4K codec decode & encode for HEVC 4, H.264, VP8, SVC and MVC
Display Output	1 x HDMI 1 x 18-bit/24-bit single-channel LVDS
Ethernet	Dual Realtek RTL8111H PCIe GbE controller
Digital I/O	8-bit digital I/O by 10-pin (2x5) header
Embedded Controller	ITE IT8587VG
Watchdog Timer	Software programmable support 1~255 sec. system reset
I/O Interface	
Audio Connector	1 x Front audio by 10-pin (2x5) header
Ethernet	2 x RJ-45 GbE port
Front Panel	1 x Front panel by 10-pin (2x5) header (power LED, HDD LED, power button, reset button)
Serial Ports	1 x RS-232 by 9-pin (1x9) wafer
USB Ports	2 x USB 3.2 Gen 1 (5Gb/s) on rear I/O 2 x USB 2.0 by 8-pin (2x4) header
Storage	1 x SATA 6Gb/s with 5 V SATA power connector
Expansion	1 x M.2 2230 slot (A key, PCIe + USB signal) 1 x M.2 2242 slot (B key, SATA + USB signal)

Specification	HYPER-AL
Environmental and Power Specifications	
Power Supply	12 V DC input power (AT/ATX support)
Power Consumption	+12 V @ 2.36 A (Intel® Celeron® N3350 processor with 8 GB 1600 MHz DDR3L memory)
Operating Temperature	-20°C ~ 60°C
Storage Temperature	-10°C ~ 70°C
Humidity	5% ~ 95%, non-condensing
Physical Specifications	
Dimensions	100 mm x 72 mm
Weight GW/NW	600 g / 250 g

Table 1-1: Technical Specifications

Chapter

2

Unpacking

2.1 Anti-static Precautions

WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband***: Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding***: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad***: When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB***: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the HYPER-AL is unpacked, please do the following:

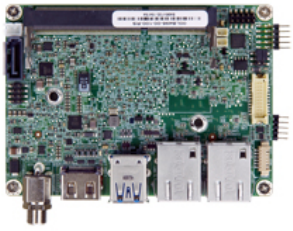
- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

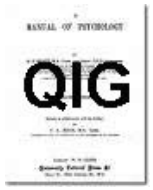
2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the HYPER-AL was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

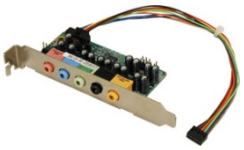
The HYPER-AL is shipped with the following components:

Quantity	Item and Part Number	Image
1	HYPER-AL single board computer	
1	COM port cable	
1	SATA and power cable	
1	Heat spreader	
4	Brass male-female spacer (M3*20mm, thread: 6mm)	

1	Quick Installation Guide	

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual USB port cable, 210mm, p=2.0 mm (**P/N**: 32001-008600-200-RS)	
Audio kit, 7.1 channel (**P/N**: AC-KIT-892HD-R10)	

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the internal and external connectors.

3.1.1 HYPER-AL Layout

The figures below show all the connectors and jumpers.

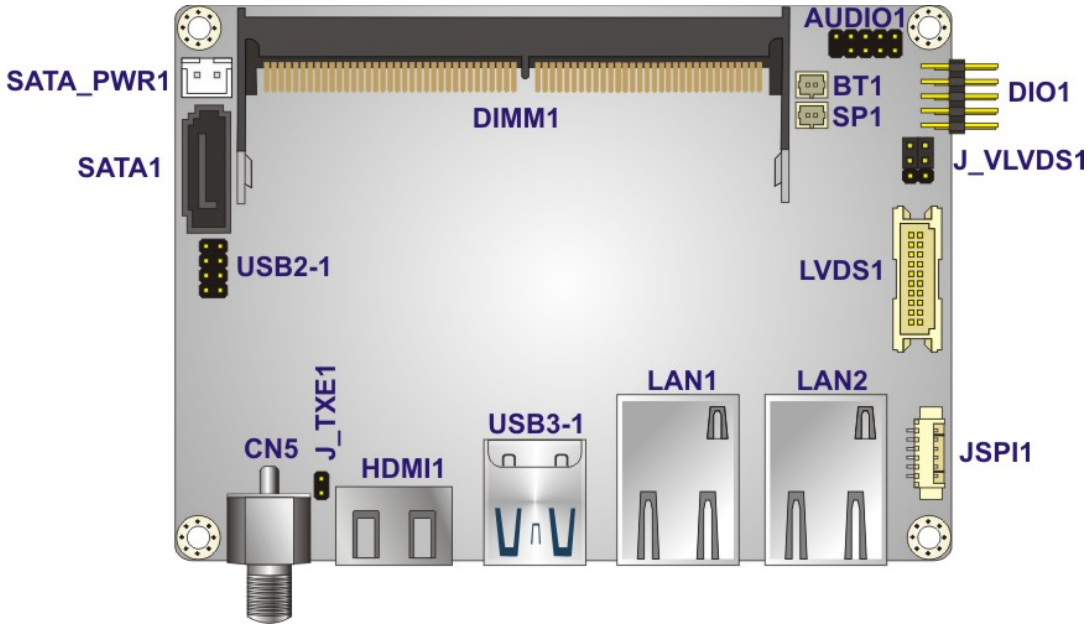


Figure 3-1: Connector and Jumper Locations (Front Side)

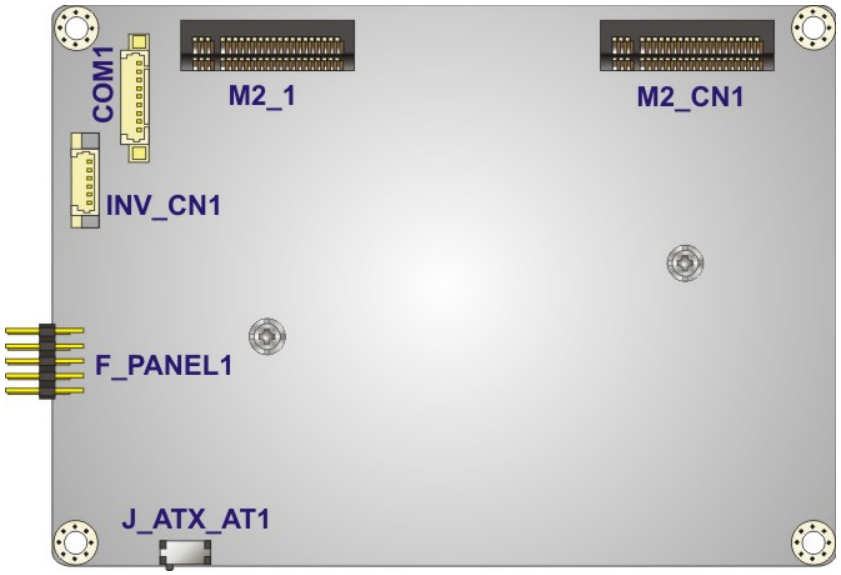


Figure 3-2: Connector and Jumper Locations (Solder Side)

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
Audio connector	10-pin header	AUDIO1
Battery connector	2-pin wafer	BT1
Buzzer connector	2-pin wafer	SP1
DDR3L SO-DIMM socket	204-pin DDR3	DIMM1
Digital I/O connector	10-pin header	DIO1
Front panel connector	10-pin header	F_PANEL1
LVDS connector	20-pin crimp	LVDS1
LVDS backlight inverter connector	6-pin wafer	INV_CN1
M.2 slot, A-key	M.2 A-key 2230 slot	M2_CN1
M.2 slot, B-key	M.2 B-key 2242 slot	M2_1
RS-232 serial port connector	9-pin wafer	COM1
SATA 6Gb/s connector	7-pin SATA connector	SATA1
SATA power connector	2-pin wafer	SATA_PWR1
SPI Flash connector	6-pin wafer	JSPI1
USB 2.0 connector	8-pin header	USB2-1

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the connectors on the external I/O panel.

Connector	Type	Label
HDMI connector	HDMI	HDMI1
LAN connectors	RJ-45	LAN1, LAN2
Power input connector	Power jack	CN5
USB 3.2 Gen 1 connectors	USB 3.2 Gen 1 Type A	USB3-1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the HYPER-AL.

3.2.1 Audio Connector

CN Label: **AUDIO1**

CN Type: 10-pin header, p=2.00 mm

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-3**

The audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

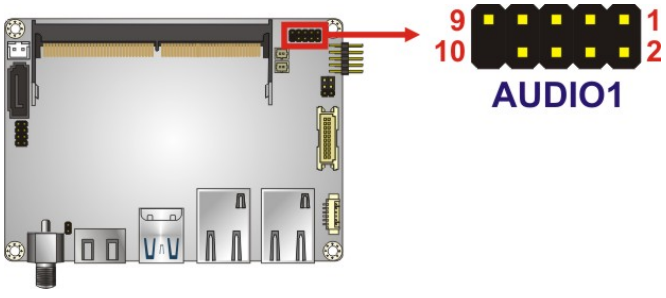


Figure 3-3: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SYNC	2	BCLK
3	SDO	4	SPKR
5	SDI	6	RST
7	+V5S	8	GND
9	+V12S	10	N/A

Table 3-3: Audio Connector Pinouts

3.2.2 Battery Connector

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

NOTE:

It is recommended to attach the RTC battery onto the system chassis in which the HYPER-AL is installed.

CN Label: **BT1**

CN Type: 2-pin wafer, p=1.25 mm

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-4**

The battery connector is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.

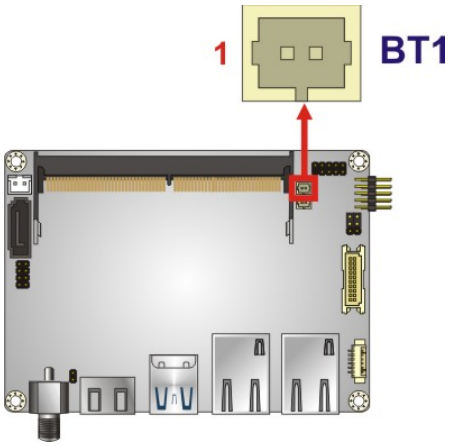


Figure 3-4: Battery Connector Location

Pin	Description
1	VBAT+
2	GND

Table 3-4: Battery Connector Pinouts

3.2.1 Buzzer Connector

NOTE:

If you cannot find a good place to put a buzzer on the HYPER-AL, it is recommended to attach the buzzer onto the system chassis in which the HYPER-AL is installed.

CN Label: **SP1**

CN Type: 2-pin wafer, p=1.25 mm

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-5**

The buzzer connector is connected to a buzzer.

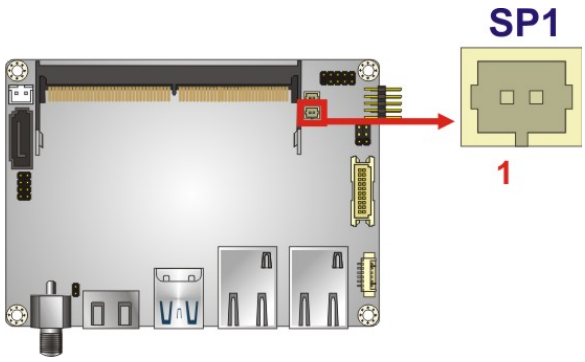


Figure 3-5: Buzzer Connector Location

Pin	Description
1	BU_PWR
2	PC_BEEP

Table 3-5: Buzzer Connector Pinouts

3.2.2 DDR3L SO-DIMM Socket

CN Label: **DIMM1**

CN Type: 204-pin DDR3L SO-DIMM socket

CN Location: See **Figure 3-6**

The SO-DIMM slot is for installing DDR3L SO-DIMMs.

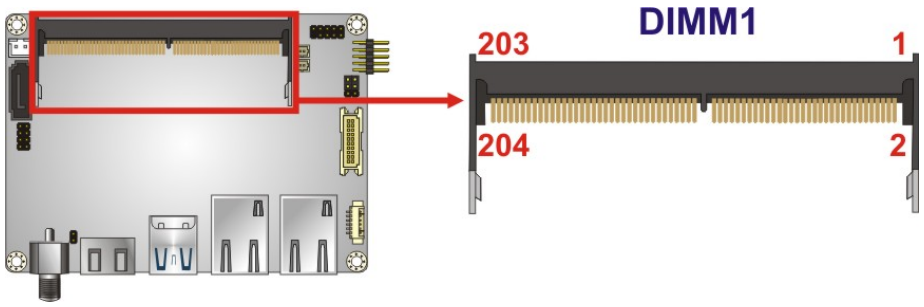


Figure 3-6: DDR3L SO-DIMM Socket Location

3.2.3 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header, p=2.00 mm

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-6**

The 8-bit digital I/O connector provides programmable input and output for external devices.

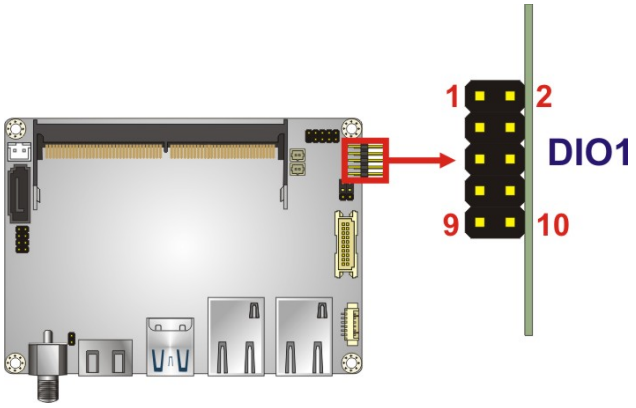


Figure 3-7: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC +5V
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

Table 3-6: Digital I/O Connector Pinouts

3.2.4 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 10-pin header, p=2.00 mm

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-7**

The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.

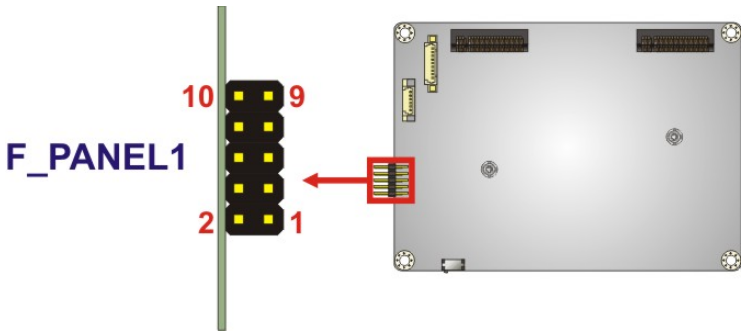


Figure 3-8: Front Panel Connector Location

Function	Pin	Description	Function	Pin	Description
Power Button	1	PWR_BTN+	HDD LED	6	HDD_LED-
	2	PWR_BTN-	Power LED	7	PWR_LED+
	3	N/A		8	PWR_LED-
	4	GND	Reset	9	RESET+
HDD LED	5	HDD_LED+		10	RESET-

Table 3-7: Front Panel Connector Pinouts

3.2.5 LVDS LCD Connector

CAUTION:

1. The LVDS connector is disabled by default. To enable LVDS, please enter BIOS menu, and go to “Chipset → North Bridge Configuration→ LCD Control” to configure it (refer to **Section 5.4.1.2**).

