IEI Integration Corp.

MODEL:

KINO-KX Series

Mini-ITX SBC Supports 16nm Zhaoxin KX-U6580/KXU6780A (70W) On-board Processor with PCIe Mini, VGA, DVI-I, USB 3.2 Gen 1, SATA 6Gb/s, COM, Audio and RoHS

User Manual

Rev. 1.00 - February 18, 2021

RoHS Lead Free

Revision

Date	Version	Changes
February 18, 2021	1.00	Initial release

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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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Introduction

1.1 Introduction

Figure 1-1: KINO-KX

The KINO-KX series is a Mini-ITX form factor single bard computer. It has an on-board Zhaoxin KX-U6780A/KX-U6580 processor, and supports two 260-pin 2666 MHz dual-channel DDR4 SO-DIMM slots with up to 64.0 GB of memory.

The KINO-KX provides two GbE interfaces through the Realtek RTL8111H controllers. The integrated Zhaoxin ZX-200 chipset supports four SATA 6Gb/s drives and one full-size PCIe Mini slot. In addition, the KINO-KX includes VGA and DVI-I interfaces for dual independent display.

Expansion and I/O include one PCIe x16 slot, four USB 3.2 Gen 1 (5Gb/s) on the rear panel, ten USB 2.0 on the rear panel and ten RS-232. High Definition Audio (HDA) support ensures HDA devices can be easily implemented on the KINO-KX.

1.2 Model Variations

The model variations of the KINO-KX series are listed below.

Model No.	Processor
KINO-KX-U6580	Zhaoxin KX-U6580 (8-core, 8 MB cache, 2.5 GHz, 70W)
KINO-KX-U6780A*	Zhaoxin KX-U6780A (8-core, 8 MB cache, 2.7 GHz, 70W)
*By order production, MOQ: 100	

Table 1-1: Model Variations

1.3 Features

Some of the KINO-KX motherboard features are listed below:

- Mini-ITX motherboard supports Zhaoxin KX-U6780A/KX-U6580 on-board processor
- Dual independent display via DVI-I and VGA
- Two 2666 MHz DDR4 SO-DIMM slots support up to 64 GB of memory
- Four SATA 6Gb/s connectors
- One PCIe x16 (x8 mode) slot and one full-size PCIe Mini slot for expansions
- Four external USB 3.2 Gen 1 (5Gb/s) connectors and up to ten USB 2.0 ports
- Supports up to ten RS-232 ports
- TPM 2.0 hardware security function supported by TPM module

1.4 Connectors

The connectors on the KINO-KX are shown in the figures below.

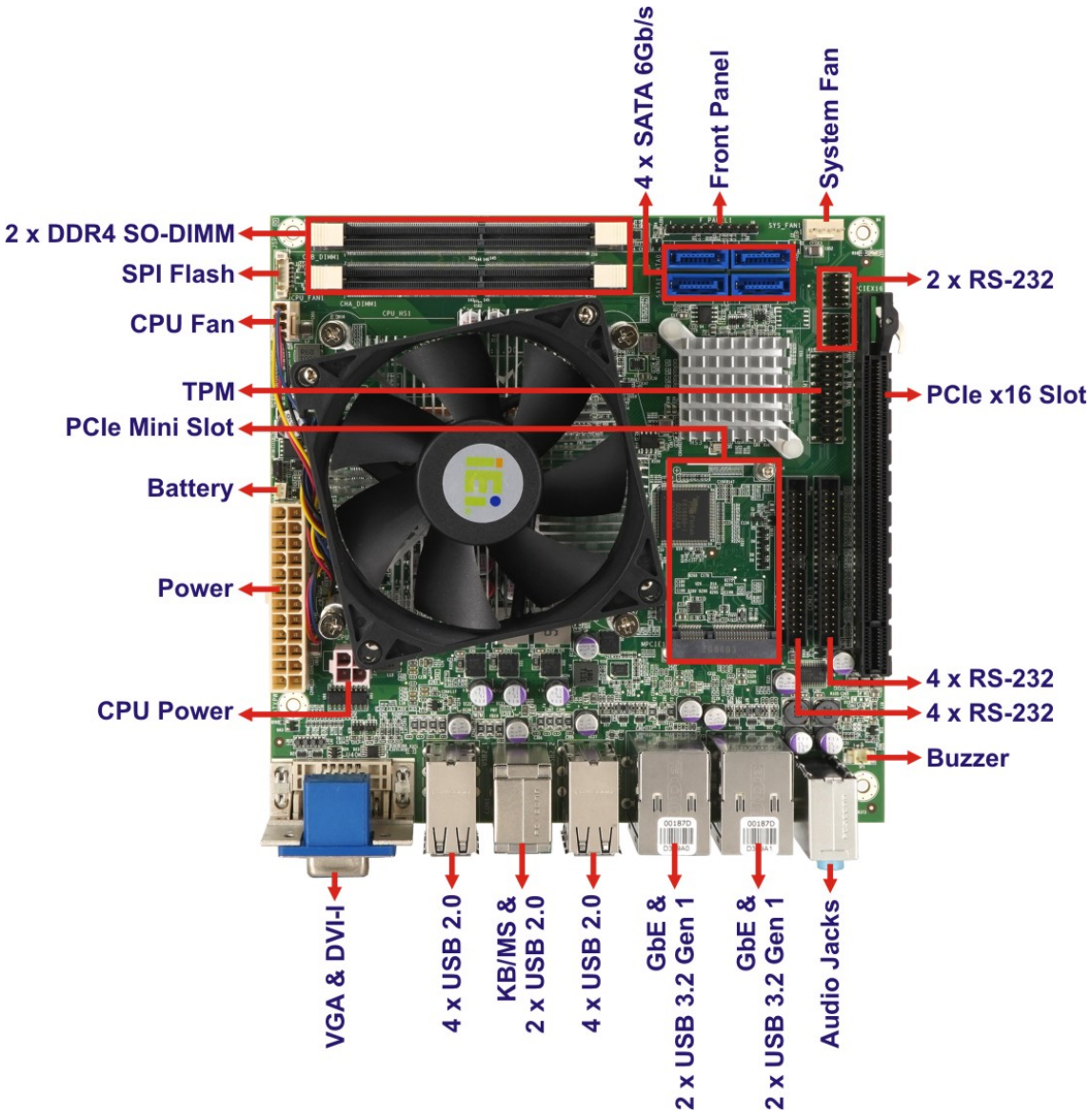


Figure 1-2: Connectors

1.5 Dimensions

The dimensions of the two models are listed below:

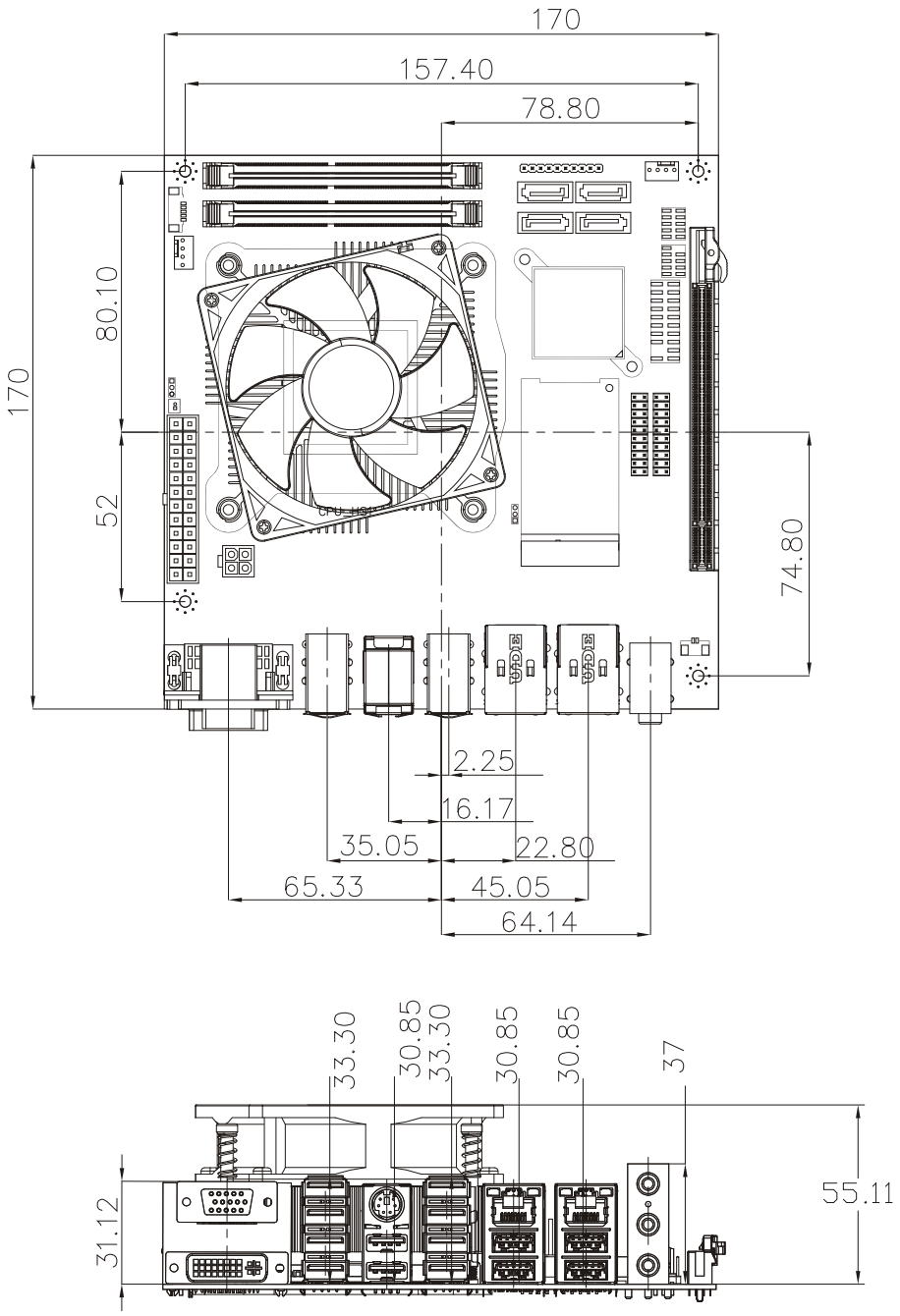


Figure 1-3: Dimensions (mm)

1.6 Data Flow

Figure 1-4 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

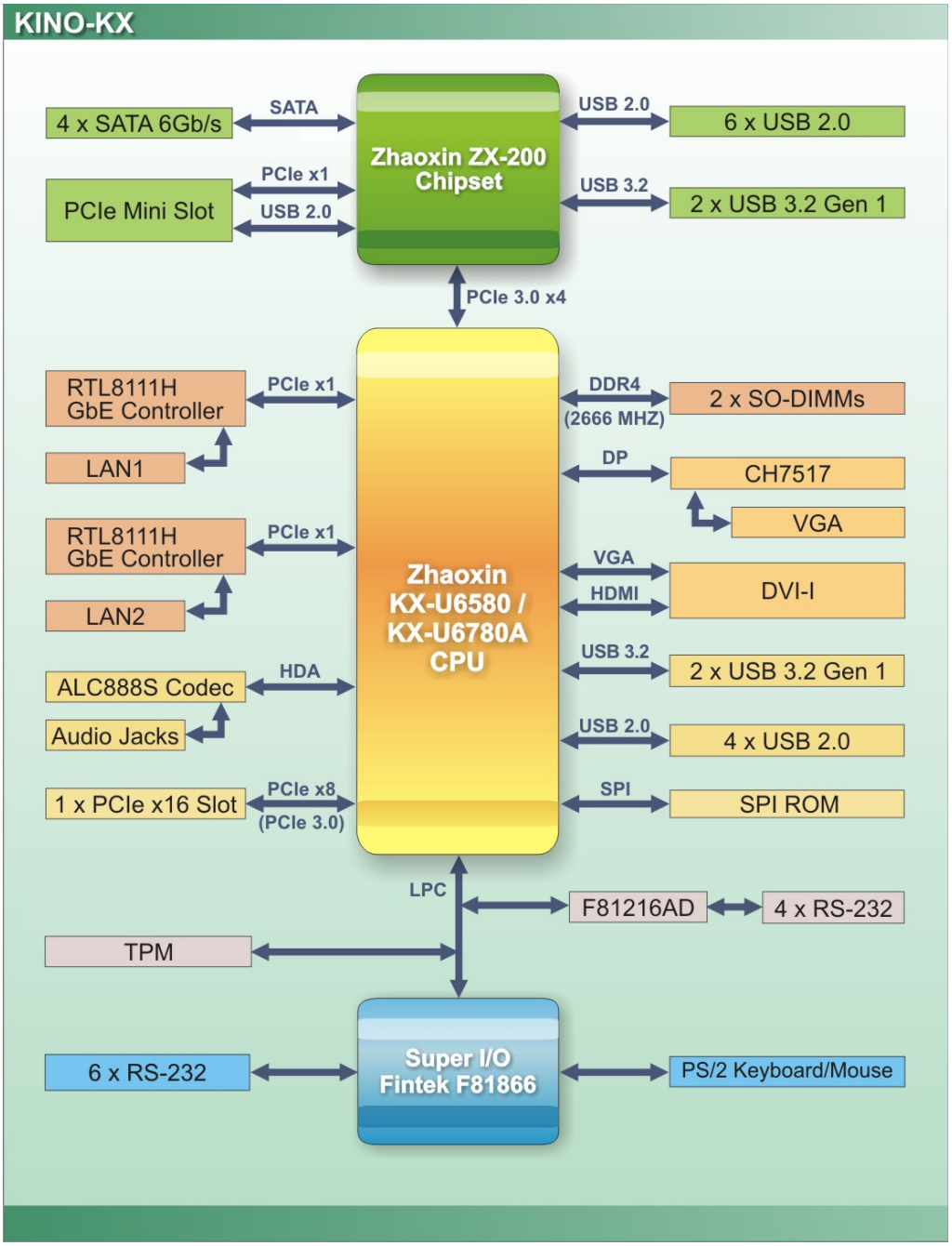


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

KINO-KX technical specifications are listed below.

Specification	KINO-KX
Form Factor	Mini-ITX
Processor	Zhaoxin KX-U6580 (8-core, 8 MB cache, 2.5 GHz, 70W) Zhaoxin KX-U6780A (8-core, 8 MB cache, 2.7 GHz, 70W)
Chipset	Zhaoxin ZX-200
BIOS	AMI UEFI BIOS
Memory	Two 260-pin 2666 MHz DDR4 SDRAM SO-DIMM slots (system max. 64 GB)
Graphics	C-960 Graphics Processing Unit with 2D/3D/video acceleration
Display Output	1 x VGA (up to 1920x1080@60Hz) 1 x DVI-I (up to 1920x1080@60Hz)
Ethernet	Dual Realtek RTL8111H PCIe GbE controller
Super IO	Fintek F81866
Audio	Realtek ALC888S HD audio codec
Watchdog Timer	Software programmable support 1~255 sec. system reset
I/O Interface	
Audio Connector	3 x Audio jack (line-in, line-out and mic-in)
Ethernet	2 x RJ-45 GbE port
Serial Ports	2 x RS-232 by 10-pin (2x5) header 8 x RS-232 by two 40-pin (2x20) header
USB Ports	4 x USB 3.2 Gen 1 (5Gb/s) on rear I/O 10 x USB 2.0 on rear I/O
Front Panel	1 x Front panel connector by 10-pin (1x10) header for power LED, HDD LED, power button and reset button
Fan	1 x CPU smart fan connector by 4-pin (1x4) wafer 1 x System smart fan connector by 4-pin (1x4) wafer

Specification	KINO-KX
Keyboard/Mouse	1 x PS/2 keyboard/mouse connector on rear IO
TPM	1 x TPM connector by 20-pin (2x10) header
Storage	4 x SATA 6Gb/s connectors
Expansion	1 x Full-size PCIe Mini slot (USB 2.0 + PCIe 2.0 x1 signal) 1 x PCIe x16 slot (with PCIe 3.0 x8 signal)
Environmental and Power Specifications	
Power Supply	ATX power supply
Power Connector	1 x Internal power connector by 24-pin (2x12) connector 1 x Internal power connector by 4-pin (2x2) connector
Power Consumption	12V @ 3.38A, 3.3V @ 0.62A, 5V @ 9.81A, 5VSB @ 0.03A (Zhaoxin KX-U6580 2.5 GHz CPU with 8 GB 2400 MHz DDR4 memory)
Temperature	Operating: -10°C ~ 50°C Storage: -20°C ~ 60°C
Humidity	20% ~ 95%, non-condensing
Safety	CE/FCC compliant
Physical Specifications	
Dimensions	170 mm x 170 mm
Weight GW/NW	900 g / 400 g

Table 1-2: 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 KINO-KX 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 KINO-KX was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The KINO-KX is shipped with the following components:

Quantity	Item and Part Number	Image
1	KINO-KX single board computer	
1	SATA cable	
1	I/O shielding	
1	Quick Installation Guide	

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Quad RS-232 cable (w/o bracket), 300mm, p=2.0 (**P/N**: 32200-025401-RS)	
Quad RS-232 cable (w/o bracket), 300mm, p=2.0 (**P/N**: 32205-002000-100-RS)	
RS-232 cable, 200mm, p=2.0 (**P/N:** 32205-002700-200-RS)	
Infineon TPM module, 20-pin, firmware v4.4 (**P/N**: TPM-IN01-R20)	

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 KINO-KX Layout

The figures below show all the connectors and jumpers.

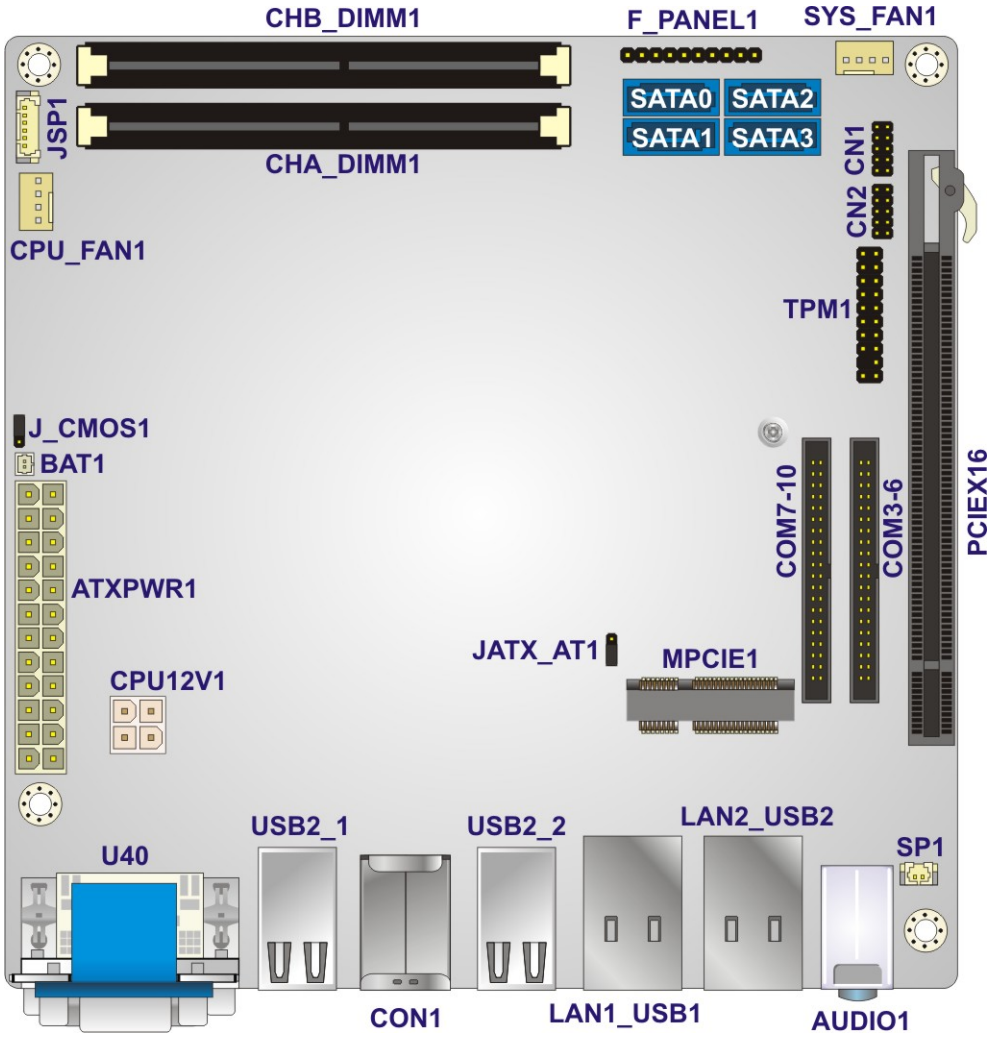


Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
12 V DC-IN power connector	4-pin Molex	CPU12V1
ATX power connector	24-pin connector	ATXPWR1
Battery connector	2-pin wafer	BAT1
Buzzer connector	2-pin wafer	SP1
Fan connector, CPU	4-pin wafer	CPU_FAN1
Fan connector, system	4-pin wafer	SYS_FAN1
Front panel connector	10-pin header	F_PANEL1
Memory slots	260-pin DDR4 SO-DIMM	CHA_DIMM1, CHB_DIMM1
PCIe x16 slot	PCIe x16 slot	PCIEX16
PCIe Mini slot	Full-size PCIe Mini slot	MPCIE1
RS-232 connectors	10-pin header	CN1, CN2
Quad RS-232 connectors	40-pin box header	COM3-6, COM7-10
SATA 6Gb/s drive connectors	7-pin SATA connector	SATA0, SATA1, SATA2, SATA3
SPI flash connector	6-pin wafer	JSP1
TPM connector	20-pin header	TPM1

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
Audio jacks	Audio jack	AUDIO1
KB/MS and USB 2.0 connector	PS/2 KB/MS & USB 2.0 Type A combo	CON1
LAN and USB 3.2 Gen 1 combo connectors	RJ-45 & USB 3.2 Type A combo	LAN1_USB1, LAN2_USB2
USB 2.0 connectors	Quad-port USB 2.0 Type A	USB2_1, USB2_2
VGA and DVI-I connector	VGA & DVI-I combo	U40

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the KINO-KX.

3.2.1 12 V DC-IN Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin Molex, p=4.2 mm

CN Location: See **Figure 3-2**

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

The connector supports the 12 V power supply.

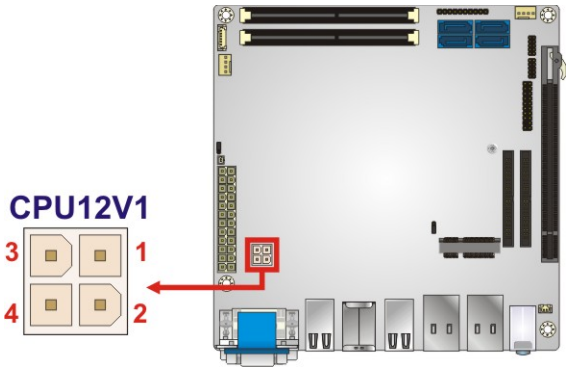


Figure 3-2: DC-IN Power Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	+12V	4	+12V

Table 3-3: DC-IN Power Connector Pinouts

3.2.2 ATX Power Connector

CN Label: **ATXPWR1**

CN Type: 24-pin connector, p=4.2 mm

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

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

The ATX power connector connects to an ATX power supply.

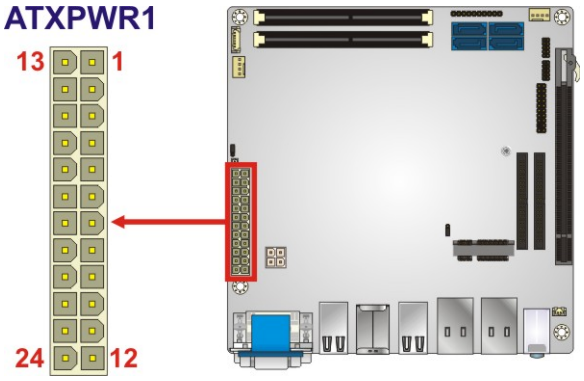


Figure 3-3: ATX Power Connector Pinout Locations

Pin	Description	Pin	Description
1	+3.3 V	13	+3.3 V
2	+3.3 V	14	-12 V
3	GND	15	GND
4	+5 V	16	PS-ON
5	GND	17	GND
6	+5 V	18	GND
7	GND	19	GND
8	PW-OK	20	NC
9	+ATX_5VSB	21	+5 V
10	+12 V	22	+5 V
11	+12 V	23	+5 V
12	+3.3 V	24	GND

Table 3-4: ATX Power Connector Pinouts

3.2.3 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 KINO-KX is installed.

CN Label:	**BAT1**
CN Type:	2-pin wafer, p=1.25 mm
CN Location:	See **Figure 3-4**
CN Pinouts:	See **Table 3-5**

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.

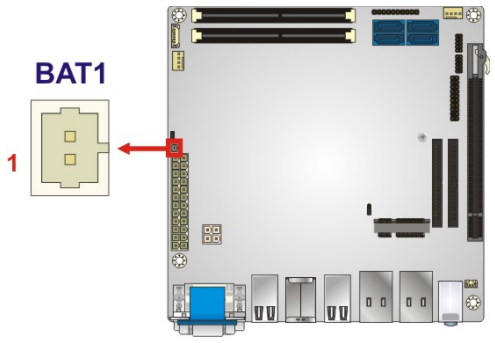


Figure 3-4: Battery Connector Location

Pin	Description
1	RTC Battery+
2	GND

Table 3-5: Battery Connector Pinouts

3.2.4 Buzzer Connector

CN Label: **SP1**

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

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

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

The buzzer connector can be connected with a buzzer.