2. **Pin 16** on the LVDS cable must be **GROUND**; otherwise the system will not display through LVDS even the LVDS cable is connected to the HYPER-AL and the LVDS BIOS option is enabled.

CN Label:	**LVDS1**
CN Type:	20-pin crimp, p=1.25 mm
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-8**

The LVDS connector is for an LCD panel connected to the board.

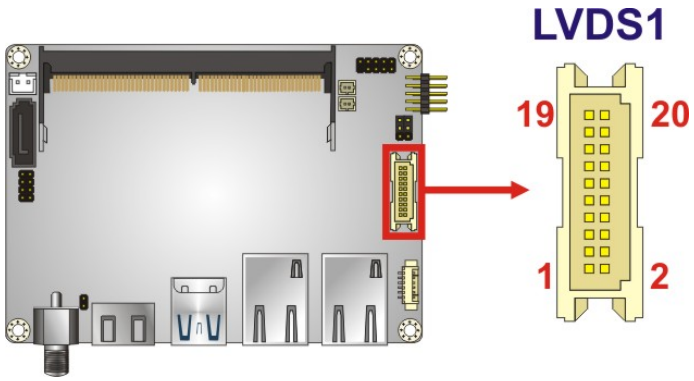


Figure 3-9: LVDS Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	LVDSA_DATA1-	4	LVDSA_DATA0-
5	LVDSA_DATA1+	6	LVDSA_DATA0+
7	GND	8	GND
9	LVDSA_CLK-	10	LVDSA_DATA2-
11	LVDSA_CLK+	12	LVDSA_DATA2+
13	GND	14	GND
15	LVDSA_DATA3-	16	LVDS Detect (GND)*
17	LVDSA_DATA3+	18	+VCC_LCD
19	GND	20	+VCC_LCD

***LVDS Detect must be connected to GND.**

Table 3-8: LVDS Connector Pinouts

3.2.6 LVDS Backlight Inverter Connector

CN Label: **INV_CN1**

CN Type: 6-pin wafer, p=1.25 mm

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-9**

The backlight inverter connector provides power to an LCD panel.

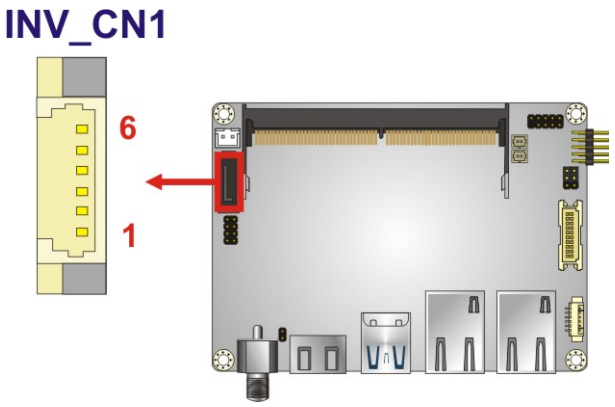


Figure 3-10: Backlight Inverter Connector Location

Pin	Description
1	+12 V
2	+12 V
3	BACKLIGHT ENABLE
4	BRIGHTNESS
5	GND
6	GND

Table 3-9: Backlight Inverter Connector Pinouts

3.2.7 M.2 Slot, A-key

CN Label: **M2_CN1**

CN Type: M.2 A-key slot

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-10**

The M.2 slot is keyed in the A position and accepts 2230 size of M.2 modules. The M.2 slot supports PCI Express and USB signals.

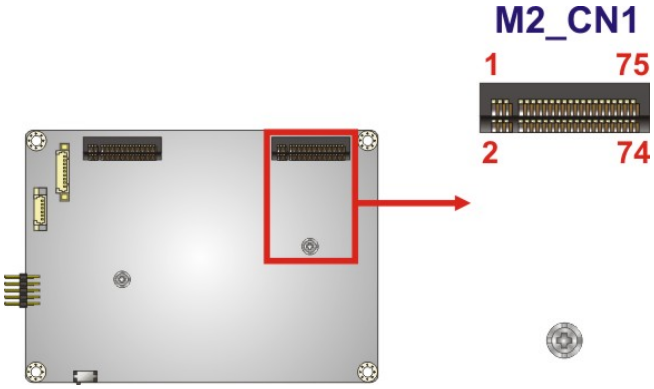


Figure 3-11: M.2 A-key Slot Location

Pin	Description	Pin	Description
1	GND	2	+3.3V
3	USB_DATA7+	4	+3.3V
5	USB_DATA7-	6	NC
7	GND	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	GND	24	GND
25	NC	26	NC
27	NC	28	NC
29	GND	30	GND
31	NC	32	NC
33	GND	34	NC
35	PCIE_TXP3	36	GND
37	PCIE_TXN3	38	NC
39	GND	40	NC
41	PCIE_RXP3	42	NC
43	PCIE_RXN3	44	NC
45	GND	46	NC
47	CLK_PCIE_M2.2_2_P	48	NC
49	CLK_PCIE_M2.2_2_N	50	NC
51	GND	52	PCIRST#
53	NC	54	+3.3V
55	NC	56	+3.3V
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+3.3V
73	NC	74	+3.3V

Pin	Description	Pin	Description
75	GND		

Table 3-10: M.2 A-Key Slot Pinouts

3.2.8 M.2 Slot, B-key

CN Label: **M2_1**

CN Type: M.2 B-key slot

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-11**

The M.2 slot is keyed in the B position and accepts 2242 size of M.2 modules. The M.2 slot supports SATA and USB signals.

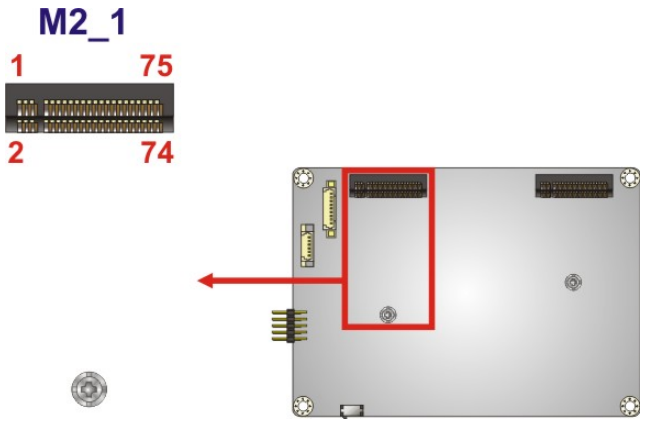


Figure 3-12: M.2 B-key Slot Location

Pin	Description	Pin	Description
1	GND	2	+3.3V
3	GND	4	+3.3V
5	GND	6	NC
7	USB_DATA6+	8	NC
9	USB_DATA6-	10	NC
11	NC	20	NC
21	NC	22	NC
23	GND	24	NC

Pin	Description	Pin	Description
25	NC	26	NC
27	NC	28	NC
29	USB3_RX2_N	30	NC
31	USB3_RX2_P	32	NC
33	GND	34	NC
35	USB3P0_TXDNM2	36	NC
37	USB3P0_TXDPM2	38	GND
39	GND	40	NC
41	M1_SATA_RX1+_C	42	NC
43	M1_SATA_RX1-_C	44	NC
45	GND	46	NC
47	M1_SATA_TX1+_C	48	NC
49	M1_SATA_TX1-_C	50	NC
51	GND	52	NC
53	NC	54	GND
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	Reset	68	NC
69	NC	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

Table 3-11: M.2 B-Key Slot Pinouts

3.2.9 RS-232 Serial Port Connector

CN Label: **COM1**

CN Type: 9-pin wafer, p=1.25 mm

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-12**

The serial connector provides a RS-232 connection.

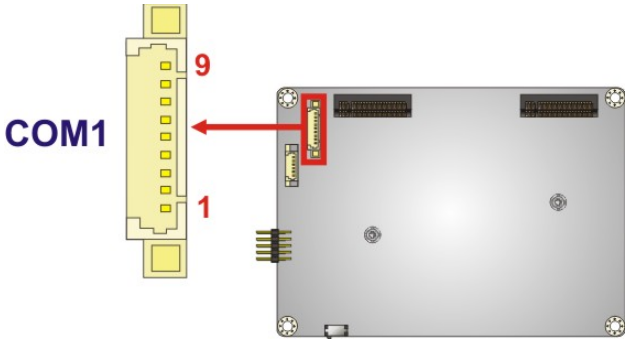


Figure 3-13: RS-232 Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND		

Table 3-12: RS-232 Serial Port Connector Pinouts

3.2.10 SATA 6Gb/s Connector

CN Label:	**SATA1**
CN Type:	7-pin SATA connector
CN Location:	See **Figure 3-14**

The SATA 6Gb/s connector is connected to a SATA 6Gb/s device. The SATA 6Gb/s device transfers data at speeds as high as 6Gb/s.

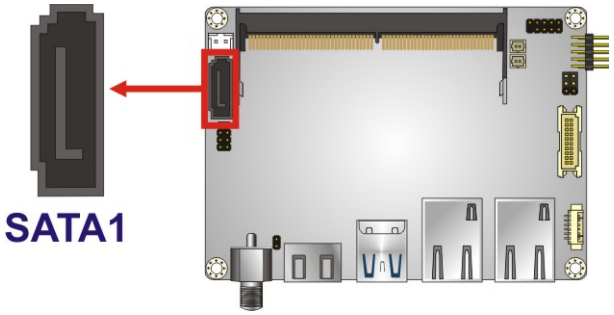


Figure 3-14: SATA 6Gb/s Connector Location

3.2.11 SATA Power Connector

CN Label:	**SATA_PWR1**
CN Type:	2-pin wafer, p=2.00 mm
CN Location:	See **Figure 3-15**
CN Pinouts:	See **Table 3-13**

The SATA power connector provides +5 V power output to the SATA connector.

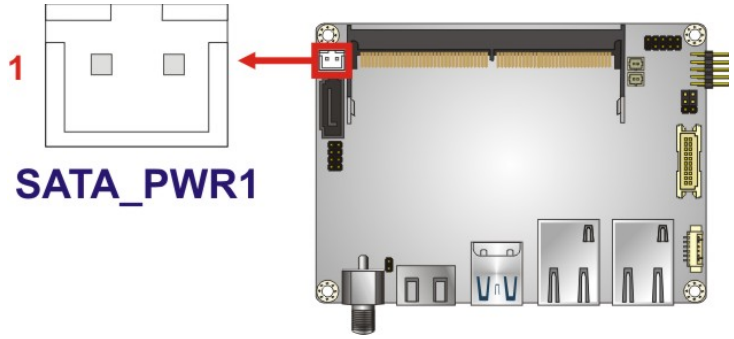


Figure 3-15: SATA Power Connector Location

Pin	Description
1	+5V
2	GND

Table 3-13: SATA Power Connector Pinouts

3.2.12 SPI Flash Connector

CN Label: **JSPI1**

CN Type: 6-pin wafer, p=1.25 mm

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-14**

The 6-pin SPI Flash connector is used to flash the BIOS.

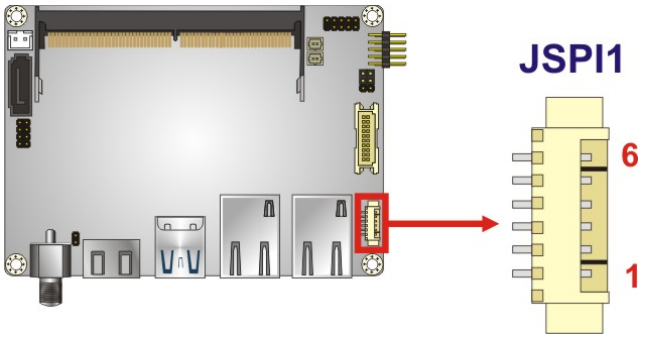


Figure 3-16: SPI Flash Connector Location

Pin	Description
1	VCC
2	SPI_CS
3	SPI_SO
4	SPI_CLK
5	SPI_SI
6	GND

Table 3-14: SPI Flash Connector Pinouts

3.2.13 USB 2.0 Connector

CN Label: **USB2-1**

CN Type: 8-pin header, p=2.00 mm

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-15**

The USB connector provides two USB 2.0 ports by dual-port USB cable.

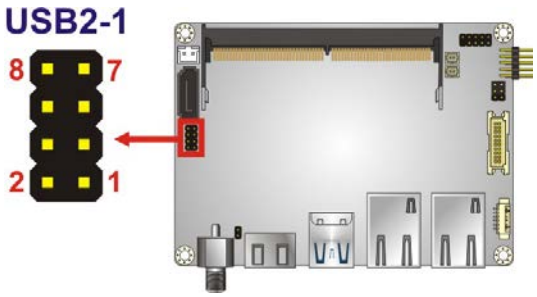


Figure 3-17: USB Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB_VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	USB_VCC

Table 3-15: USB Connector Pinouts

3.3 External Peripheral Interface Connector Panel

Figure 3-18 shows the HYPER-AL external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

- 1 x HDMI connector
- 2 x GbE LAN connector
- 1 x Power input connector
- 2 x USB 3.2 Gen 1 connector

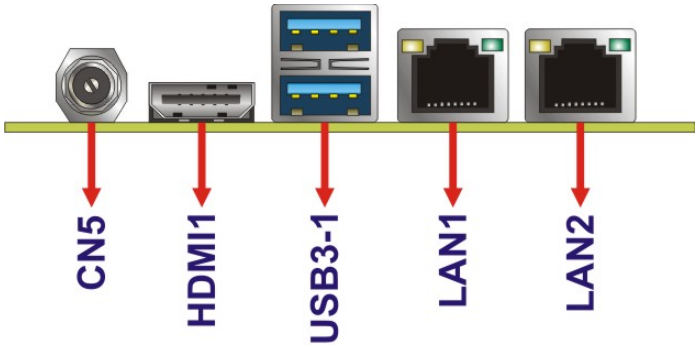


Figure 3-18: External Peripheral Interface Connector

3.3.1 HDMI Connector

CN Label: **HDMI1**

CN Type: HDMI

CN Location: See **Figure 3-18**

CN Pinouts: See **Table 3-16**

The HDMI connector can connect to an HDMI device.