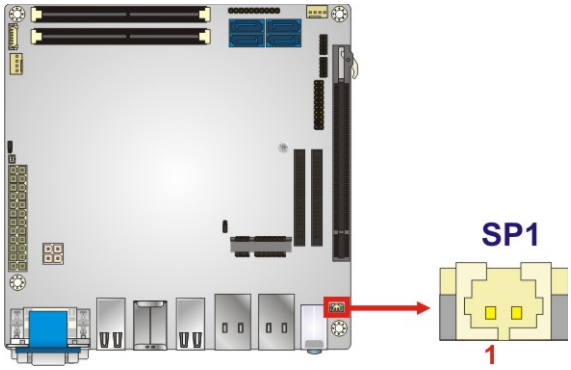


Figure 3-5: Buzzer Connector Location

Pin	Description
1	+5V
2	Buzzer

Table 3-6: Buzzer Connector Pinouts

NOTE:

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

3.2.5 Fan Connectors

CN Label:	**CPU_FAN1, SYS_FAN1**
CN Type:	4-pin wafer, p=2.54 mm
CN Location:	See **Figure 3-6**
CN Pinouts:	See **Table 3-7**

The fan connector attaches to a cooling fan.

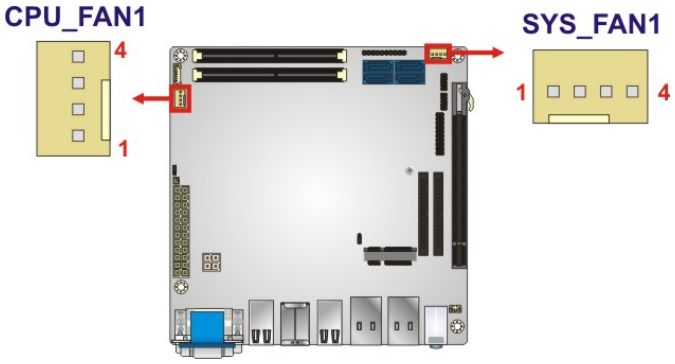


Figure 3-6: Fan Connector Locations

Pin	Description
1	GND
2	+12V
3	FAN_IO
4	FAN_OUT

Table 3-7: Fan Connector Pinouts

3.2.6 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 10-pin header, p=2.54 mm

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

CN Pinouts: See **Table 3-8**

The front panel connector connects to the indicator LEDs and buttons on the system front panel.

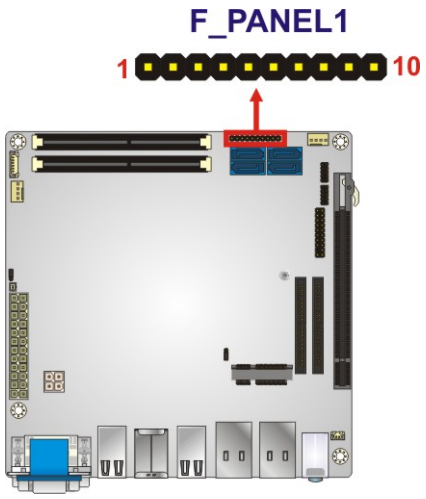


Figure 3-7: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	PWR_LED+		6	N/C
	2	PWR_LED-	Power Button	7	PWR_BTN+
	3	N/C		8	PWR_BTN-
HDD LED	4	HDD_LED+	Reset Button	9	RESET+
	5	HDD_LED-		10	RESET-

Table 3-8: Front Panel Connector Pinouts

3.2.7 PCIe x16 Slot

CN Label: **PCIEX16**

CN Type: PCIe x16 slot

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

The PCIe x16 slot supports PCIe x8 expansion cards.

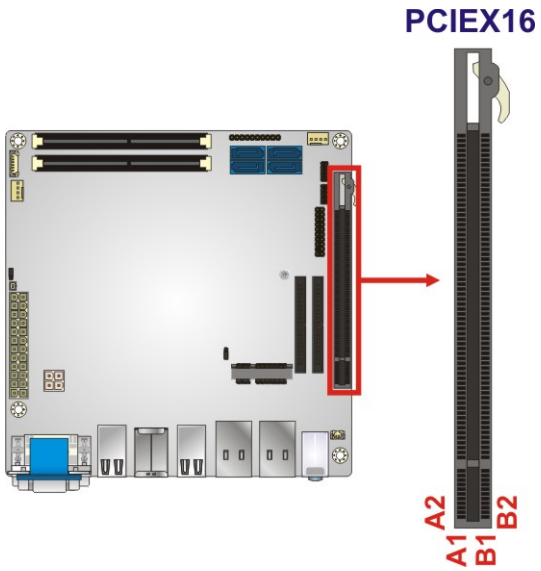


Figure 3-8: PCIe x16 Slot Location

3.2.8 PCIe Mini Slot

CN Label: **MPCIE1**

CN Type: Full-size PCIe Mini slot

CN Location: See **Figure 3-9**

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

The PCIe Mini slot enables a PCIe Mini expansion module to be connected to the board.

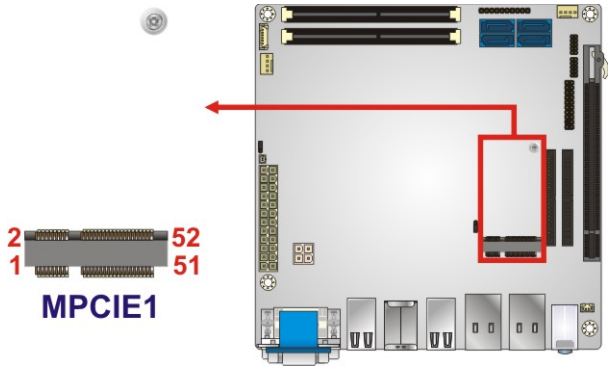


Figure 3-9: PCIe Mini Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	+3.3V
3	N/C	4	GND
5	N/C	6	1.5 V
7	CLKREQ#	8	N/C
9	GND	10	N/C
11	CLK-	12	N/C
13	CLK+	14	N/C
15	GND	16	N/C
17	N/C	18	GND
19	N/C	20	W_DISABLE#
21	GND	22	PERST#
23	PCIE_RXN0	24	+3.3V
25	PCIE_RXN0	26	GND
27	GND	28	1.5 V

Pin	Description	Pin	Description
29	GND	30	SMBCLK
31	PCIE_TXN1	32	SMBDATA
33	PCIE_TXN1	34	GND
35	GND	36	USBD7-
37	GND	38	USBD7+
39	+3.3V	40	GND
41	+3.3V	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5 V
49	N/C	50	GND
51	N/C	52	+3.3V

Table 3-9: PCIe Mini Slot Pinouts

3.2.9 RS-232 Serial Port Connectors (COM1, COM2)

CN Label: **CN1, CN2**

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

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

CN Pinouts: See **Table 3-10** and **Table 3-11**

The serial connectors provide RS-232 connections.

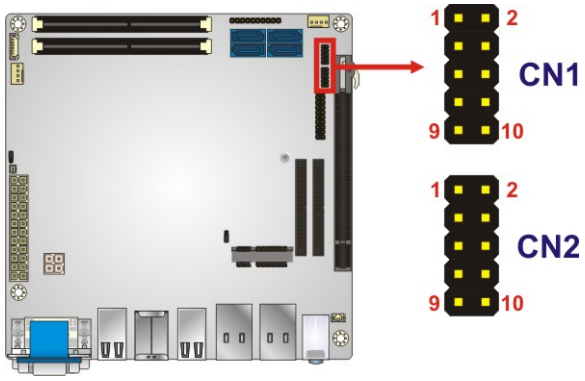


Figure 3-10: RS-232 Serial Port Connector Locations

Pin	Description	Pin	Description
1	DCD_COM1	2	DSR_COM1
3	SIN_COM1	4	RTS_COM1
5	SOUT_COM1	6	CTS_COM1
7	DTR_COM1	8	RI_COM1
9	GND	10	GND

Table 3-10: RS-232 Serial Port Connector (CN1) Pinouts

Pin	Description	Pin	Description
1	DCD_COM2	2	DSR_COM2
3	SIN_COM2	4	RTS_COM2
5	SOUT_COM2	6	CTS_COM2
7	DTR_COM2	8	RI_COM2
9	GND	10	GND

Table 3-11: RS-232 Serial Port Connector (CN2) Pinouts

3.2.10 RS-232 Serial Port Connector (COM3 ~ COM10)

CN Label: **COM3-6, COM7-10**

CN Type: 40-pin box header, p=2.00 mm

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

CN Pinouts: See **Table 3-12** and **Table 3-13**

Each connector provides RS-232 connections for four serial ports.

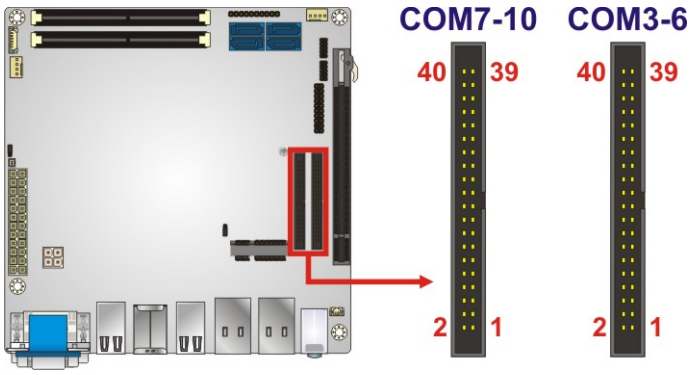


Figure 3-11: Serial Port Connector Pinout Locations

Pin	Description	Pin	Description
1	DCD_COM3	2	DSR_COM3
3	SIN_COM3	4	RTS_COM3
5	SOUT_COM3	6	CTS_COM3
7	DTR_COM3	8	RI_COM3
9	GND	10	GND
11	DCD_COM4	12	DSR_COM4
13	SIN_COM4	14	RTS_COM4
15	SOUT_COM4	16	CTS_COM4
17	DTR_COM4	18	RI_COM4
19	GND	20	GND
21	DCD_COM5	22	DSR_COM5
23	SIN_COM5	24	RTS_COM5
25	SOUT_COM5	26	CTS_COM5
27	DTR_COM5	28	RI_COM5

Pin	Description	Pin	Description
29	GND	30	GND
31	DCD_COM6	32	DSR_COM6
33	SIN_COM6	34	RTS_COM6
35	SOUT_COM6	36	CTS_COM6
37	DTR_COM6	38	RI_COM6
39	GND	40	GND

Table 3-12: RS-232 Serial Port Connector (COM3-6) Pinouts

Pin	Description	Pin	Description
1	DCD_COM7	2	DSR_COM7
3	SIN_COM7	4	RTS_COM7
5	SOUT_COM7	6	CTS_COM7
7	DTR_COM7	8	RI_COM7
9	GND	10	GND
11	DCD_COM8	12	DSR_COM8
13	SIN_COM8	14	RTS_COM8
15	SOUT_COM8	16	CTS_COM8
17	DTR_COM8	18	RI_COM8
19	GND	20	GND
21	DCD_COM9	22	DSR_COM9
23	SIN_COM9	24	RTS_COM9
25	SOUT_COM9	26	CTS_COM9
27	DTR_COM9	28	RI_COM9
29	GND	30	GND
31	DCD_COM10	32	DSR_COM10
33	SIN_COM10	34	RTS_COM10
35	SOUT_COM10	36	CTS_COM10
37	DTR_COM10	38	RI_COM10
39	GND	40	GND

Table 3-13: RS-232 Serial Port Connector (COM7-10) Pinouts

3.2.11 SATA 6Gb/s Drive Connectors

CN Label:	**SATA0, SATA1, SATA2, SATA3**
CN Type:	7-pin SATA connector
CN Location:	See **Figure 3-12**
CN Pinouts:	See **Table 3-14**

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

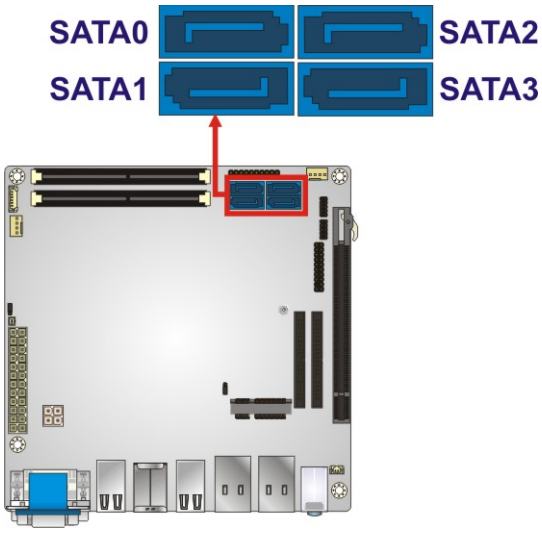


Figure 3-12: SATA 6Gb/s Drive Connector Location

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-14: SATA Drive Connector Pinouts

3.2.12 SPI Flash Connector

CN Label:	**JSP1**
CN Type:	6-pin wafer, p=1.25 mm
CN Location:	See **Figure 3-13**
CN Pinouts:	See **Table 3-15**

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

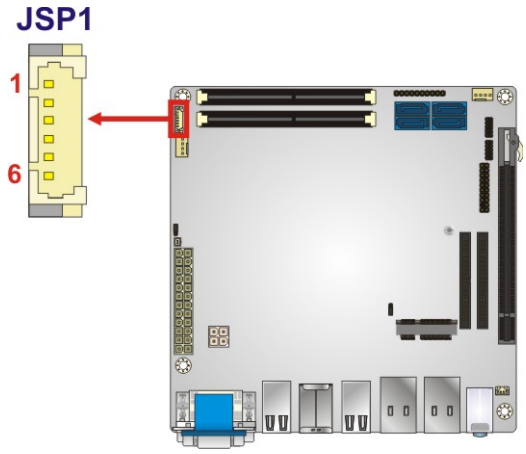


Figure 3-13: SPI Flash Connector Location

Pin	Description
1	SPIVCC
2	SPI_CS#
3	SPI_MISO
4	SPI_CLK
5	SPI_MOSI
6	GND

Table 3-15: SPI Flash Connector Pinouts

3.2.13 TPM Connector

CN Label:	**TPM1**
CN Type:	20-pin header, p=2.54 mm
CN Location:	See **Figure 3-14**
CN Pinouts:	See **Table 3-16**

The Trusted Platform Module (TPM) connector secures the system on bootup.

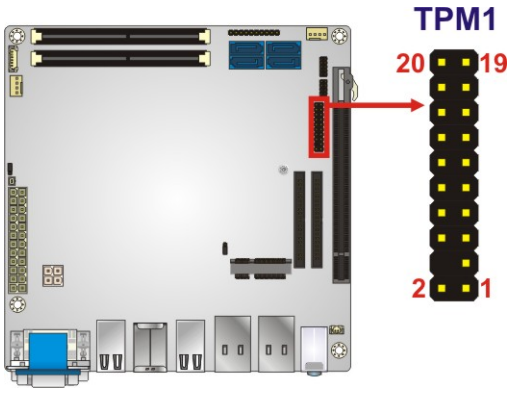


Figure 3-14: TPM Connector Location

Pin	Description	Pin	Description
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	CLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-16: TPM Connector Pinouts

3.3 External Peripheral Interface Connector Panel

Figure 3-15 shows the KINO-KX external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

- 3 x Audio jacks (AUDIO1)
- 1 x KB/MS and USB 2.0 connector (CON1)
- 2 x LAN and USB 3.2 Gen 1 combo connectors (LAN1_USB1, LAN2_USB2)
- 2 x USB 2.0 connectors (USB2_1, USB2_2)
- 1 x VGA and DVI-I connector (U40)

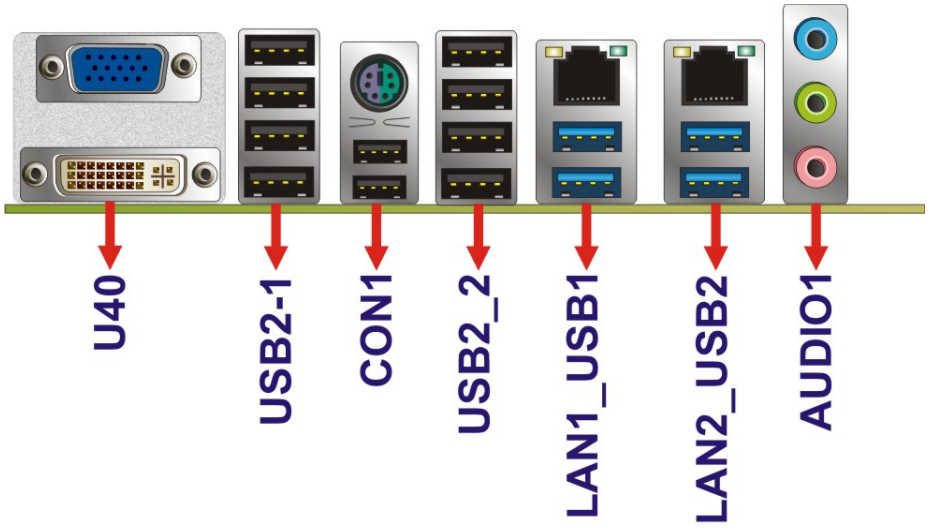


Figure 3-15: External Peripheral Interface Connectors

3.3.1 Audio Jacks

CN Label: **AUDIO1**

CN Type: Audio jack

CN Location: See **Figure 3-15**

The audio jacks connect to external audio devices.

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

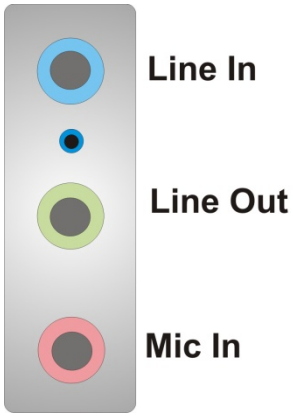


Figure 3-16: Audio Connector

3.3.2 Keyboard/Mouse and USB 2.0 Combo Connector

CN Label: **CON1**

CN Type: PS/2 and USB 2.0 Type A connector

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-17** and **Table 3-18**

The USB 2.0 connector can be connected to a USB device.

Pin	Description
1	5 V
2	Data-
3	Data+
4	GND

Table 3-17: USB 2.0 Port Pinouts

The keyboard and mouse connector is a standard PS/2 connector.

Pin	Description
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

Table 3-18: Keyboard Connector Pinouts

3.3.3 LAN and USB 3.2 Gen 1 Combo Connector

CN Label: **LAN1_USB1, LAN2_USB2**

CN Type: RJ-45 and USB 3.2 Type A combo

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-19** and **Table 3-20**

There are four external USB 3.2 Gen 1 connectors on the KINO-KX.

Pin	Description	Pin	Description
1	VCC	10	VCC
2	USB_DATA-	11	USB_DATA-
3	USB_DATA+	12	USB_ DATA+
4	GND	13	GND
5	USB3_RX-	14	USB3_RX-
6	USB3_RX+	15	USB3_ RX+
7	GND	16	GND
8	USB3_TX-	17	USB3_TX-
9	USB3_TX+	18	USB3_TX+

Table 3-19: USB 3.2 Gen 1 Port Pinouts

Each LAN connector connects to a local network.

Pin	Description	Pin	Description
1	LAN_MDI0P	5	LAN_MDI2P
2	LAN_MDI0N	6	LAN_MDI2N
3	LAN_MDI1P	7	LAN_MDI3P
4	LAN_MDI1N	8	LAN_MDI3N

Table 3-20: LAN Pinouts

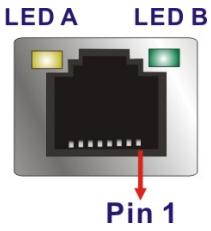


Figure 3-17: Ethernet Connector

LED	Description	LED	Description
A	on: linked blinking: data is being sent/received	B	off: 10 Mb/s green: 100 Mb/s orange: 1000 Mb/s

Table 3-21: Connector LEDs

3.3.4 USB 2.0 Connectors

CN Label: **USB2_1, USB2_2**

CN Type: USB 2.0 Type A

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-22**

The USB 2.0 connector can be connected to a USB 2.0/1.1 device.

Pin	Description
1	5V
2	DATA-
3	DATA+
4	GND

Table 3-22: USB 2.0 Port Pinouts

3.3.5 VGA and DVI-I Connectors

CN Label: **U40**

CN Type: 15-pin VGA, 24-pin DVI-I

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-23** and **Table 3-24**

The 24-pin Digital Visual Interface (DVI) connector connects to a high-speed, high-resolution digital display. The DVI-I connector supports both digital and analog signals.

Pin	Description	Pin	Description
1	DATA2-	2	DATA2+
3	GND	4	NC
5	NC	6	DDC CLK
7	DDC DATA	8	VSYNC
9	DATA1-	10	DATA1+
11	GND	12	NC
13	NC	14	VCC5V
15	GND	16	HPDET
17	DATA0-	18	DATA0+
19	GND	20	NC
21	NC	22	GND
23	CLK+	24	CLK-
C1	RED	C2	GREEN
C3	BLUE	C4	HSYNC
C5	GND		

Table 3-23: DVI-I Connector Pinouts

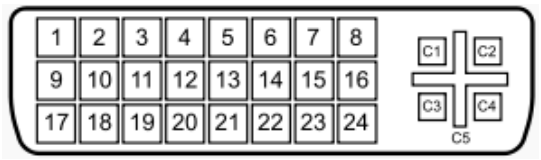


Figure 3-18: DVI-I Connector

The 15-pin VGA connector connects to a monitor that accepts a standard VGA input.

Pin	Description	Pin	Description
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC5V	10	GND
11	NC	12	DDCDATA
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-24: VGA Connector Pinouts

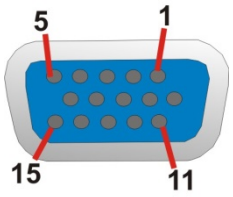


Figure 3-19: VGA Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

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

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-KX. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the KINO-KX, 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 KINO-KX, place it on an anti-static pad. This reduces the possibility of ESD damaging the KINO-KX.
- ***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 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 KINO-KX 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 KINO-KX 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 KINO-KX off**:
  - When working with the KINO-KX, 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 KINO-KX **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.

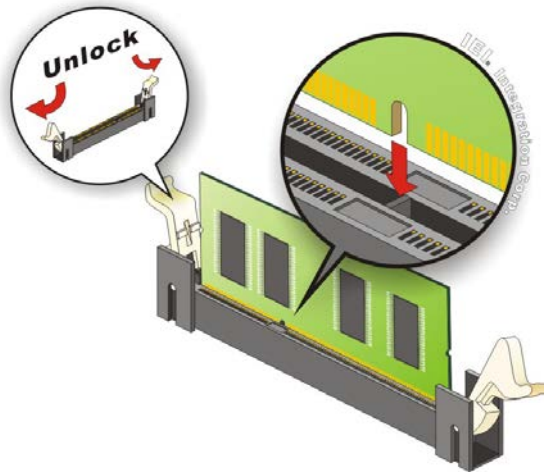


Figure 4-1: SO-DIMM Installation

Step 1: **Open the SO-DIMM socket handles**. Open the two handles outwards as far as they can. See Figure 4-1.

Step 2: **Align the SO-DIMM with the socket**. Align the SO-DIMM so the notch on the memory lines up with the notch on the memory socket. See Figure 4-1.

Step 3: **Insert the SO-DIMM**. Once aligned, press down until the SO-DIMM is properly seated. Clip the two handles into place. See Figure 4-1.

Step 1: **Removing a SO-DIMM**. To remove a SO-DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

CAUTION:

For dual channel configuration, always install two identical memory modules that feature the same capacity, timings, voltage, number of ranks and the same brand.

4.4 PCIe Mini Card Installation

To install a PCIe Mini card, please follow the steps below.

Step 1: **Locate the PCIe Mini card slot**. The location of the PCIe Mini card slot is shown in **Chapter 3**.

Step 2: **Remove the retention screw**. Remove the retention screw secured on the motherboard as shown in **Figure 4-2**.

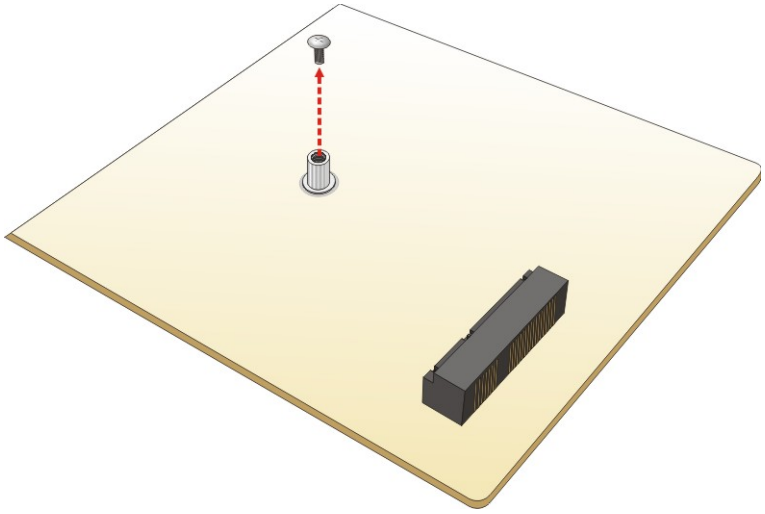


Figure 4-2: Remove the Retention Screw for the PCIe Mini Card

Step 3: **Insert into the socket at an angle**. Line up the notch on the card with the notch on the connector. Slide the PCIe Mini card into the socket at an angle of about 20º (**Figure 4-3**).

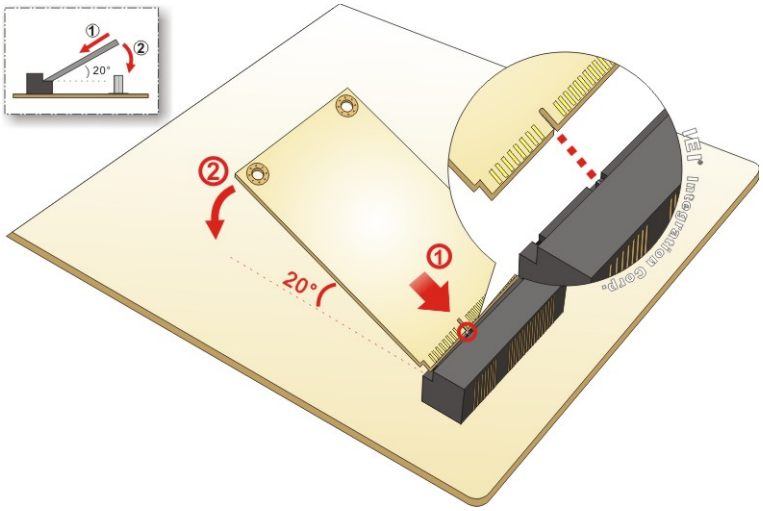


Figure 4-3: Insert the PCIe Mini Card into the Socket at an Angle

Step 4: **Secure the PCIe Mini card**. Secure the PCIe Mini card with the retention screw previously removed (**Figure 4-4**).