Pin	Description	Pin	Description
1	HDMI_DATA2	2	GND
3	HDMI_DATA2#	4	HDMI_DATA1
5	GND	6	HDMI_DATA1#
7	HDMI_DATA0	8	GND
9	HDMI_DATA0#	10	HDMI_CLK

Pin	Description	Pin	Description
11	GND	12	HDMI_CLK#
13	N/C	14	N/C
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	+5V
19	HDMI_HPD		

Table 3-16: HDMI Connector Pinouts

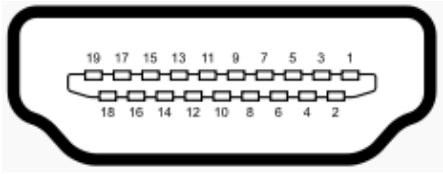


Figure 3-19: HDMI Connector

3.3.2 LAN Connectors

CN Label: **LAN1, LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-18**

CN Pinouts: See **Figure 3-20** and **Table 3-17**

The LAN connector connects to a local network.

Pin	Description	Pin	Description
1	LAN_MDI0+	7	LAN_MDI2+
2	LAN_MDI0-	8	LAN_MDI2-
3	LAN_MDI1+	9	LAN_MDI3+
4	LAN_MDI1-	10	LAN_MDI3-

Table 3-17: LAN Pinouts

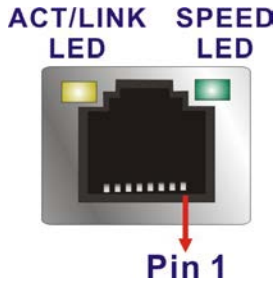


Figure 3-20: LAN Connector

3.3.3 USB 3.2 Gen 1 Connectors

CN Label: **USB3-1**

CN Type: USB 3.2 Gen 1 Type A

CN Location: See **Figure 3-18**

CN Pinouts: See **Table 3-18**

The HYPER-AL has two external USB 3.2 Gen 1 (5Gb/s) ports. The USB connector can be connected to a USB 2.0 or USB 3.2 Gen 1 device. The pinouts of USB 3.2 Gen 1 connectors are shown below.

Pin	Description	Pin	Description
1	USB_VCC	10	USB_VCC
2	USB2_D0-	11	USB2_D0-
3	USB2_D0+	12	USB2P0_D0+
4	GND	13	GND
5	USB3P0_RXDN1	14	USB3P0_RXDN2
6	USB3P0_RXDP1	15	USB3P0_RXDP2
7	GND	16	GND
8	USB3P0_TXDN1	17	USB3P0_TXDN2
9	USB3P0_TXDP1	18	USB3P0_TXDP2

Table 3-18: USB 3.2 Gen 1 Port Pinouts

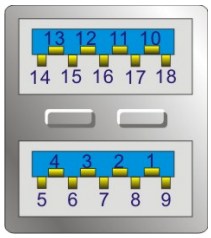


Figure 3-21: USB 3.2 Gen 1 Port Pinout Locations

3.3.4 Power Connector (Power Adapter)

CN Label:	**CN5**
CN Type:	Power jack
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Figure 3-22**

The connector supports the 12V power adapter.

Figure 3-22: Power Input Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the HYPER-AL may result in permanent damage to the HYPER-AL and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the HYPER-AL. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the HYPER-AL or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding*** Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the HYPER-AL, place it on an anti-static pad. This reduces the possibility of ESD damaging the HYPER-AL.
- ***Only handle the edges of the PCB***: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the HYPER-AL, HYPER-AL components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the HYPER-AL installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the HYPER-AL on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the HYPER-AL off:
  - When working with the HYPER-AL, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the HYPER-AL **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 SO-DIMM Installation

To install an SO-DIMM, please follow the steps below and refer to **Figure 4-1**.

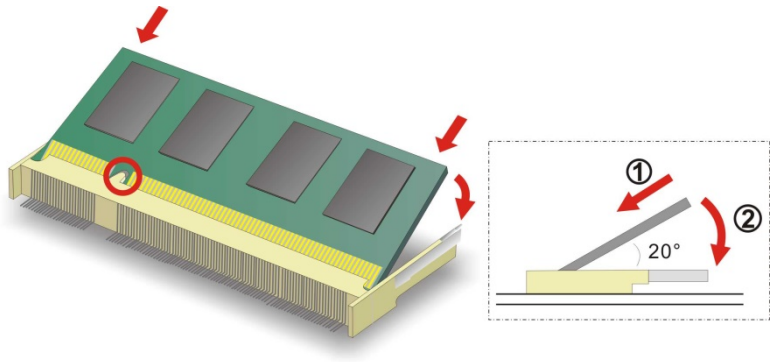


Figure 4-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the board on an anti-static mat.

Step 2: **Align the SO-DIMM with the socket**. Align the notch on the memory with the notch on the memory socket.

Step 3: **Insert the SO-DIMM**. Push the memory in at a 20º angle. (See **Figure 4-1**)

Step 4: **Seat the SO-DIMM**. Gently push downwards and the arms clip into place. (See **Figure 4-1**)

4.4 M.2 Module Installation

To install an M.2 module, please follow the steps below.

Step 1: Locate the M.2 module slot. See **Chapter 3**. Remove the on-board retention screw.

Step 2: Line up the notch on the module with the notch on the slot. Slide the M.2 module into the socket at an angle of about 20º (**Figure 4-2**).

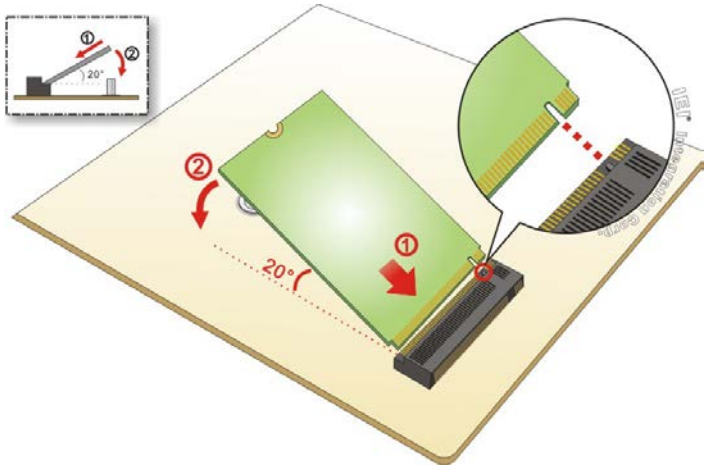


Figure 4-2: Inserting the M.2 Module into the Slot at an Angle

Step 3: Secure the M.2 module with an M2*3 retention screw (**Figure 4-3**).

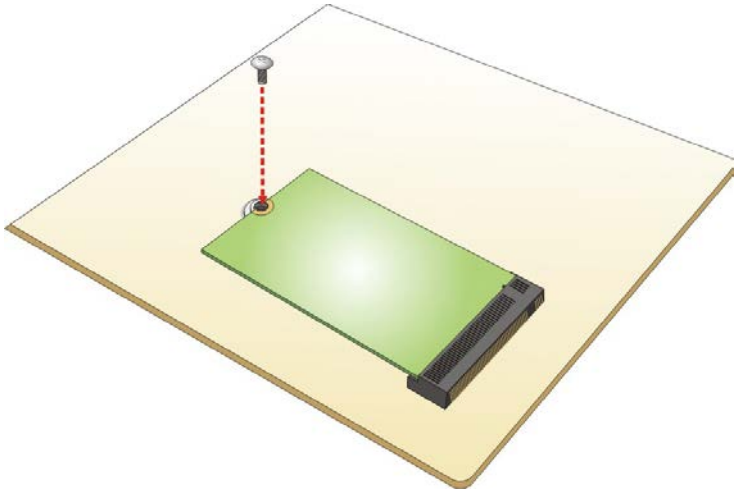


Figure 4-3: Securing the M.2 Module

4.5 System Configuration

The system configuration is controlled by buttons, jumpers and switches. The system configuration should be performed before installation.

4.5.1 AT/ATX Mode Select Switch

CN Label:	**J_ATX_AT1**
CN Type:	Switch
CN Location:	See **Figure 4-4**
CN Settings:	See **Table 4-1**

The AT/ATX mode select switch specifies the systems power mode as AT or ATX. AT/ATX mode select switch settings are shown in **Table 4-1**.

Setting	Description
Short 1-2	ATX Mode (Default)
Short 2-3	AT Mode

Table 4-1: AT/ATX Mode Select Switch Settings

The location of the AT/ATX mode select switch is shown in **Figure 4-4** below.

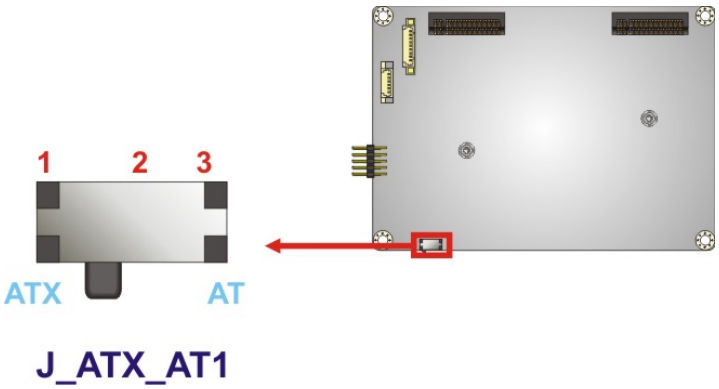


Figure 4-4: AT/ATX Mode Select Switch Location

4.5.2 LVDS Voltage Selection

WARNING:

Incorrect voltages can destroy the LCD panel. Make sure to select a voltage that matches the voltage required by the LCD panel.

Jumper Label:	**J_VLVDS1**
Jumper Type:	6-pin header, p=2.00 mm
Jumper Settings:	See Table 4-2
Jumper Location:	See **Figure 4-5**

The LCD voltage selection jumper sets the voltage of the power supplied of the LCD panel.

Setting	Description
Short 1-3	Backlight Enable +3.3 V
Short 2-4	Set the voltage level of panel to +3.3 V
Short 3-5	Backlight Enable +5 V
Short 4-6	Set the voltage level of panel to +5 V

Table 4-2: LVDS Voltage Selection Jumper Settings

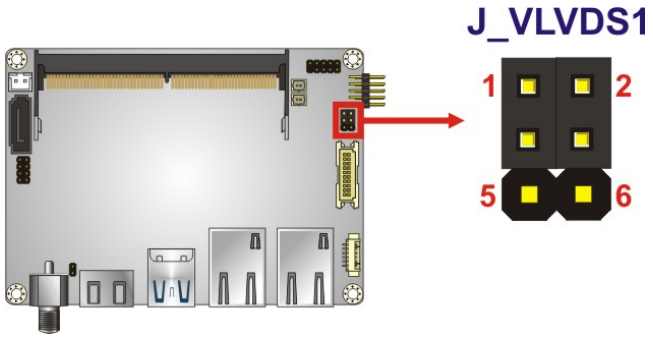


Figure 4-5: LVDS Voltage Selection Jumper Location

4.5.3 Flash Descriptor Security Override Jumper

CN Label:	**J_TXE1**
CN Type:	2-pin header, p=2 mm
CN Location:	See **Figure 4-6**
CN Settings:	See **Table 4-3**

The Flash Descriptor Security Override jumper (J_TXE1) allows to enable or disable the ME firmware update. Refer to Figure 4-6 and Table 4-3 for the jumper location and settings.

Setting	Description
Open	Disabled (default)
Short	Enabled

Table 4-3: Flash Descriptor Security Override Jumper Settings

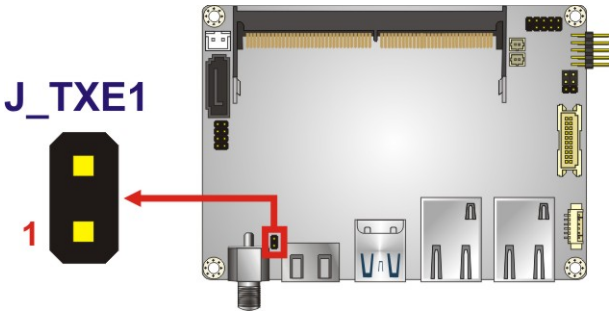


Figure 4-6: Flash Descriptor Security Override Jumper Location

To update the ME firmware, please follow the steps below.

Step 1: Before turning on the system power, short the Flash Descriptor Security Override jumper.

Step 2: Update the BIOS and ME firmware, and then turn off the system power.

Step 3: Remove the metal clip on the Flash Descriptor Security Override jumper.

Step 4: Restart the system. The system will reboot 2 ~ 3 times to complete the ME firmware update.

4.6 Chassis Installation

4.6.1 Airflow

WARNING:

Airflow is critical for keeping components within recommended operating temperatures. The chassis should have fans and vents as necessary to keep things cool.

The HYPER-AL must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

4.6.2 Heat Spreader Installation

WARNING:

Never run the HYPER-AL without the heat spreader secured to the board. The heat spreader ensures the system remains cool and does not need addition heat sinks to cool the system.

A heat spreader is shipped with the HYPER-AL. The heat spreader must be installed on to the HYPER-AL before operation.

4.6.3 Motherboard Installation

To install the HYPER-AL motherboard into the chassis please refer to the reference material that came with the chassis.

4.7 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors.

4.7.1 SATA Drive Connection

The HYPER-AL is shipped with one SATA cable. To connect the SATA drive to the connector, please follow the steps below.

Step 1: **Locate the SATA connector and the SATA power connector.** The locations of the connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the cable connector into the on-board SATA drive connector and the SATA power connector. See **Figure 4-7**.

NOTE:

The connector locations in the following diagram are just for reference. For the exact locations, please see **Section 3.2.10** and **Section 3.2.11**.