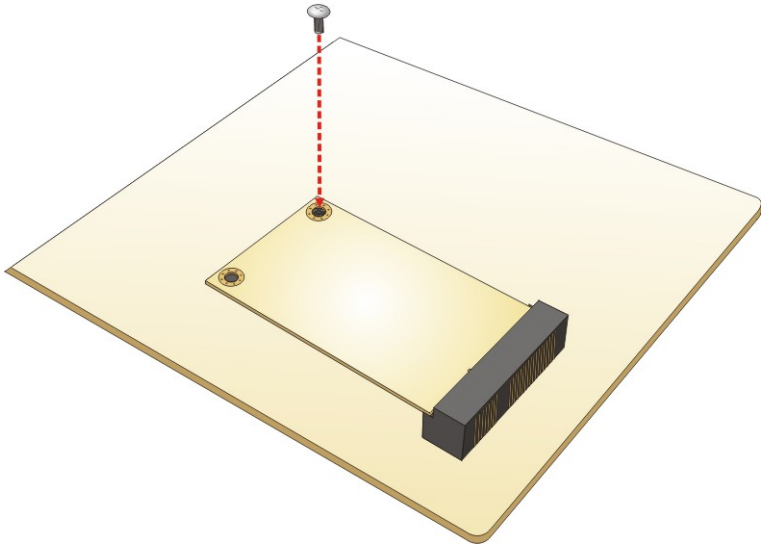


Figure 4-4: Secure the PCIe Mini Card

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

The AT/ATX mode select switch (JATX_AT1) 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 4-5** below.

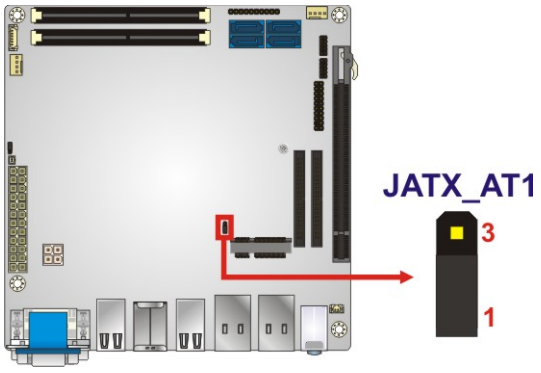


Figure 4-5: AT/ATX Mode Select Switch Location

4.5.2 Clear CMOS

To reset the BIOS, move the jumper to the "Clear BIOS" position for 3 seconds or more, then move back to the default position.

Setting	Description
Short 1-2	Keep current BIOS setup
Short 2-3	Clear BIOS

Table 4-2: Clear BIOS Jumper Settings

The location of the clear CMOS button (J_CMOS1) is shown in **Figure 4-6**

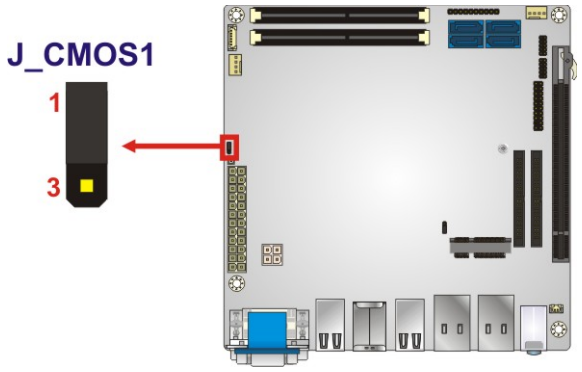


Figure 4-6: Clear CMOS Jumper Location

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 KINO-KX 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 Motherboard Installation

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

4.7 SATA Drive Connection

The KINO-KX is shipped with a SATA drive 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 until it clips into place. See **Figure 4-7**.

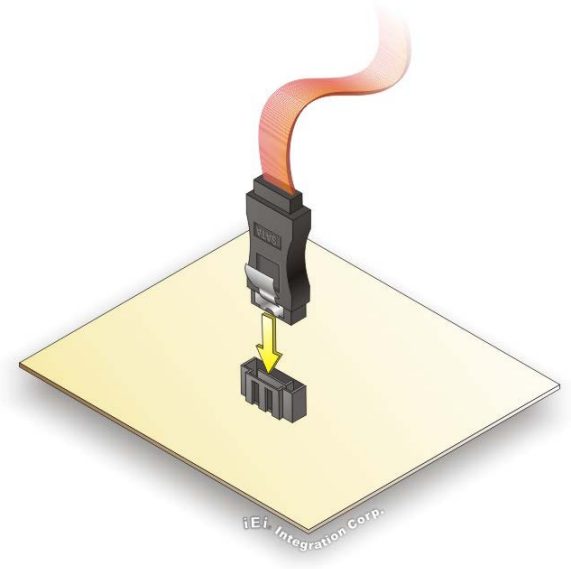


Figure 4-7: SATA Drive Cable Connection

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.

NOTE:

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

4.8 Available Drivers

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

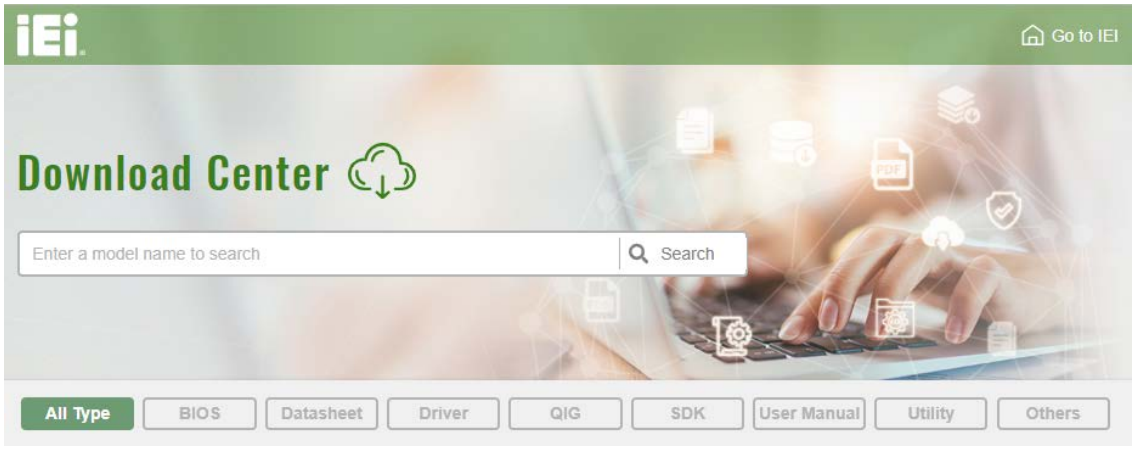
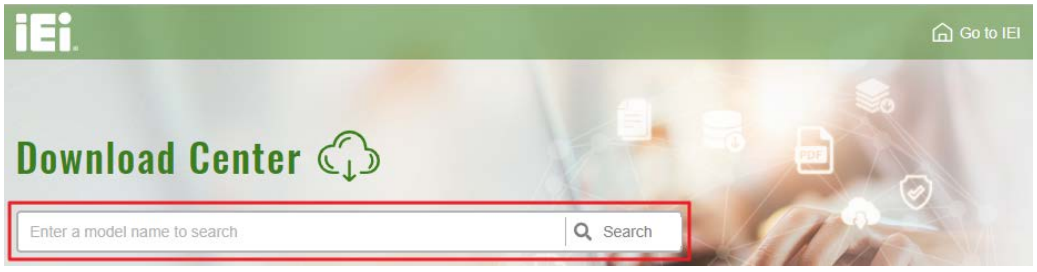


Figure 4-8: IEI Resource Download Center

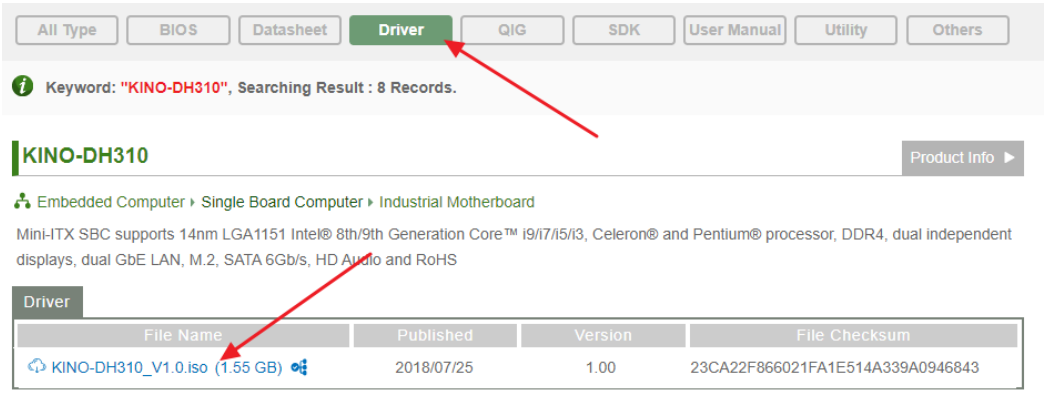
4.8.1 Driver Download

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

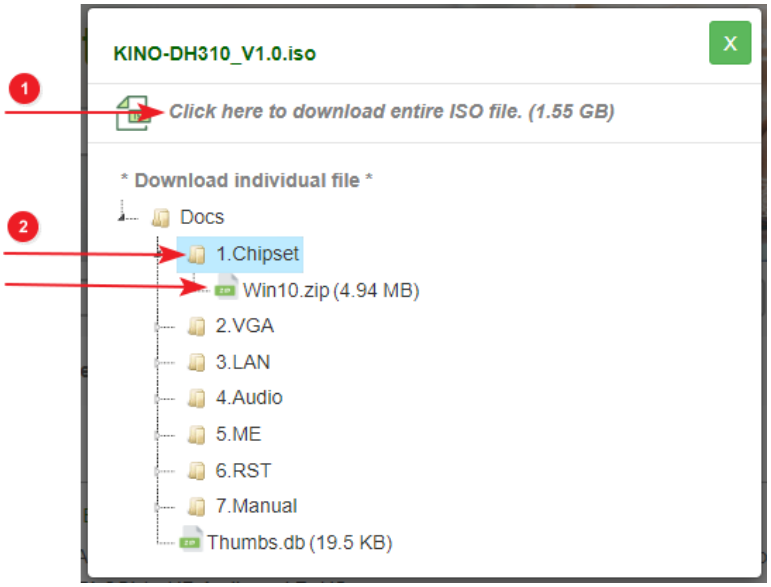
Step 1: Go to https://download.ieiworld.com. Type KINO-KX and press Enter.



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 double click an individual item to find its driver file and click the file name to download (❷).



NOTE:

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

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, CMOS defaults. Use the jumper described in **Section 4.5.2**.

5.1.5 BIOS Menu Bar

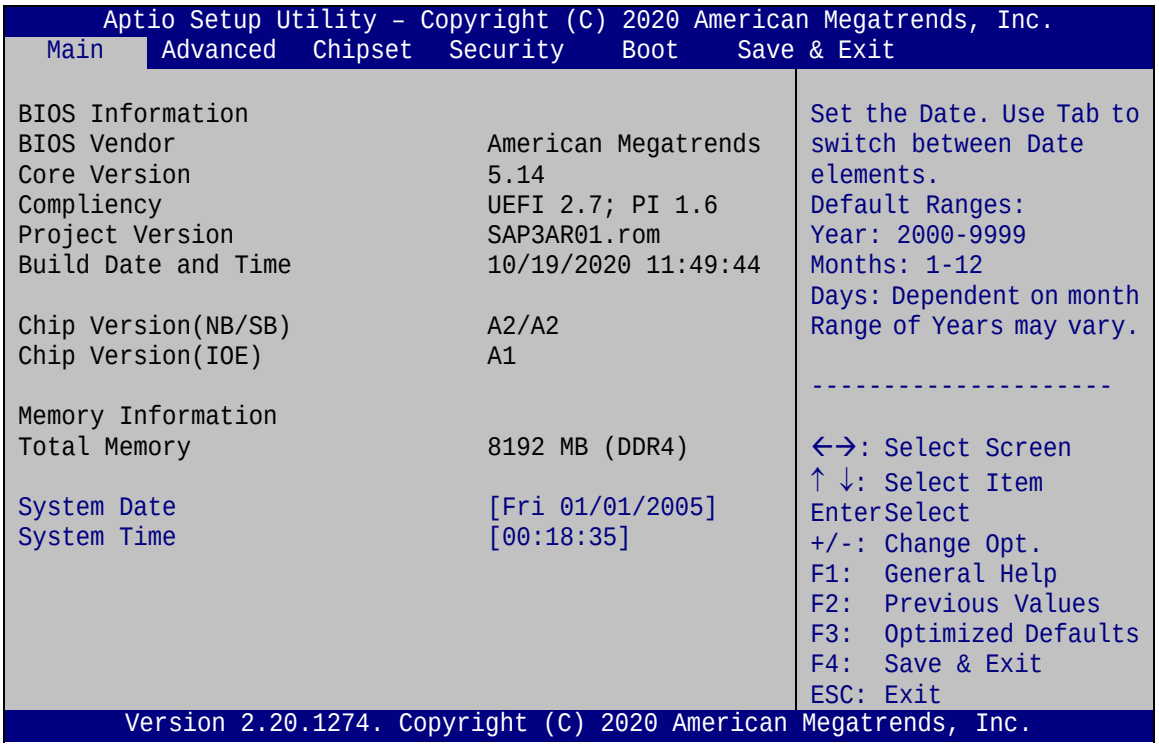
The **menu bar** on top of the BIOS screen has the following main items:

- 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.