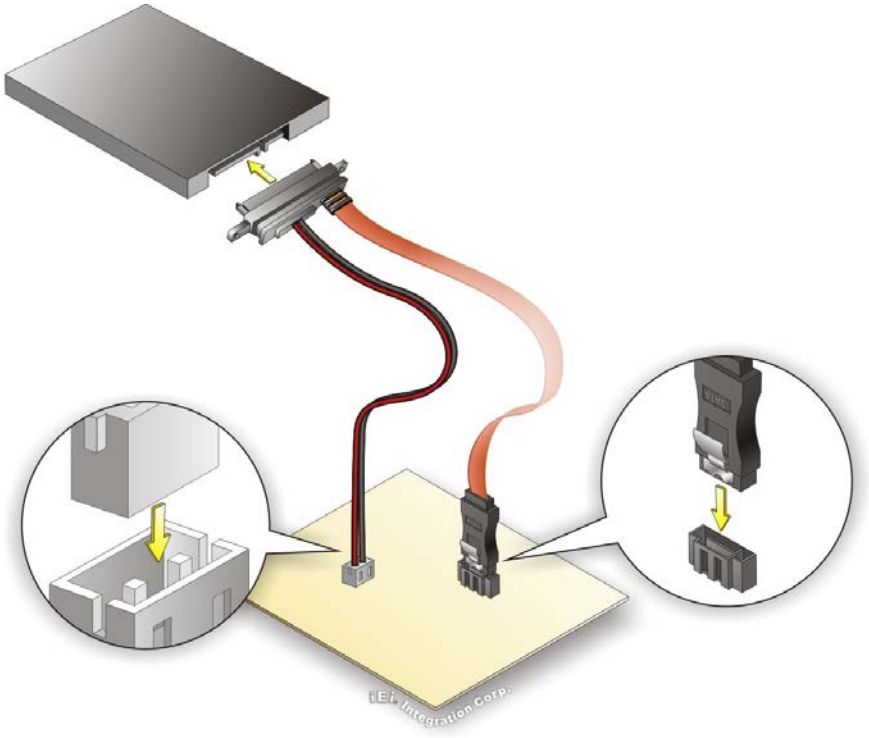


Figure 4-7: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-7**.

Step 4: To remove the SATA cable from the SATA connector, press the clip on the connector at the end of the cable.

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

5.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** or **F2** key as soon as the system is turned on or
2. Press the **DELETE** or **F2** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** or **F2** key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in Table 5-1.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes

Key	Function
-	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values.
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, clear CMOS defaults by disconnecting the battery from the battery connector described in **Section 3.2.2**.

5.1.5 BIOS Menu Bar

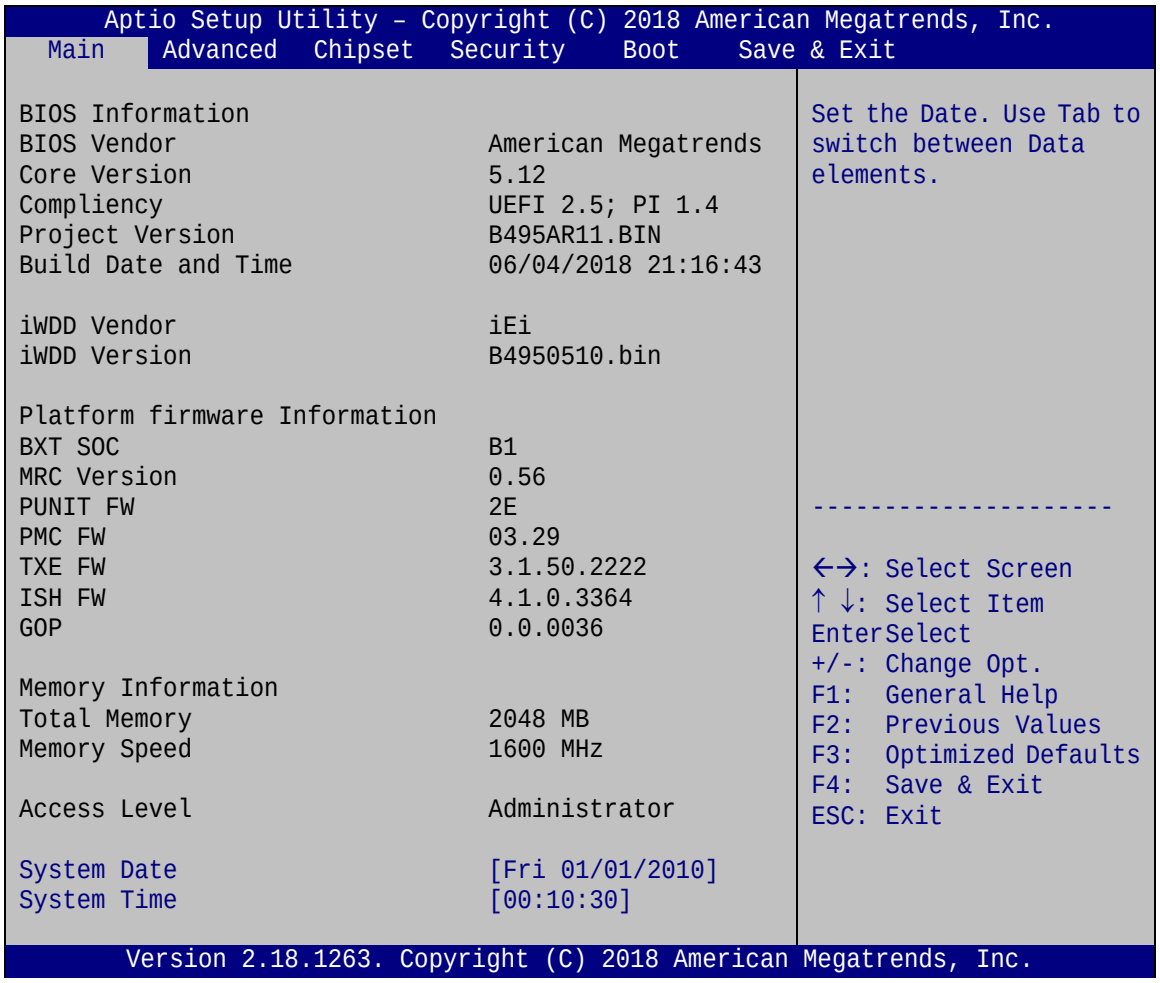
The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

➔ **System Time [xx:xx:xx]**

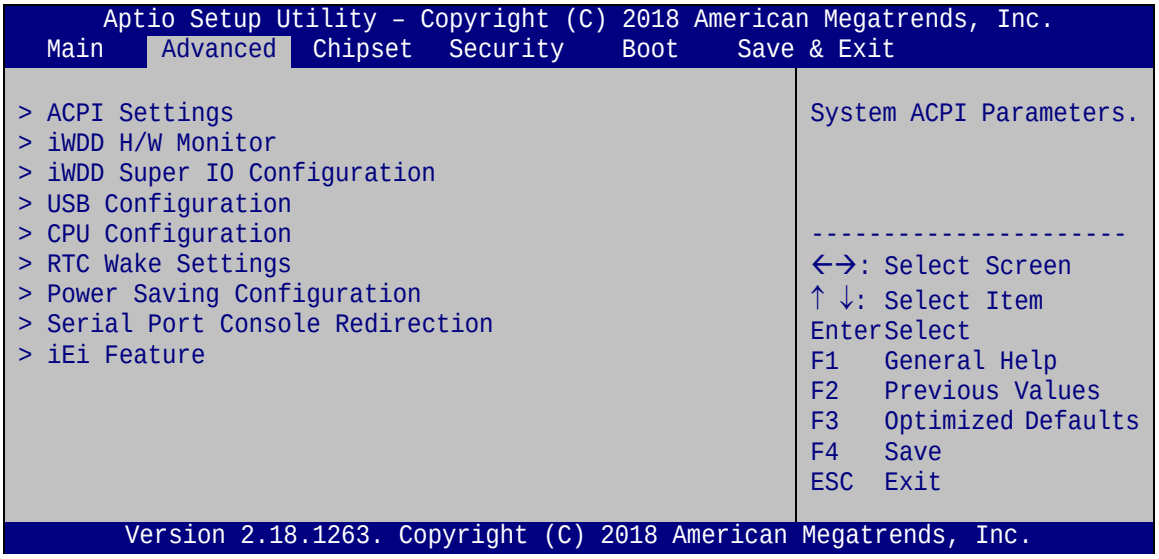
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING!

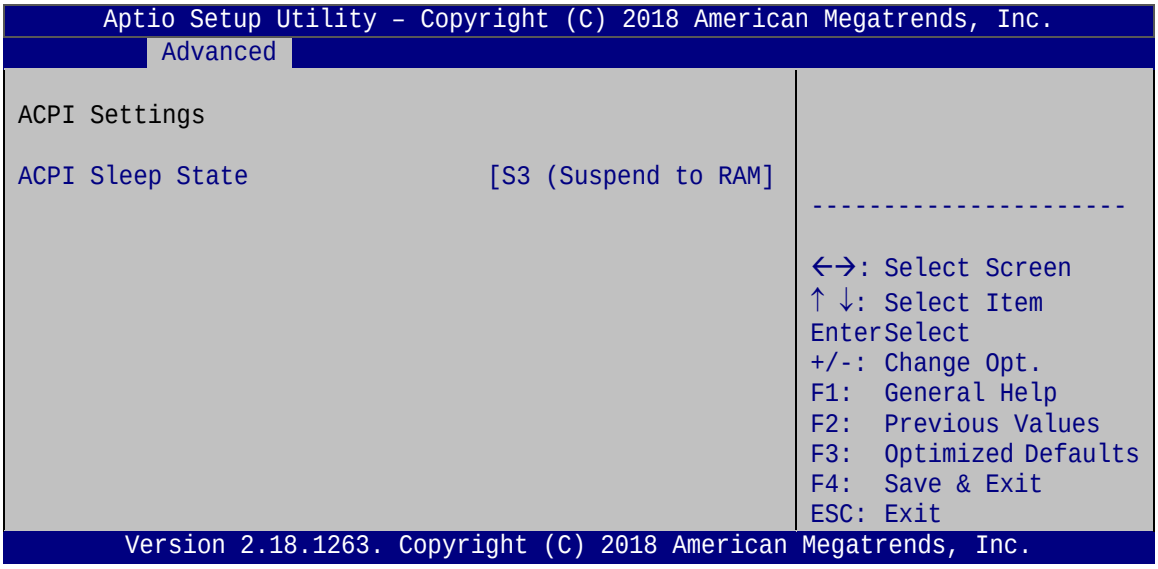
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

5.3.1 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 3**) configures the Advanced Configuration and Power Interface (ACPI) options.



BIOS Menu 3: ACPI Settings

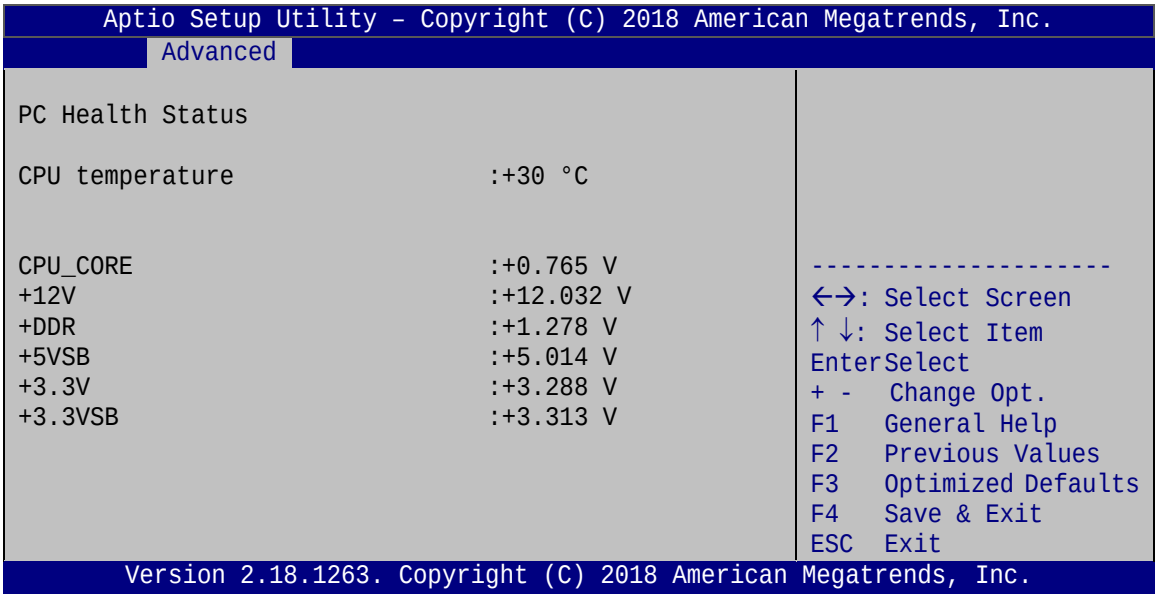
➔ **ACPI Sleep State [S3 (Suspend to RAM)]**

Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

➔ **S3 (Suspend to RAM)** **DEFAULT** The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 4**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.



BIOS Menu 4: iWDD H/W Monitor

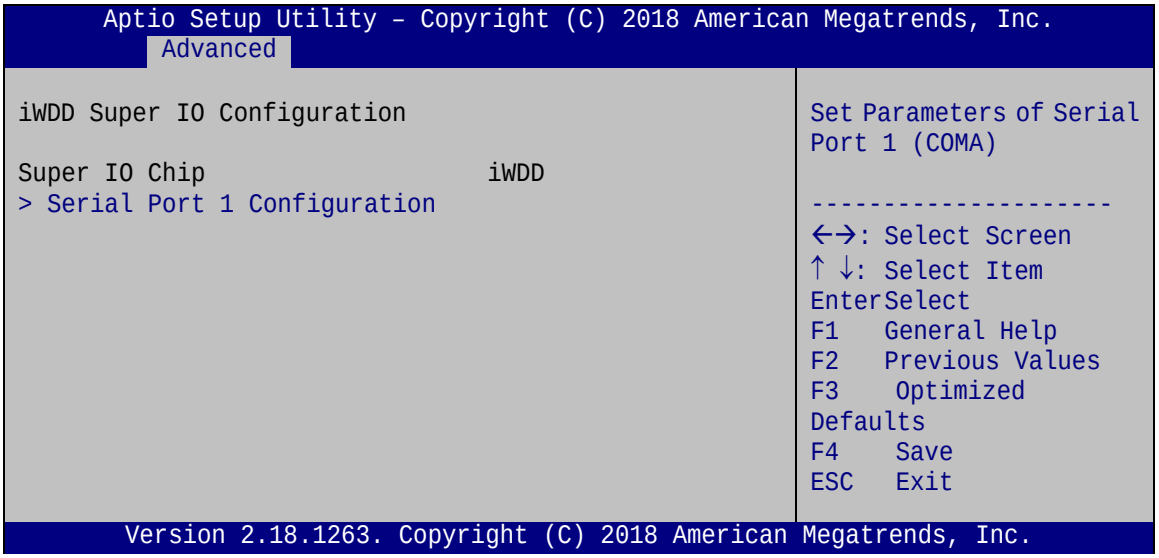
➔ **PC Health Status**

The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures
- Voltages
  - CPU_CORE
  - +12V
  - +DDR
  - +5VSB
  - +3.3V
  - +3.3VSB

5.3.3 iWDD Super IO Configuration

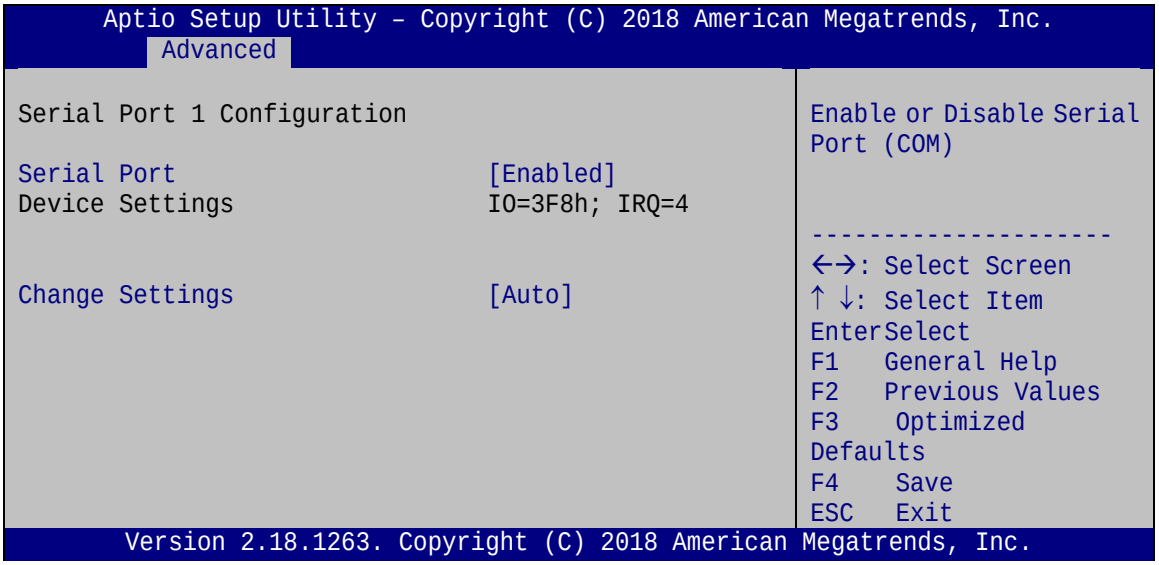
Use the **iWDD Super IO Configuration** menu (**BIOS Menu 5**) to set or change the configurations for the serial ports.