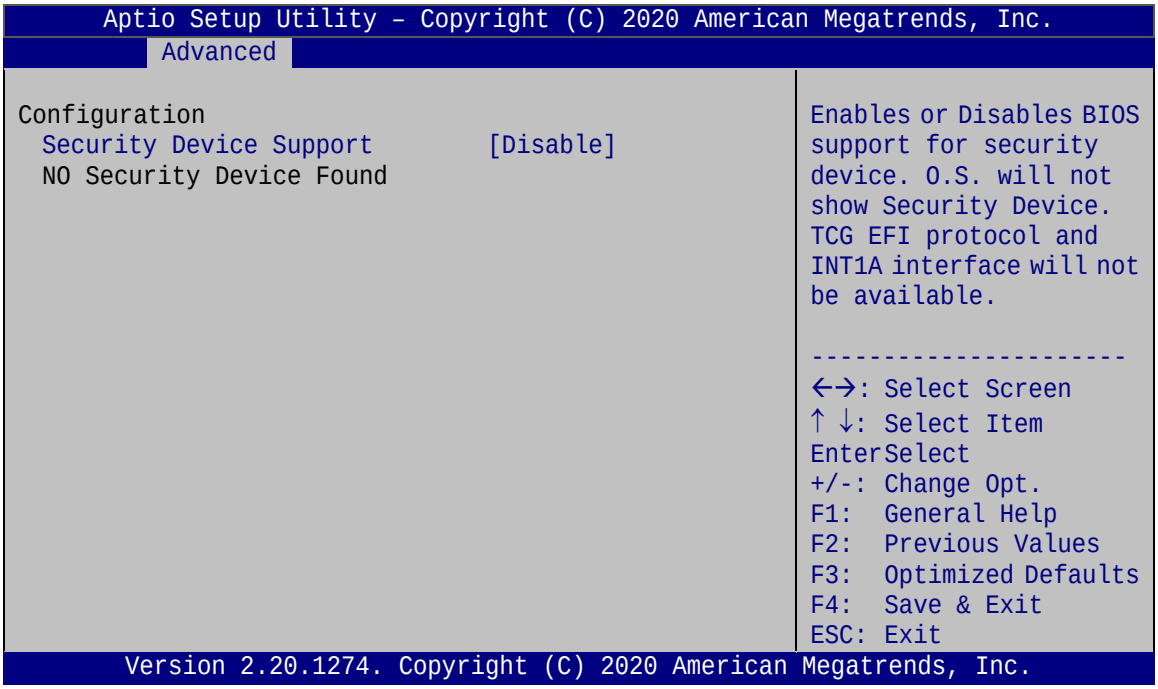
```
      Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
  Main    Advanced   Chipset   Security    Boot    Save & Exit

> Trusted Computing                                  Trusted Computing
> ACPI Settings                                      Settings
> RTC Wake Settings
> F81866 Super IO Configuration
> Hardware Monitor
> F81216SEC Super IO Configuration                   ----------------------
> Serial Port Console Redirection                    ←→: Select Screen
> CPU Configuration                                  ↑ ↓: Select Item
> USB Configuration                                  EnterSelect
                                                     +/-: Change Opt.
                                                     F1:  General Help
                                                     F2:  Previous Values
                                                     F3:  Optimized Defaults
                                                     F4:  Save & Exit
                                                     ESC: Exit
      Version 2.20.1274. Copyright (C) 2020 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 3**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 3: Trusted Computing

➔ **Security Device Support [Disable]**

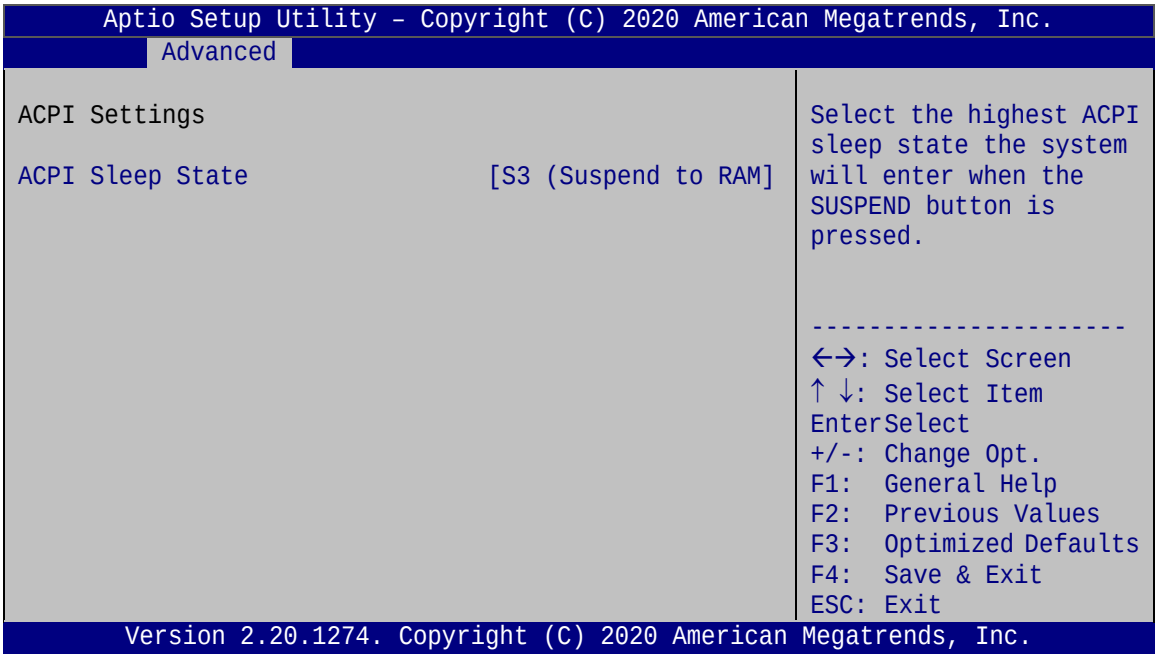
Use the **Security Device Support** option to configure support for the security device.

➔ **Disable** **DEFAULT** Security device support is disabled.

➔ **Enable** Security device support is enabled.

5.3.2 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 4**) configures the Advanced Configuration and Power Interface (ACPI) options.



BIOS Menu 4: ACPI Settings

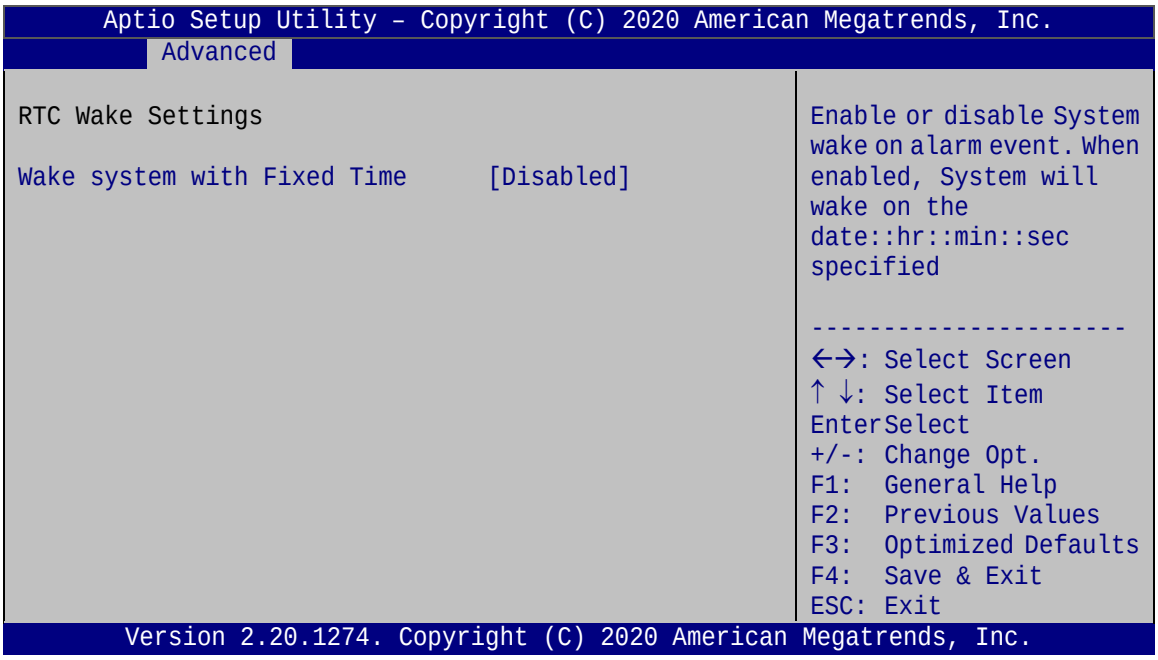
➔ **ACPI Sleep State [S3 (Suspend to RAM)]**

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.

5.3.3 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 5**) configures RTC wake event.



BIOS Menu 5: 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

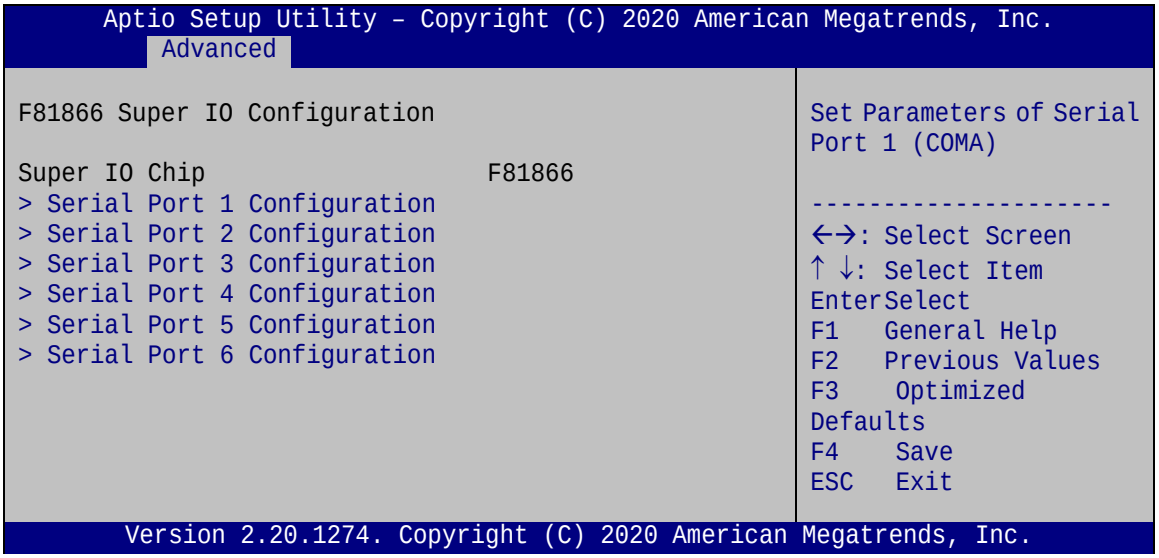
➔ **Enabled** If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:

- 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.

5.3.4 F81866 Super IO Configuration

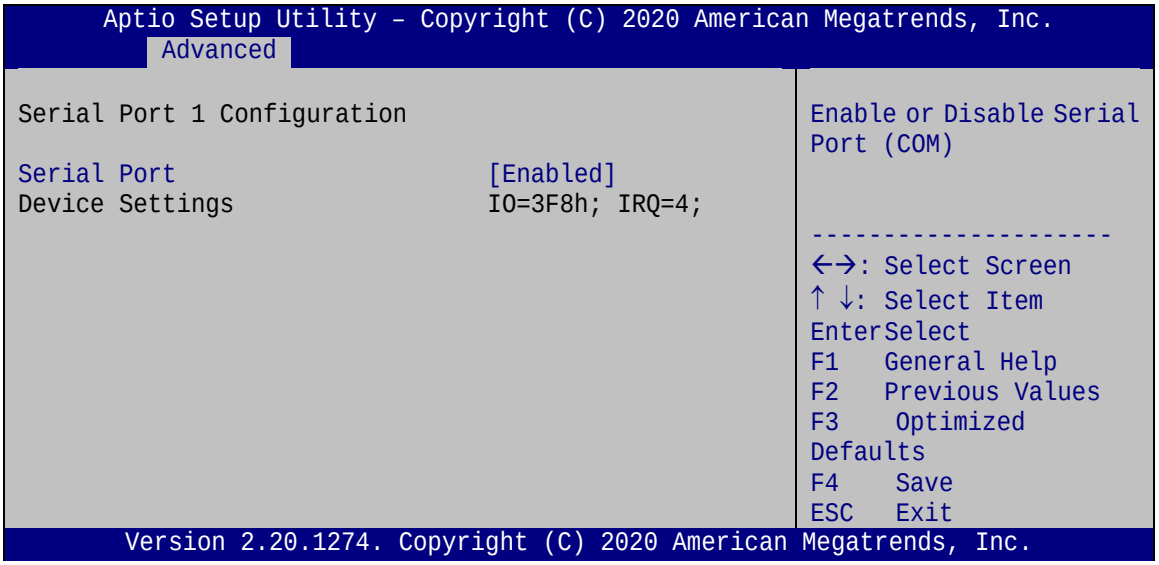
Use the **F81866 Super IO Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the serial ports.



BIOS Menu 6: F81866 Super IO Configuration

5.3.4.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 7**) to configure the serial port n.



BIOS Menu 7: Serial Port n 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

5.3.5 Hardware Monitor

The **Hardware Monitor** menu (**BIOS Menu 8**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.

```
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
        Advanced
PC Health Status                                Smart Fan function
                                                setting
CPU temperature                 :+43 °C
System temperature              :+30 °C
CPU_FAN1 Speed                  :4531 RPM       ---------------------
SYS_FAN1 Speed                  :N/A            ←→: Select Screen
VDDCPU                          :+1.104 V       ↑ ↓: Select Item
3.3V                            :+3.360 V       EnterSelect
5V                              :+5.087 V       +/-: Change Opt.
VSUSIOMEM                       :+1.200 V       F1:  General Help
> Smart Fan Function                            F2:  Previous Values
                                                F3:  Optimized Defaults
                                                F4:  Save & Exit
                                                ESC: Exit
Version 2.20.1274. Copyright (C) 2020 American Megatrends, Inc.
```

BIOS Menu 8: Hardware Monitor

➔ **PC Health Status**

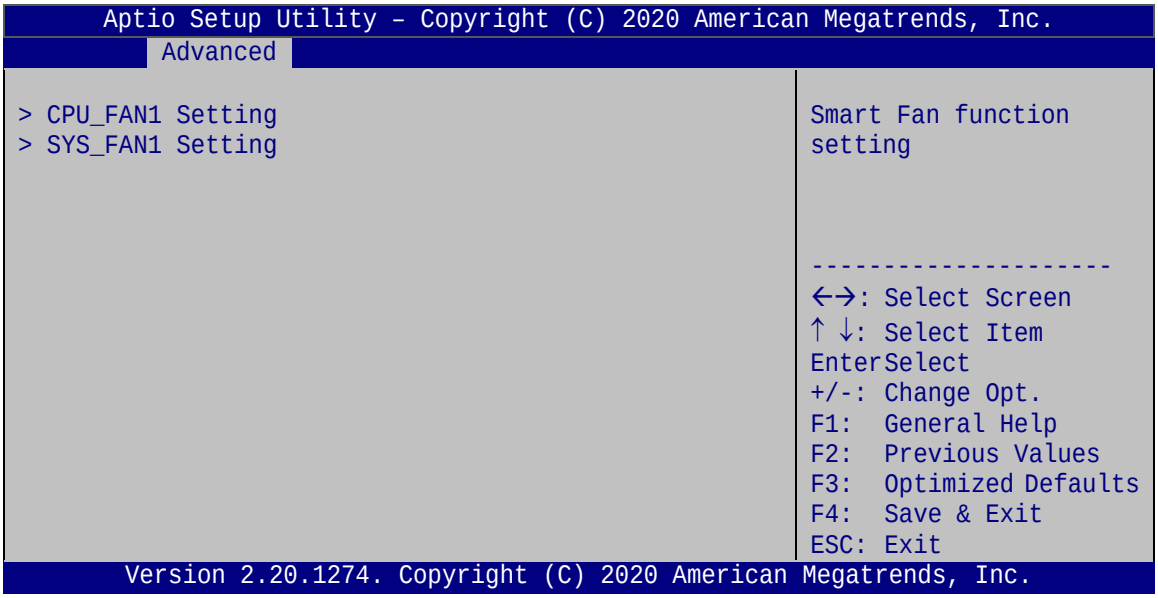
The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - CPU temperature
  - System temperature
- Fan Speed:
  - CPU Fan Speed
  - System Fan Speed

- Voltages
  - VDDCPU
  - +3.3V
  - +5V
  - VSUSIOMEM

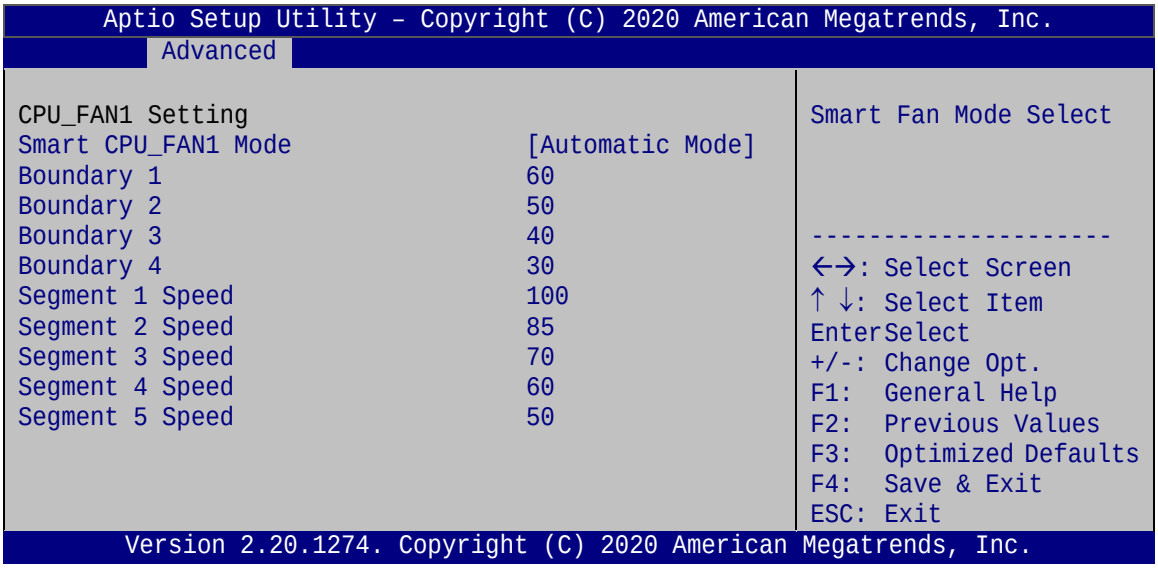
5.3.5.1 Smart Fan Function

Use the **Smart Fan Function** submenu (**BIOS Menu 10**) to configure fan temperature and speed settings.



BIOS Menu 9: Smart Fan Function

5.3.5.1.1 CPU_FAN1/SYS_FAN1



BIOS Menu 10: CPU_FAN1 Setting / SYS_FAN1 Setting

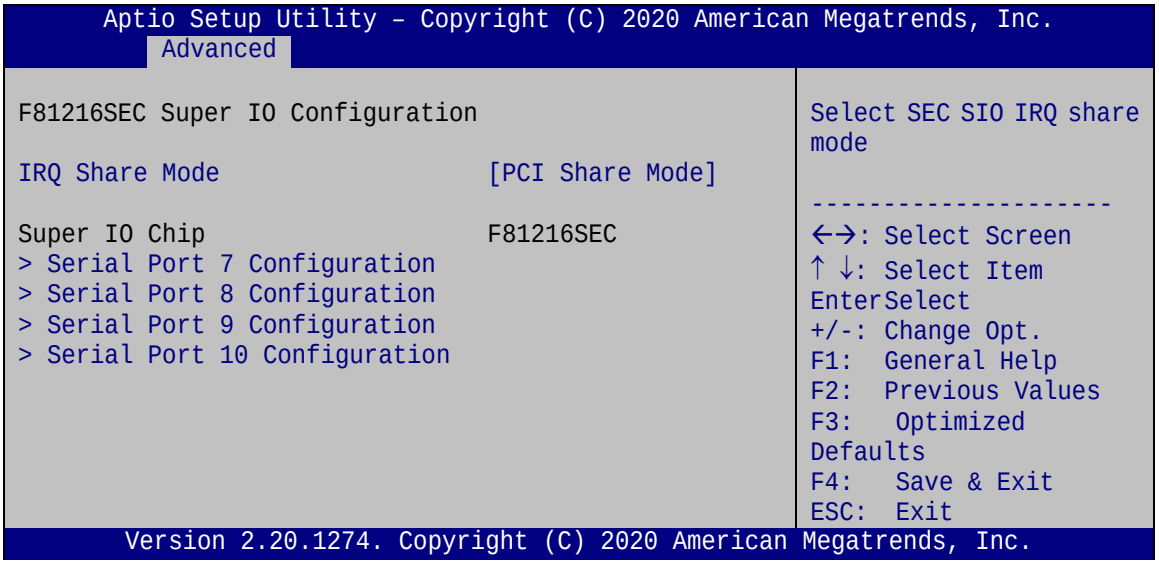
➔ **Smart CPU_FAN1/SYS_FAN1 Mode [Automatic Mode]**

Use the **Smart CPU_FAN1/SYS_FAN1 Mode** option to configure the CPU/System Smart Fan.

➔ **Manual Mode**		The fan spins at the speed set in the Manual Mode option
➔ **Automatic Mode**	**DEFAULT**	The fan adjusts its speed using these settings: Boundary 1 ~4 Segment Speed 1~5

5.3.6 F81216 Sec. Super IO Configuration

Use the **F81216 Sec. Super IO Configuration** menu (**BIOS Menu 11**) to set or change the configurations for the serial ports.



BIOS Menu 11: F81216 SEC Super IO Configuration

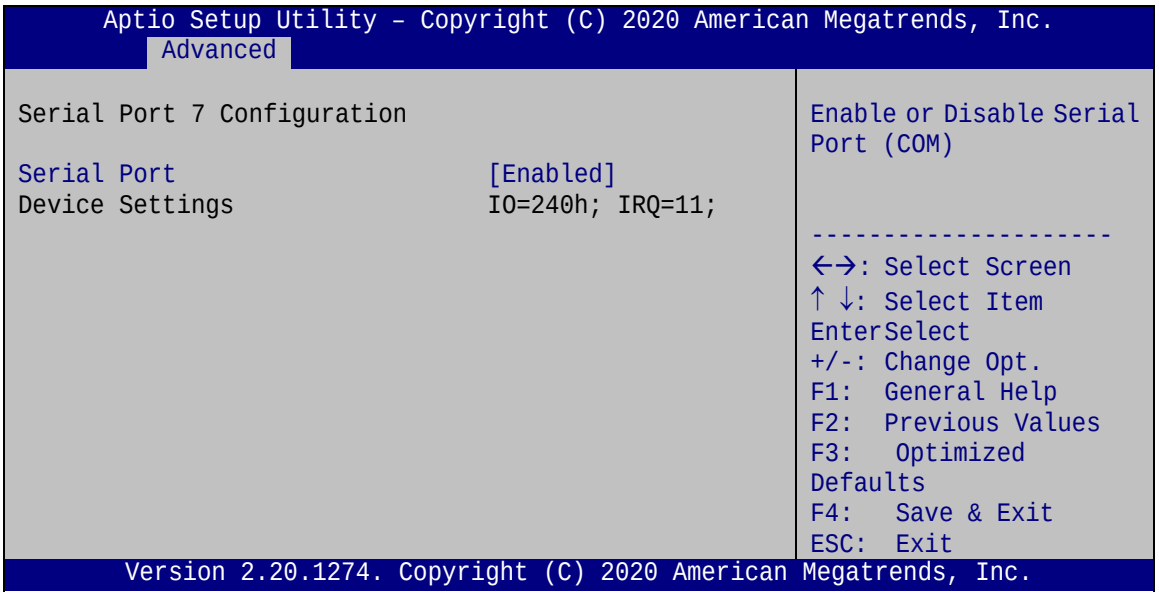
➔ **IRQ Share Mode [PCI Share Mode]**

Use the **IRQ Share Mode** BIOS option to select the IRQ sharing mode of the second super IO.

- PCI Share Mode **DEFAULT**
- ISA Share Mode

5.3.6.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 12**) to configure the serial port n.



BIOS Menu 12: Serial Port n 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

5.3.7 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 13**) 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 13: 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