BIOS Menu 5: iWDD Super IO Configuration

5.3.3.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 6**) to configure the serial port 1.



BIOS Menu 6: Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

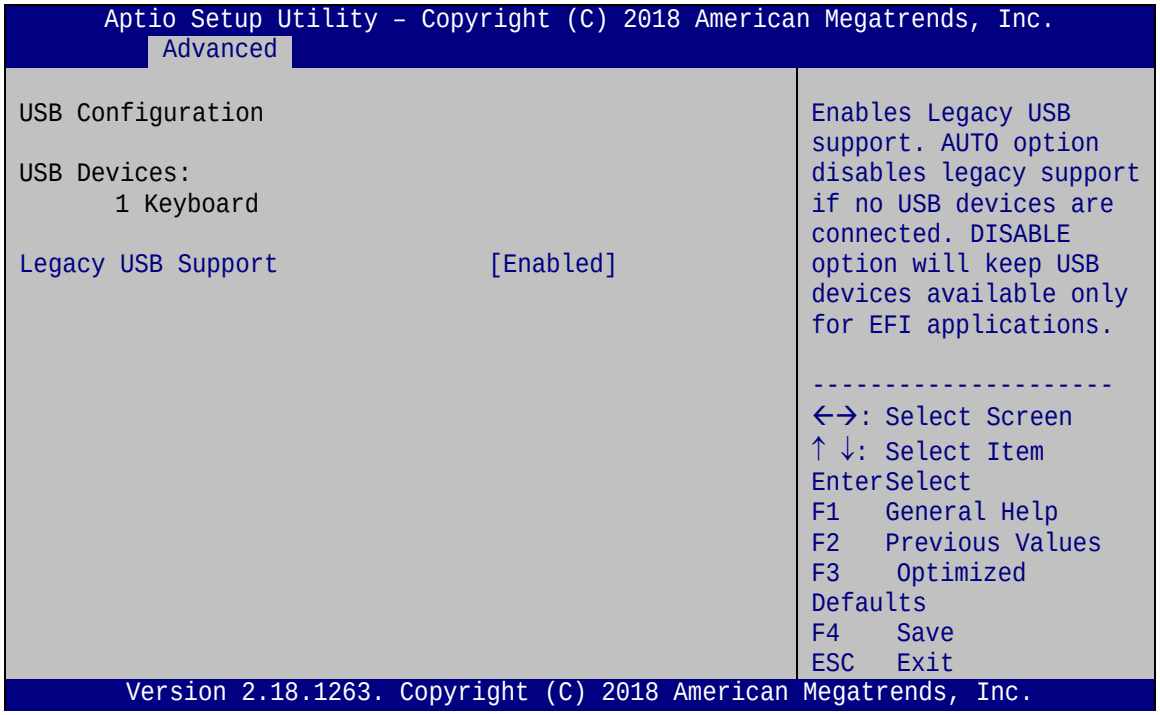
➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4
➔ **IO=3F8h; IRQ=4, 10, 11**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4, 10, 11
➔ **IO=2F8h; IRQ=4, 10, 11**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ4, 10, 11
➔ **IO=3E8h; IRQ=4, 10, 11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ4, 10, 11
➔ **IO=2E8h; IRQ=4, 10, 11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ4, 10, 11

5.3.4 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 7**) to read USB configuration information and configure the USB settings.



BIOS Menu 7: USB Configuration

➔ **USB Devices**

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Enabled** **DEFAULT** Legacy USB support enabled

➔ **Disabled** Legacy USB support disabled

➔ **Auto** Legacy USB support disabled if no USB devices are connected

5.3.5 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 8**) to view detailed CPU specifications and configure the CPU.

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
   Advanced

CPU Configuration                                  Enable/Disable Intel
                                                   SpeedStep
Intel(R) Celeron(R) CPU N3350 @ 1.10GHz
CPU Signature                   506C9
Microcode Patch                 2E
Max CPU Speed                   1100 MHz
Min CPU Speed                   800 MHz
Processor Cores                 2
Intel HT Technology             Not Supported
Intel VT-x Technology           Supported          ----------------------

L1 Data Cache                   24 KB x 2          ←→: Select Screen
L1 Code Cache                   32 KB x 2          ↑ ↓: Select Item
L2 Cache                        1024 KB x 2        EnterSelect
L3 Cache                        Not Present        F1   General Help
                                                   F2   Previous Values
EIST                            [Enabled]          F3    Optimized
C-States                        [Disabled]         Defaults
Intel Virtualization Technology [Disabled]         F4    Save
VT-d                            [Disabled]         ESC   Exit

      Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 8: CPU Configuration

➔ **EIST [Enabled]**

Use the **EIST** option to enable or disable the Intel® Speed Step Technology.

➔ **Disabled** Disables the Intel® Speed Step Technology.

➔ **Enabled** **DEFAULT** Enables the Intel® Speed Step Technology.

➔ **C-States [Disabled]**

Use the **C-States** option to enable or disable the C-states.

➔ **Disabled**	**DEFAULT**	Disables the C-state
➔ **Enabled**		Enables the C-state

➔ **Intel Virtualization Technology [Disabled]**

Use the **Intel Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel® Virtualization technology allows several OSs to run on the same system at the same time.

➔ **Disabled**	**DEFAULT**	Disables Intel® Virtualization Technology.
➔ **Enabled**		Enables Intel® Virtualization Technology.

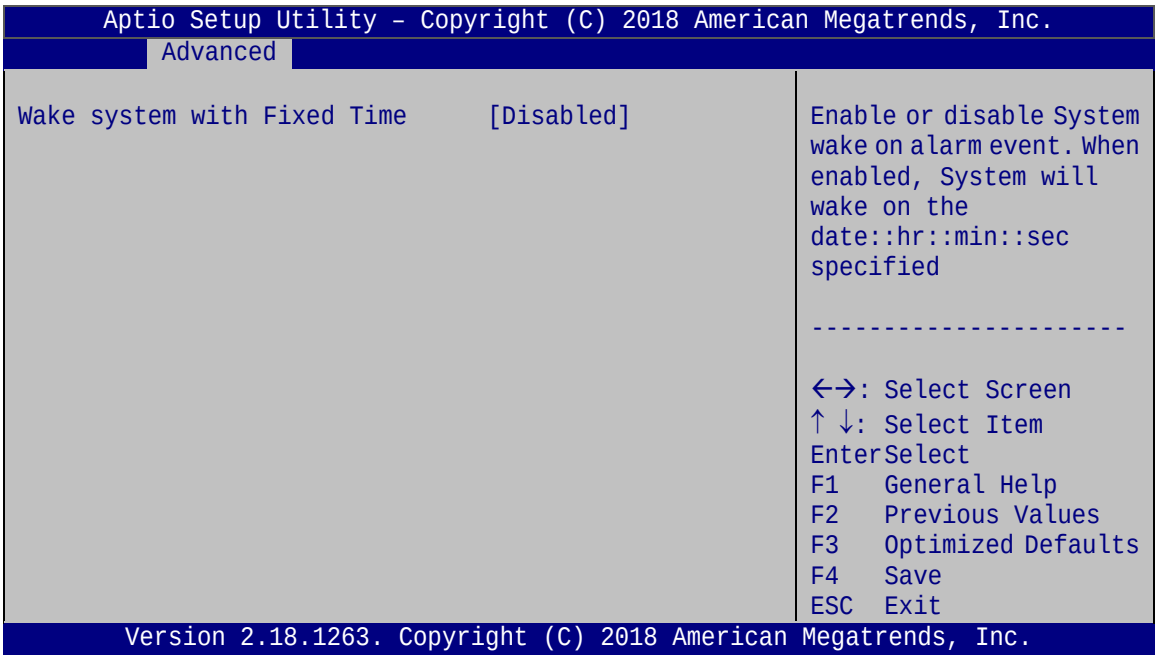
➔ **VT-d [Disabled]**

Use the **VT-d** BIOS option to enable or disabled VT-d support.

➔ **Disabled**	**DEFAULT**	Disable VT-d support.
➔ **Enabled**		Enable VT-d support.

5.3.6 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 9**) configures RTC wake event.



BIOS Menu 9: RTC Wake Settings

➔ **Wake system with Fixed Time [Disabled]**

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

➔ **Disabled** **DEFAULT** The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:

Wake up date

Wake up hour

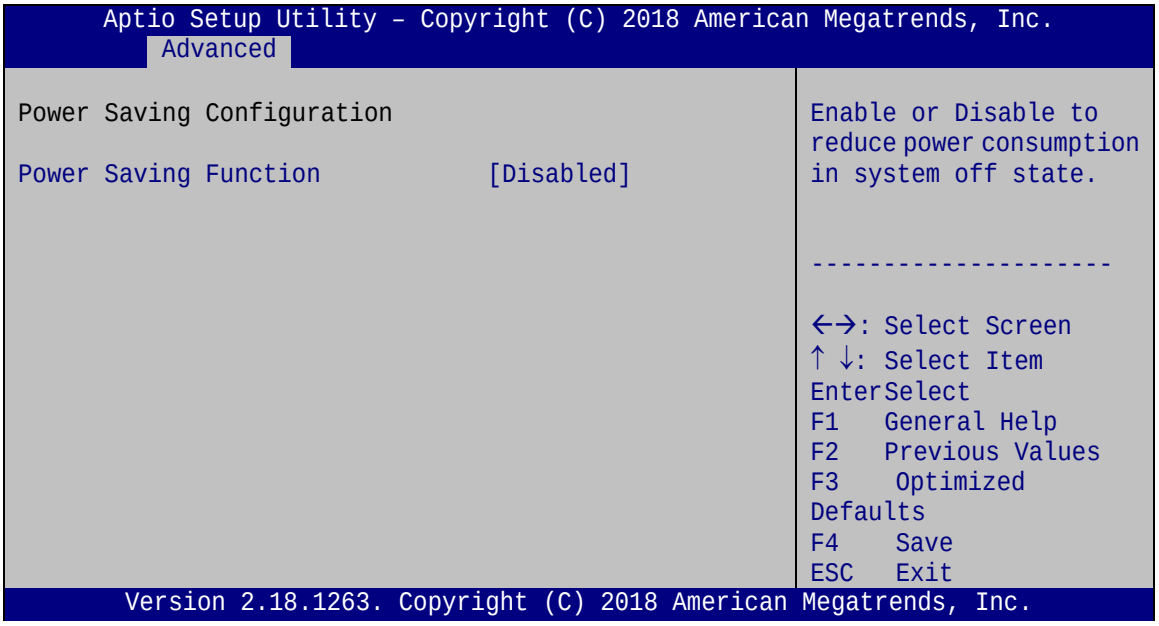
Wake up minute

Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.7 Power Saving Configuration

Use the **Power Saving Configuration** menu (**BIOS Menu 10**) to configure system to reduce power consumption in system off state.



BIOS Menu 10: Power Saving Configuration

➔ **Power Saving Function [Disabled]**

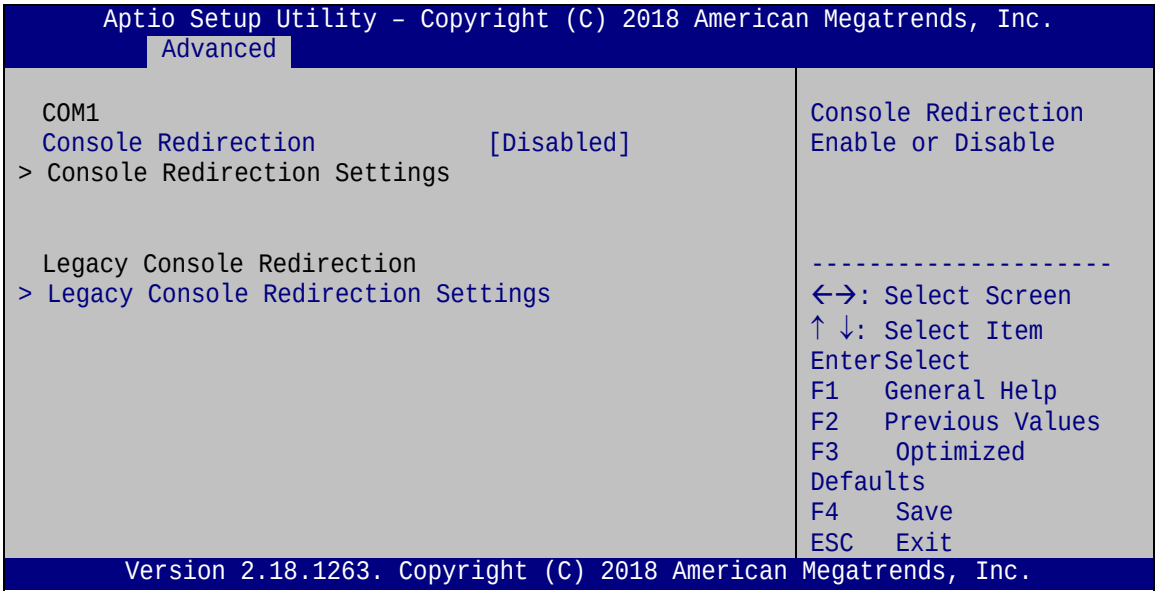
Use the **Power Saving Function** BIOS option to enable or disable the power saving function.

➔ **Disabled** **DEFAULT** Power saving function is disabled.

➔ **Enabled** Power saving function is enabled. It will reduce power consumption when the system is off.

5.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 11**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 11: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

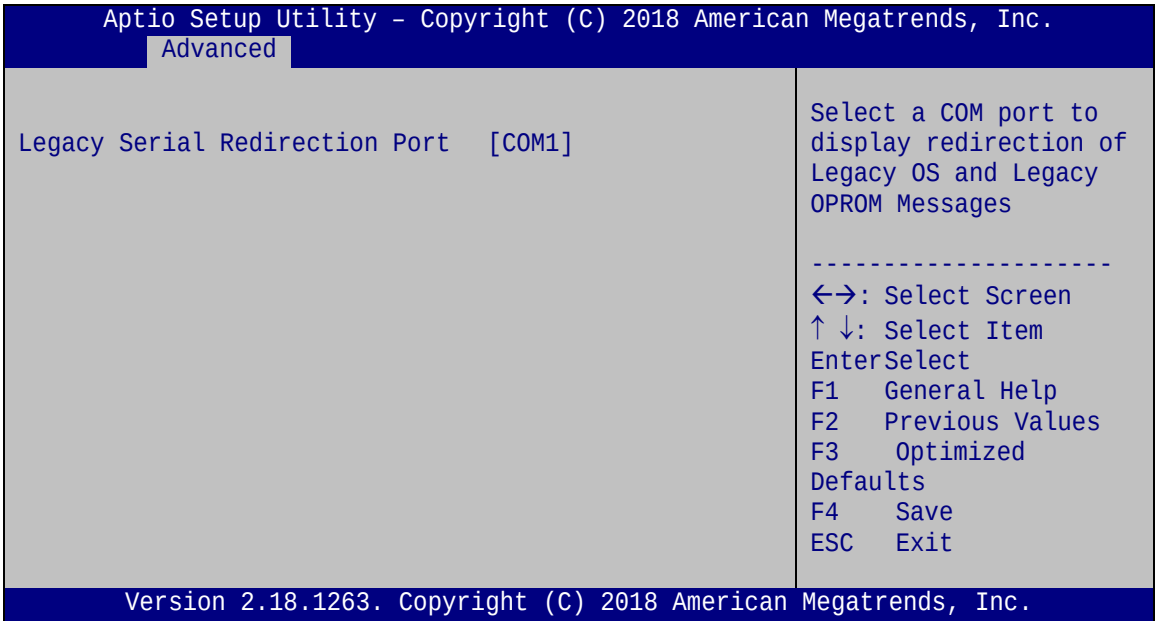
Use **Console Redirection** option to enable or disable the console redirection function.

➔ **Disabled** **DEFAULT** Disabled the console redirection function

➔ **Enabled** Enabled the console redirection function

5.3.8.1 Legacy Console Redirection Settings

The **Legacy Console Redirection Settings** menu (**BIOS Menu 12**) allows the legacy console redirection options to be configured.



BIOS Menu 12: Legacy Console Redirection Settings

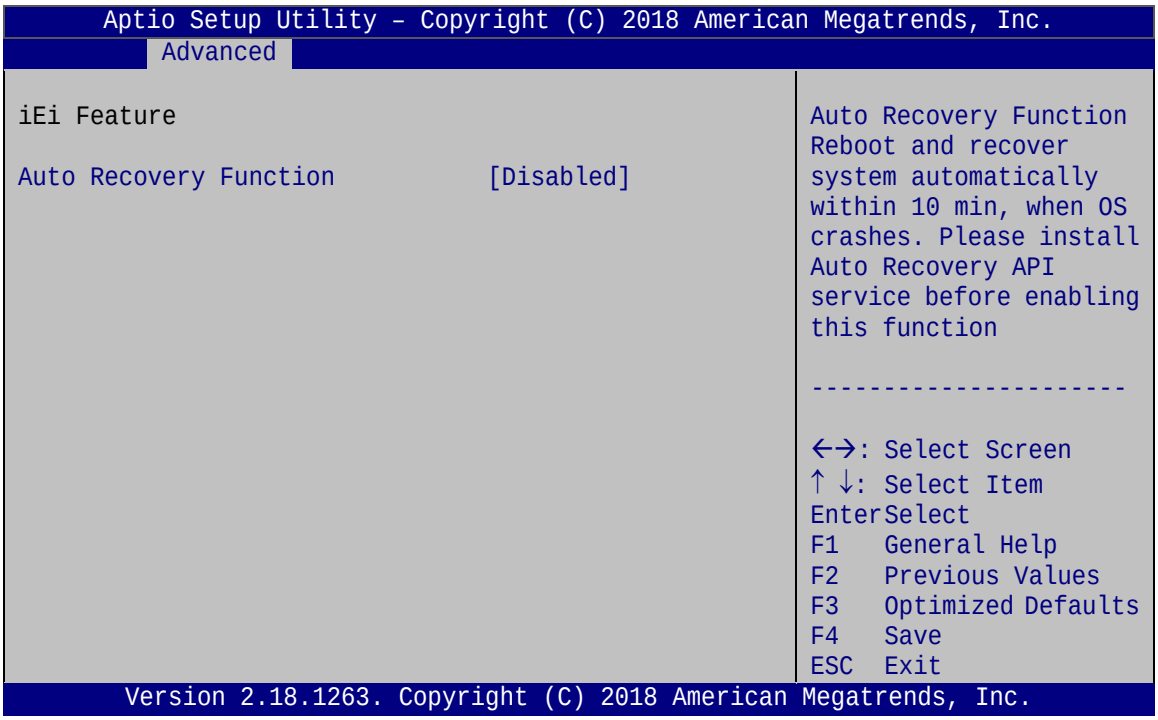
➔ **Legacy Serial Redirection Port [COM1]**

Use the **Legacy Serial Redirection Port** option to specify a COM port to display redirection of legacy OS and legacy OPROM messages. The options include:

- COM1 **DEFAULT**

5.3.9 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 13**) to configure One Key Recovery function.



BIOS Menu 13: IEI Feature

➔ **Auto Recovery Function [Disabled]**

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

➔ **Disabled** **DEFAULT** Auto recovery function disabled

➔ **Enabled** Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 14**) to access the north bridge and south bridge configuration menus

WARNING!

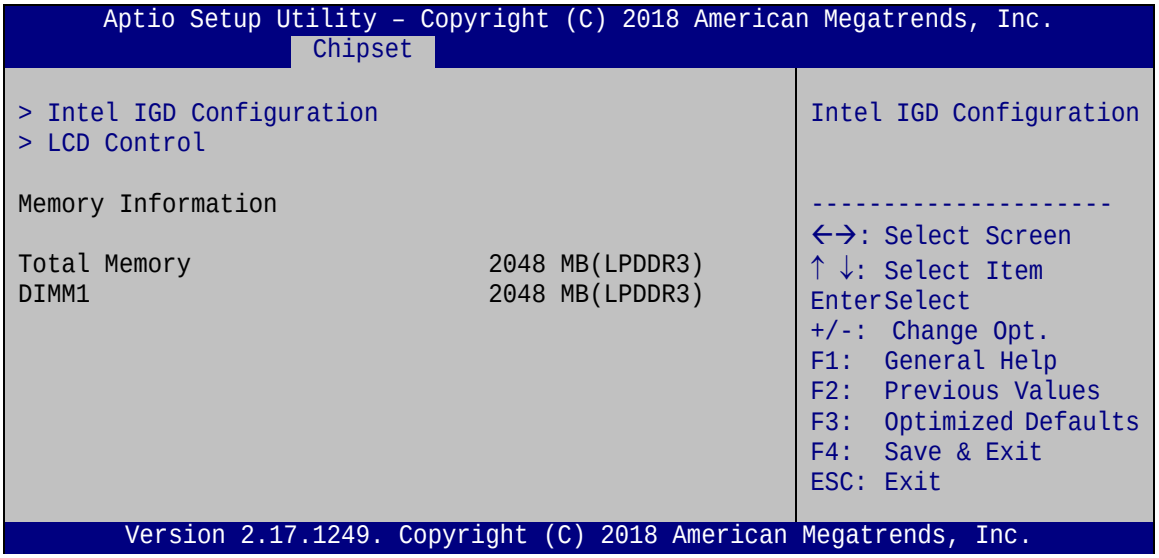
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
  Main    Advanced  Chipset   Security    Boot    Save & Exit

> North Bridge                                  North Bridge Parameters
> South Bridge


                                                ---------------------
                                                ←→: Select Screen
                                                ↑ ↓: Select Item
                                                EnterSelect
                                                +/-:  Change Opt.
                                                F1    General Help
                                                F2    Previous Values
                                                F3    Optimized Defaults
                                                F4    Save & Exit
                                                ESC   Exit
        Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 14: Chipset

5.4.1 North Bridge Configuration

Use the **North Bridge Configuration** menu (**BIOS Menu 15**) to configure the Intel IGD settings.



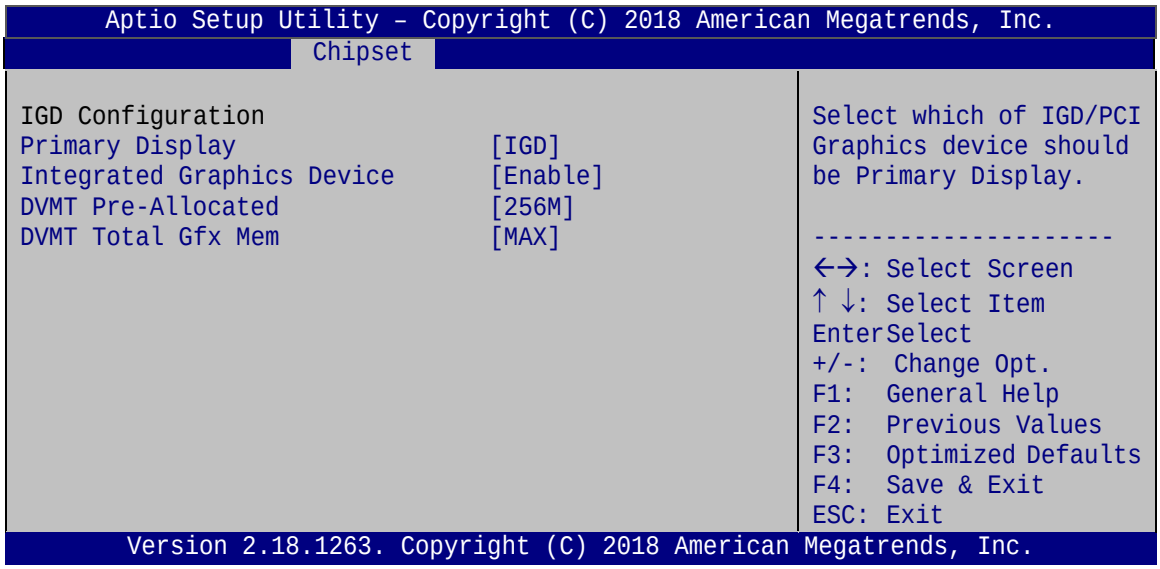
BIOS Menu 15: North Bridge Configuration

➔ **Memory Information**

The **Memory Information** lists a brief summary of the on-board memory. The fields in **Memory Information** cannot be changed.

5.4.1.1 Intel IGD Configuration

Use the **Intel IGD Configuration** menu (**BIOS Menu 16**) to configure the video device connected to the system.



BIOS Menu 16: Intel IGD Configuration

➔ **Primary Display [IGD]**

Use the **Primary Display** option to select the graphics controller used as the primary boot device. Configuration option includes:

- IGD **DEFAULT**

➔ **Integrated Graphics Device [Enable]**

Use the **Integrated Graphics Device** option to enable or disable Integrated Graphics Device (IGD).

➔ **Disable** Always disable IGD.

➔ **Enable** **DEFAULT** Enabled Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor.

➔ **DVMT Pre-Allocated [256M]**

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- 64M
- 128M
- 256M **DEFAULT**
- 512M

➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to select DVMT5.0 total graphic memory size used by the internal graphic device. The following options are available:

- 128M
- 256M
- MAX **DEFAULT**

5.4.1.2 LCD Control

Use the **LCD Control** submenu (**BIOS Menu 17**) to select a display device which will be activated during POST.

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                    Chipset
LCD Control                                 | Select the Video Device which
                                            | will be activated during POST.
Primary IGFX Boot Display       [Auto]      | This has no effect if external
                                            | graphics present. Secondary
LVDS Panel Detect               [INSTALLED] | boot display selection will
                                            | appear based on your
On board LVDS                   [Disabled]  | selection. VGA modes will be
                                            | supported only on primary
Panel Setting                               | display.
                                            |
                                            | ---------------------
Backlight Control Mode          [LED]       | ←→: Select Screen
Backlight Control Type          [PWM]       | ↑ ↓: Select Item
Backlight Control Voltage Level [3.3V]      | Enter Select
LCD Panel Type                  [800x600 18bit] | +/-: Change Opt.
                                            | F1: General Help
                                            | F2: Previous Values
                                            | F3: Optimized Defaults
                                            | F4: Save & Exit
                                            | ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 17: LCD Control

➔ **Primary IGFX Boot Display [Auto]**

Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- Auto **DEFAULT**
- HDMI1
- LVDS

➔ **On board LVDS [Disabled]**

Use the **On board LVDS** option to enable or disable the LVDS connector.

➔ **Disabled** **DEFAULT** Disable LVDS.

➔ **Enabled** Enabled LVDS.

➔ **Backlight Control Mode [LED]**

Use the **Backlight Control Mode** option to specify the backlight control mode. Configuration options are listed below.

- LED **DEFAULT**
- CCFL

➔ **Backlight Control Type [PWM]**

Use the **Backlight Control Type** option to specify the backlight control type. Configuration options are listed below.

- PWM **DEFAULT**
- DC

➔ **Backlight Control Voltage Level [3.3V]**

Use the **Backlight Control Voltage Level** option to specify the voltage of the power supplied to the LCD panel. Configuration options are listed below.

- 3.3V **DEFAULT**
- 5.0V

➔ **LCD Panel Type [800x600 18bit]**

Use the **LCD Panel Type** option to select the type of flat panel connected to the system. Configuration options are listed below.

- 800x600 18bit **DEFAULT**
- 1024x768 18bit
- 1024x768 24bit
- 1280x768 18bit
- 1280x800 18bit
- 1280x960 18bit
- 1366x768 18bit
- 1366x768 24bit

5.4.2 South Bridge Configuration

Use the **South Bridge Configuration** menu (**BIOS Menu 18**) to configure the south bridge chipset.

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                    Chipset

Auto Power Button Function      [Disable (ATX)]     HD-Audio Configuration
> HD-Audio Configuration                            Settings.
> PCI Express Configuration
> SATA Configuration

                                                    ---------------------
Restore AC Power Loss           [Last State]        ←→: Select Screen
                                                    ↑ ↓: Select Item
                                                    EnterSelect
                                                    +/-:  Change Opt.
                                                    F1:  General Help
                                                    F2:  Previous Values
                                                    F3:  Optimized Defaults
                                                    F4:  Save & Exit
                                                    ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 18: South Bridge Configuration

➔ **Restore on AC Power Loss [Last State]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

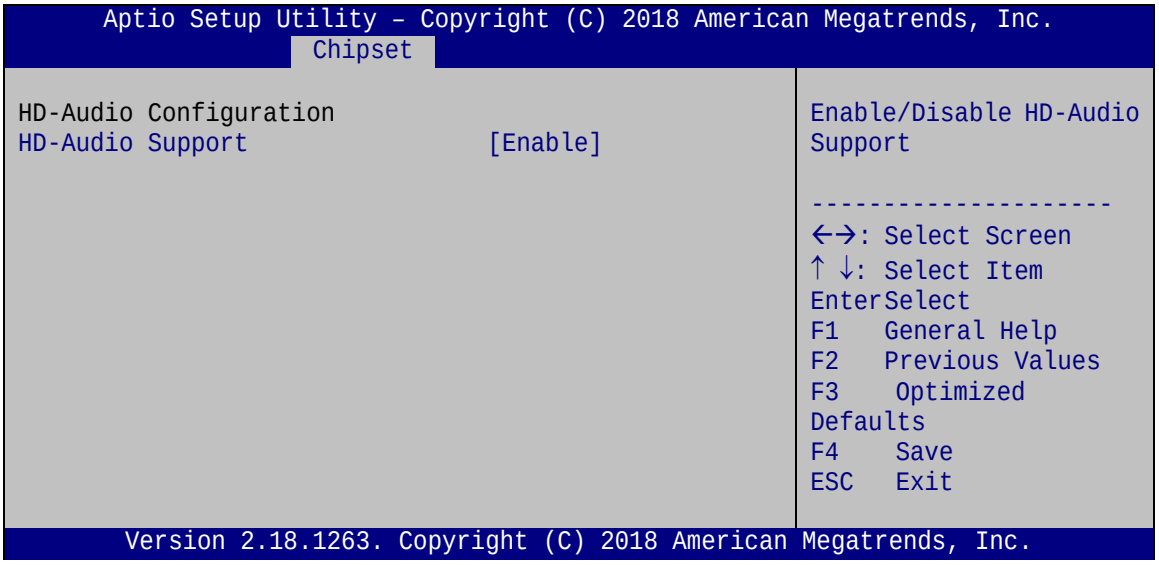
➔ **Power Off** The system remains turned off

➔ **Power On** The system turns on

➔ **Last State** **DEFAULT** The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

5.4.2.1 HD-Audio Configuration

Use the **HD-Audio Configuration** menu (**BIOS Menu 19**) to configure the HD Audio.



BIOS Menu 19: HD-Audio Configuration

➔ **HD-Audio Support [Enable]**

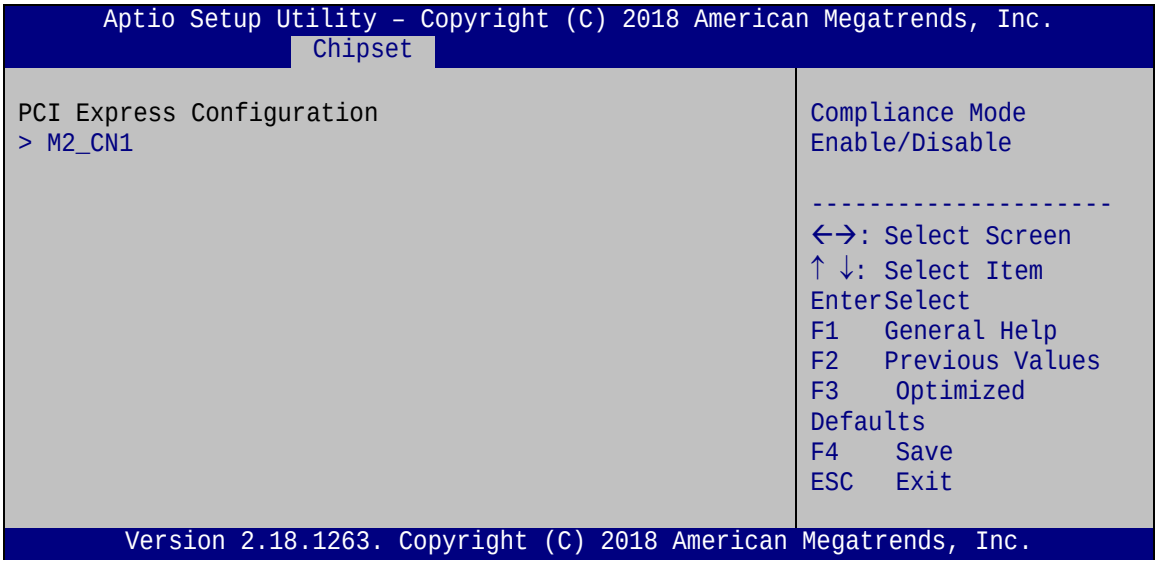
Use the **HD-Audio Support** option to enable or disable the High Definition Audio controller.

➔ **Disable** The onboard HDA controller is disabled

➔ **Enable** **DEFAULT** The onboard HDA is detected automatically and enabled

5.4.2.2 PCI Express Configuration

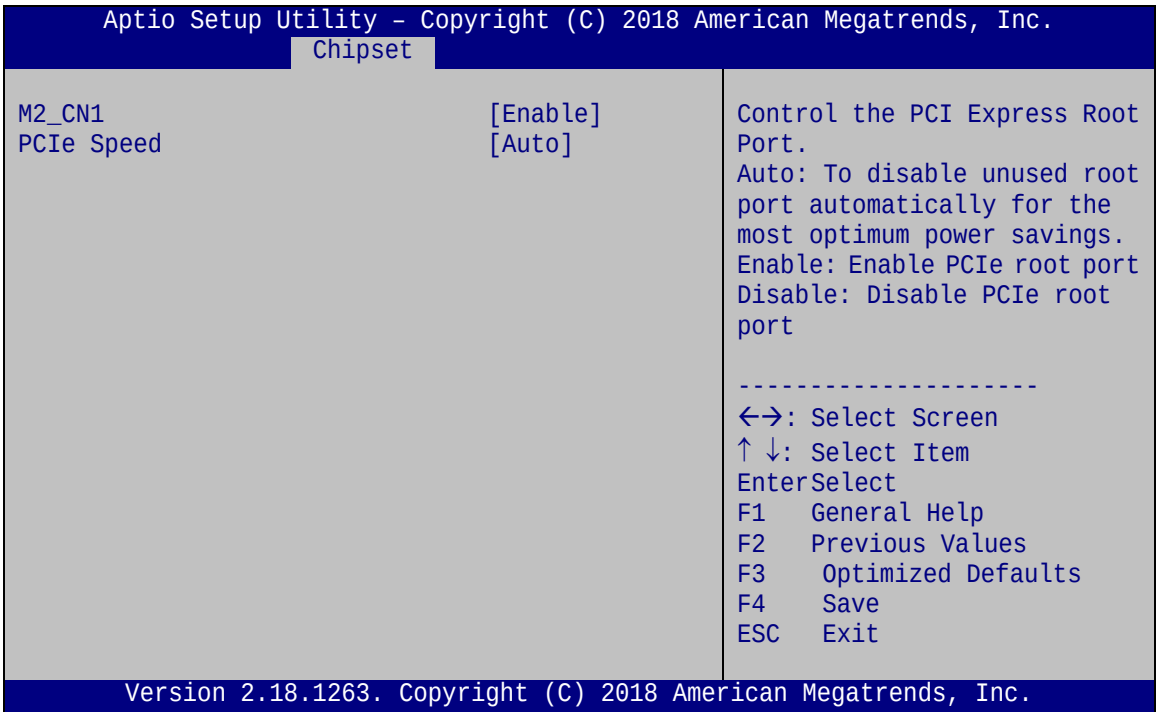
Use the **PCI Express Configuration** menu (**BIOS Menu 20**) to configure the PCI Express.



BIOS Menu 20: PCI Express Configuration

5.4.2.2.1 M2_CN1

Use the **M2_CN1** menus (**BIOS Menu 21**) to configure the M.2 A-key slot.



BIOS Menu 21: M2_CN1

➔ **M2_CN1 [Enable]**

Use the **M2_CN1** option to enable or disable the M.2 A-key slot.

➔	**Disabled**		Disables the M.2 A-key slot.
➔	**Enabled**	**DEFAULT**	Enables the M.2 A-key slot.
➔	**Auto**		Disables the unused port automatically for the most optimum power savings.

➔ **PCIe Speed [Auto]**

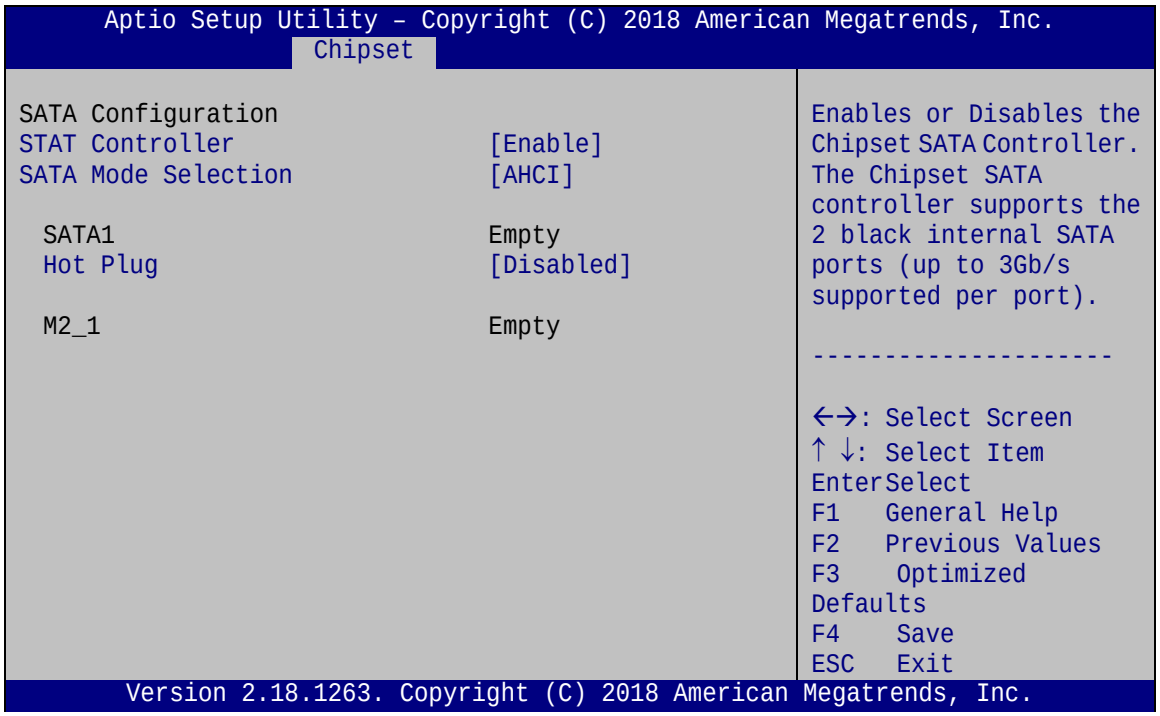
Use the **PCIe Speed** option to configure the M.2 A-key slot speed.

➔	**Auto**	**DEFAULT**	Configure M.2 A-key speed to auto
➔	**Gen 1**		Configure M.2 A-key slot speed to Gen1

➔ **Gen 2** Configure M.2 A-key slot speed to Gen2

5.4.2.3 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 22**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 22: SATA Configuration

➔ **STAT Controller [Enable]**

Use the **STAT Controller(s)** option to enable or disable the SATA device.

➔ **Enable** **DEFAULT** Enables the SATA device.

➔ **Disable** Disables the SATA device.

➔ **SATA Mode Selection [AHCI]**

Use the **SATA Mode Selection** option to configure SATA devices as AHCI devices.

➔ **AHCI** **DEFAULT** Configures SATA devices as AHCI device.

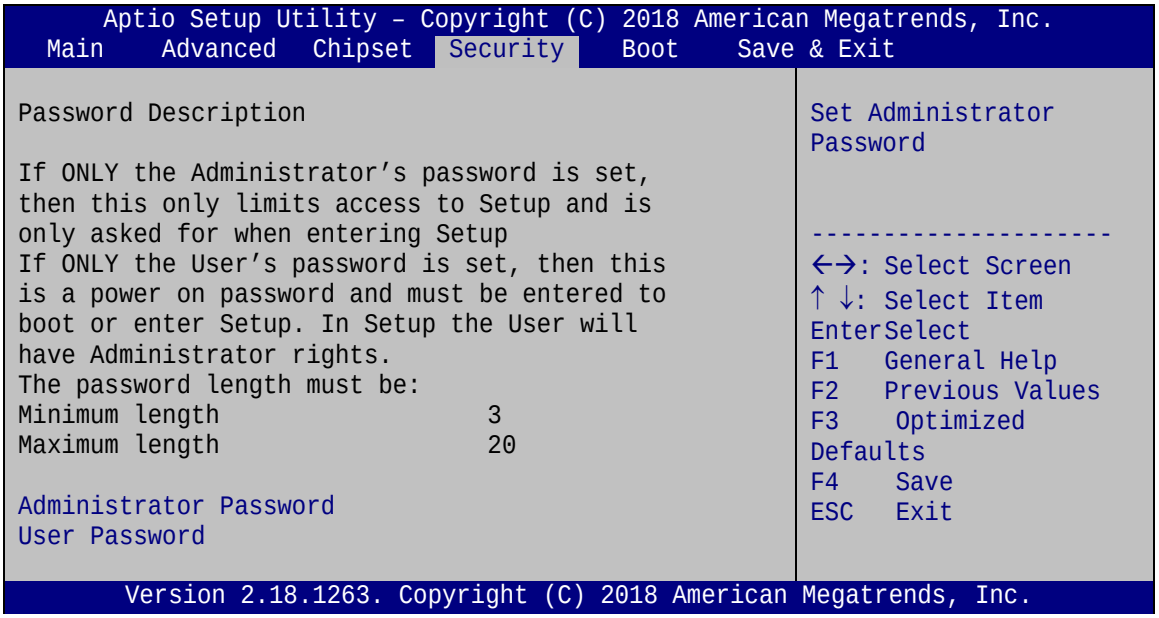
➔ **Hot Plug [Disabled]**

Use the **Hot Plug** option to enable or disable the SATA device hot plug.

➔	**Disabled**	**DEFAULT**	Disables the SATA device hot plug.
➔	**Enabled**		Enables the SATA device hot plug

5.5 Security

Use the **Security** menu (**BIOS Menu 23**) to set system and user passwords.



BIOS Menu 23: Security

➔ **Administrator Password**

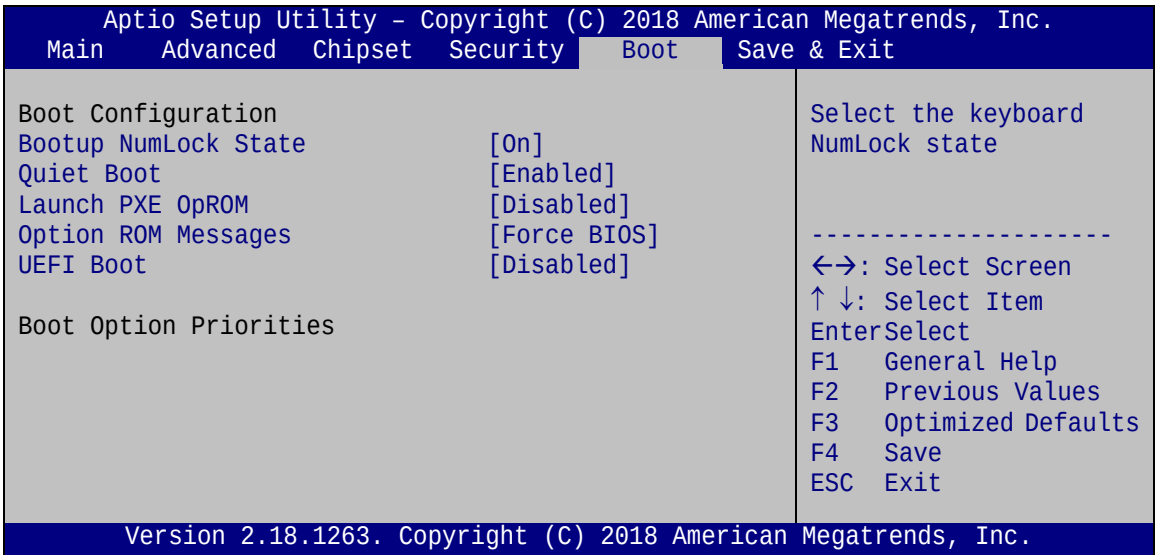
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

Use the **User Password** to set or change a user password.

5.6 Boot

Use the **Boot** menu (**BIOS Menu 24**) to configure system boot options.



BIOS Menu 24: Boot

➔ **Bootup NumLock State [On]**

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **On** **DEFAULT** Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **Quiet Boot [Enabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔	**Disabled**		Normal POST messages displayed
➔	**Enabled**	**DEFAULT**	OEM Logo displayed instead of POST messages

➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

➔	**Disabled**	**DEFAULT**	Ignore all PXE Option ROMs
➔	**Enabled**		Load PXE Option ROMs.

➔ **Option ROM Messages [Force BIOS]**

Use the **Option ROM Messages** option to set the Option ROM display mode.

➔	**Force BIOS**	**DEFAULT**	Sets display mode to force BIOS.
➔	**Keep Current**		Sets display mode to current.

➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** option to enable or disable to boot from the UEFI devices.

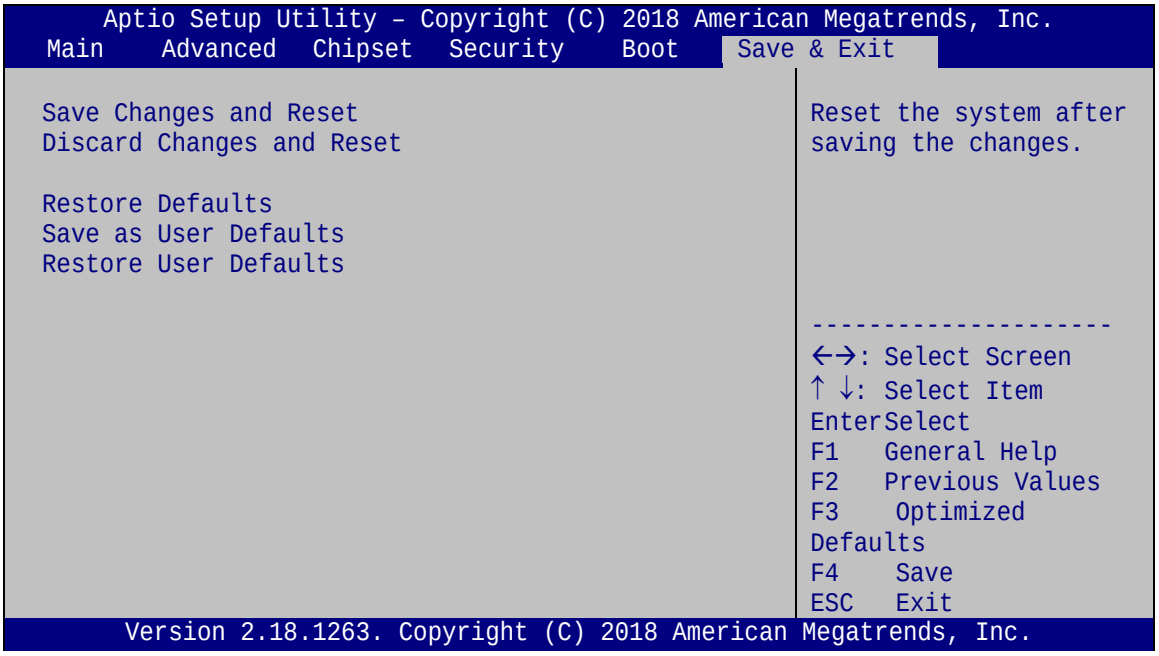
➔	**Enabled**		Boot from UEFI devices is enabled.
➔	**Disabled**	**DEFAULT**	Boot from UEFI devices is disabled.

➔ **Boot Option Priority**

Use the **Boot Option Priority** function to set the system boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.

5.7 Save & Exit

Use the **Save & Exit** menu (**BIOS Menu 25**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 25: Save & Exit

➔ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Reset**

Use the **Discard Changes and Reset** option to exit the system without saving the changes made to the BIOS configuration setup program.

➔ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Chapter

6

Software Drivers

6.1 Available Drivers

All the drivers for the HYPER-AL are available on IEI Resource Download Center (https://download.ieiworld.com). Type HYPER-AL and press Enter to find all the relevant software, utilities, and documentation.

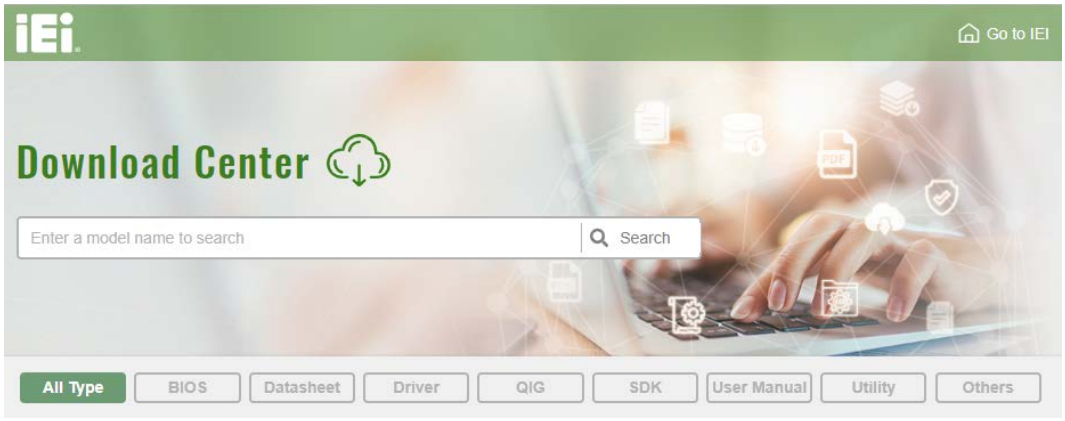
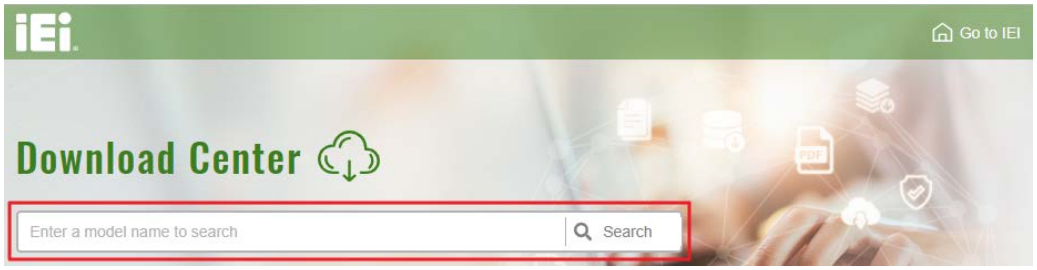


Figure 6-1: IEI Resource Download Center

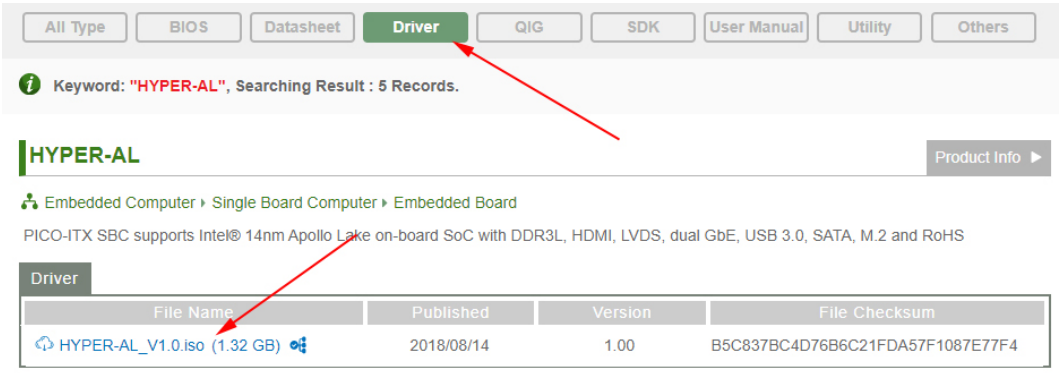
6.2 Driver Download

To download drivers from IEI Resource Download Center, follow the steps below.

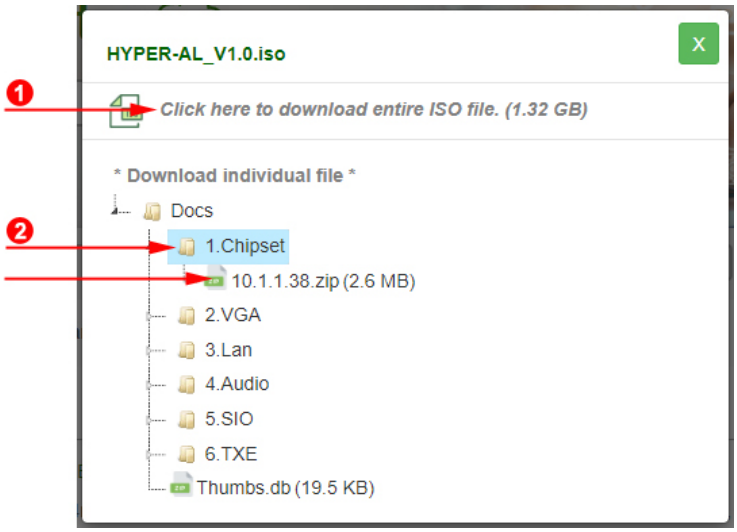
Step 1: Go to https://download.ieiworld.com. Type HYPER-AL and press Enter.



Step 2: All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.



Step 3: Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or click the small arrow to find an individual driver and click the file name to download (❷).



NOTE:

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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.

Appendix

B

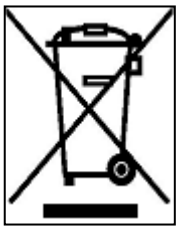
Product Disposal

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union–If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union–The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your device, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

Appendix

C

BIOS Menu Options

Appendix

D

Digital I/O Interface

The DIO connector on the HYPER-AL is interfaced to GPIO ports on the Super I/O chipset. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

The BIOS interrupt call **INT 15H** controls the digital I/O.

INT 15H:

AH – 6FH	
Sub-function:	
AL – 8	:Set the digital port as INPUT
AL	:Digital I/O input value

Assembly Language Sample 1

```
MOV     AX, 6F08H       ;setting the digital port as input
INT     15H             ;
```

AL low byte = value

AH – 6FH	
Sub-function:	
AL – 9	:Set the digital port as OUTPUT
BL	:Digital I/O output value

Assembly Language Sample 2

```
MOV     AX, 6F09H       ;setting the digital port as output
MOV     BL, 09H                 ;digital value is 09H
INT     15H             ;
```

Digital Output is 1001b

Appendix

E

Watchdog Timer

NOTE:

The following discussion applies to DOS. Contact IEI support or visit the IEI website for drivers for other operating systems.

The Watchdog Timer is a hardware-based timer that attempts to restart the system when it stops working. The system may stop working because of external EMI or software bugs. The Watchdog Timer ensures that standalone systems like ATMs will automatically attempt to restart in the case of system problems.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table E-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

The Watchdog Timer is activated through software. The software application that activates the Watchdog Timer must also deactivate it when closed. If the Watchdog Timer is not deactivated, the system will automatically restart after the Timer has finished its countdown.

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT     15H

;
; ADD THE APPLICATION PROGRAM HERE
;

        CMP     EXIT_AP, 1      ;is the application over?
        JNE     W_LOOP          ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H

;
; EXIT ;
```

Appendix

F

Error Beep Code

F.1 PEI Beep Codes

Number of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

F.2 DXE Beep Codes

Number of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

NOTE:

If you have any question, please contact IEI for further assistance.

Appendix

G

Hazardous Materials Disclosure

G.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Display	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.

G.2 China RoHS

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在SJ/T11364-2014與GB/T26572-2011标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。