The following options are available in the **Console Redirection Settings** submenu when the **Console Redirection** option is enabled.

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** option to specify the remote terminal type.

➔ **VT100**		The target terminal type is VT100
➔ **VT100+**		The target terminal type is VT100+
➔ **VT-UTF8**		The target terminal type is VT-UTF8
➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI

➔ **Bits per second [115200]**

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

➔ **9600**		Sets the serial port transmission speed at 9600.
➔ **19200**		Sets the serial port transmission speed at 19200.
➔ **38400**		Sets the serial port transmission speed at 38400.
➔ **57600**		Sets the serial port transmission speed at 57600.
➔ **115200**	**DEFAULT**	Sets the serial port transmission speed at 115200.

➔ **Data Bits [8]**

Use the **Data Bits** option to specify the number of data bits.

➔ **7**		Sets the data bits at 7.
➔ **8**	**DEFAULT**	Sets the data bits at 8.

➔ **Parity [None]**

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

➔ **None**	**DEFAULT**	No parity bit is sent with the data bits.
➔ **Even**		The parity bit is 0 if the number of ones in the data bits is even.
➔ **Odd**		The parity bit is 0 if the number of ones in the data bits is odd.
➔ **Mark**		The parity bit is always 1. This option does not provide error detection.
➔ **Space**		The parity bit is always 0. This option does not provide error detection.

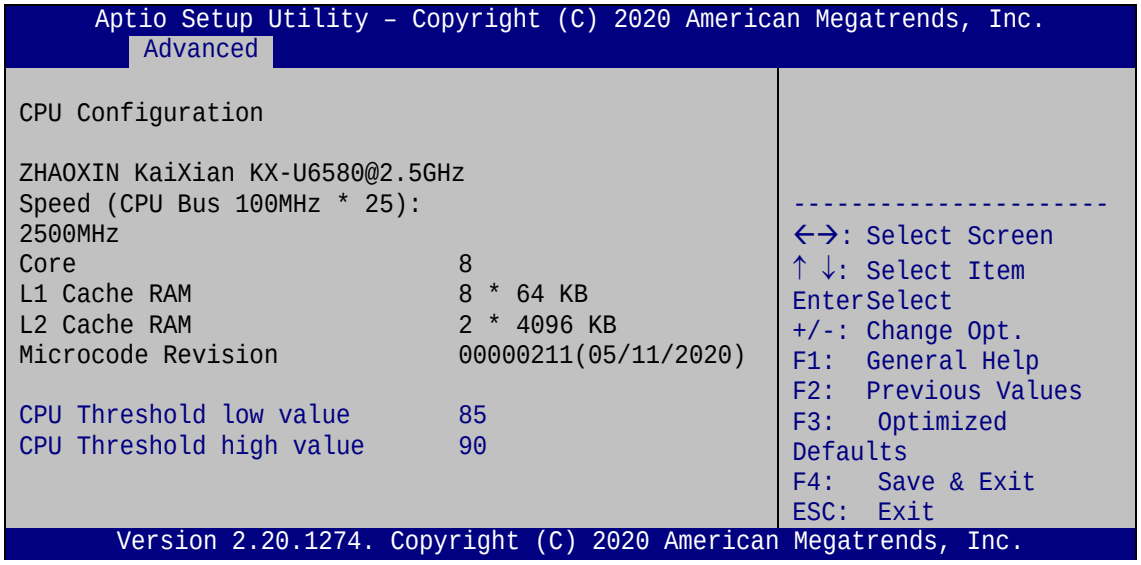
➔ **Stop Bits [1]**

Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

➔ **1**	**DEFAULT**	Sets the number of stop bits at 1.
➔ **2**		Sets the number of stop bits at 2.

5.3.8 CPU Configuration

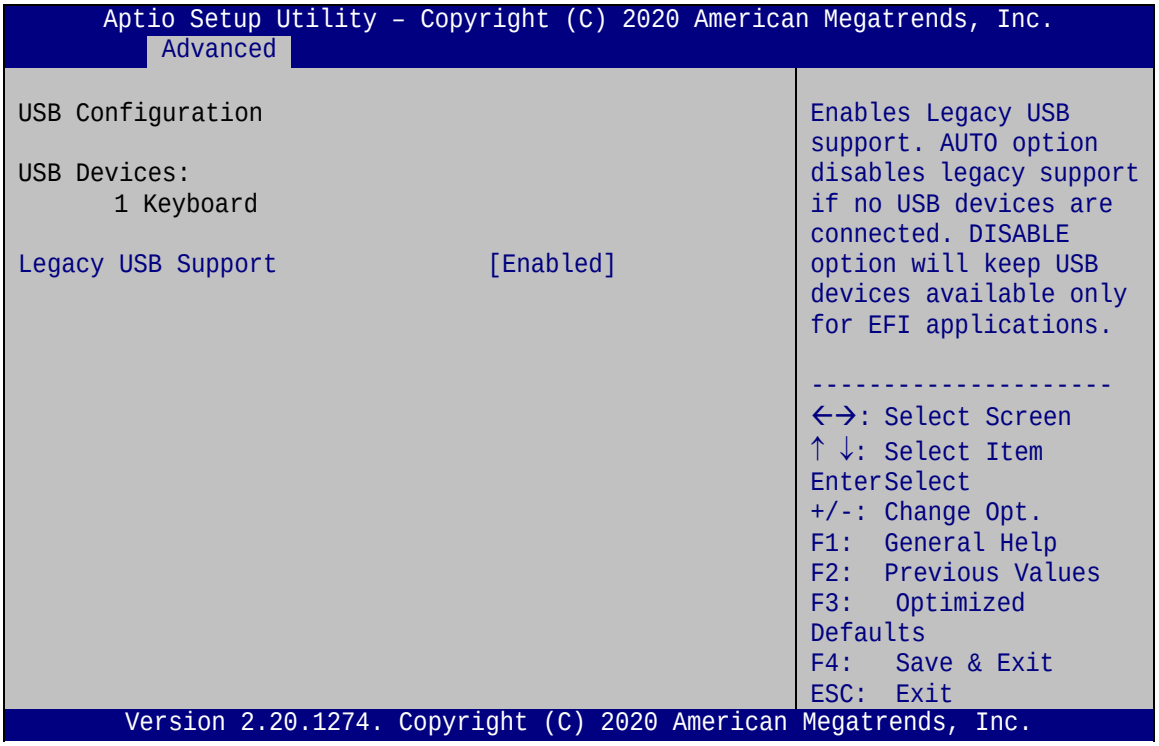
Use the **CPU Configuration** menu (**BIOS Menu 14**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 14: CPU Configuration

5.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 15**) to read USB configuration information and configure the USB settings.



BIOS Menu 15: USB Configuration

➔ **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.

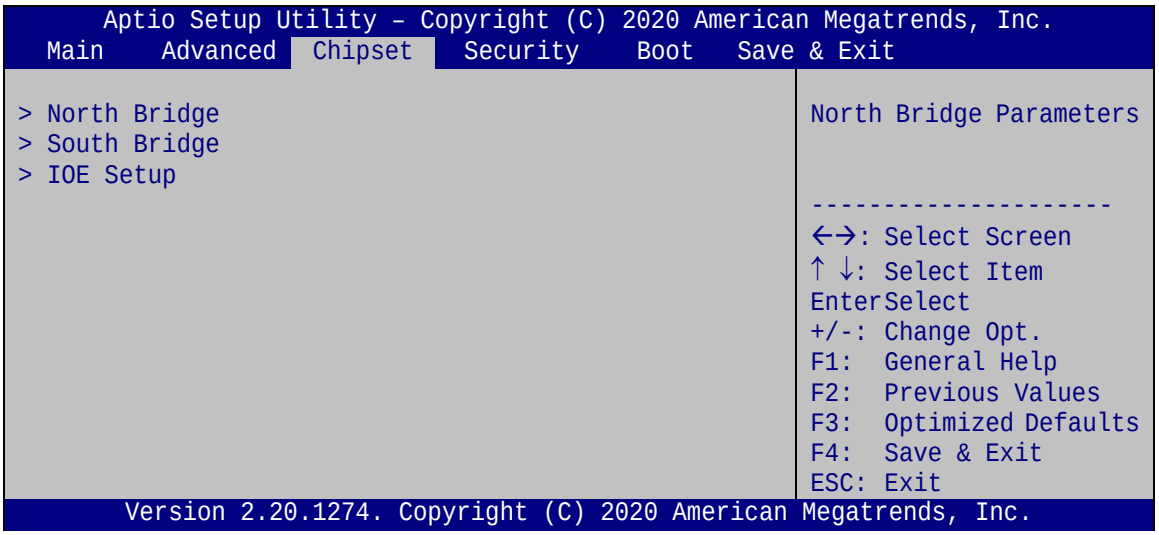
➔	**Enabled**	**DEFAULT**	Legacy USB support enabled
➔	**Disabled**		Legacy USB support disabled
➔	**Auto**		Legacy USB support disabled if no USB devices are connected

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 16**) to access the north bridge and south bridge configuration menus

WARNING!

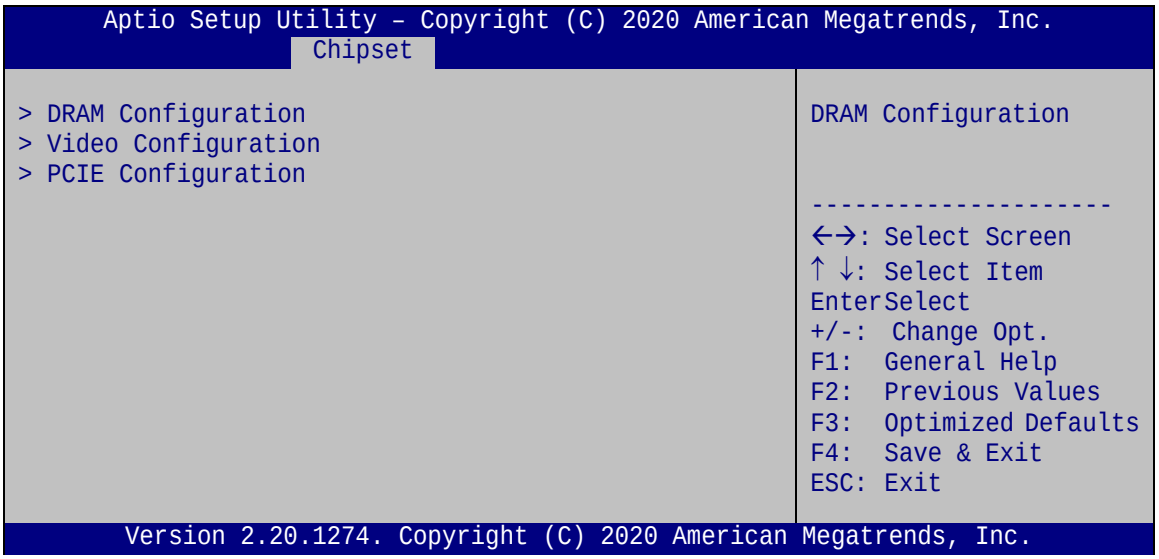
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 16: Chipset

5.4.1 North Bridge

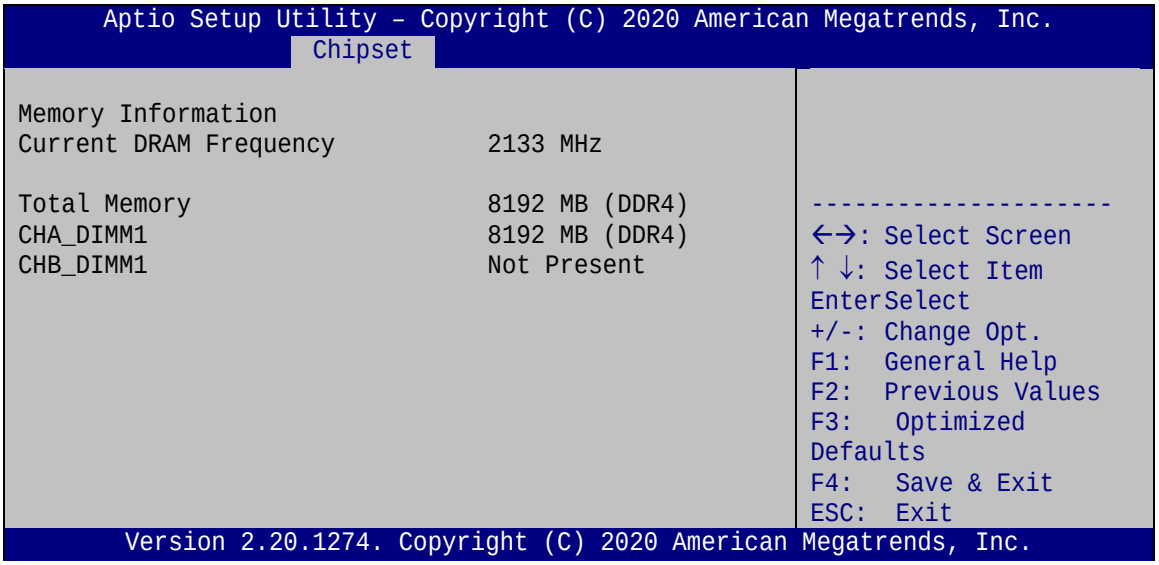
Use the **North Bridge** menu (**BIOS Menu 17**) to configure the memory settings.



BIOS Menu 17: North Bridge

5.4.1.1 DRAM Configuration

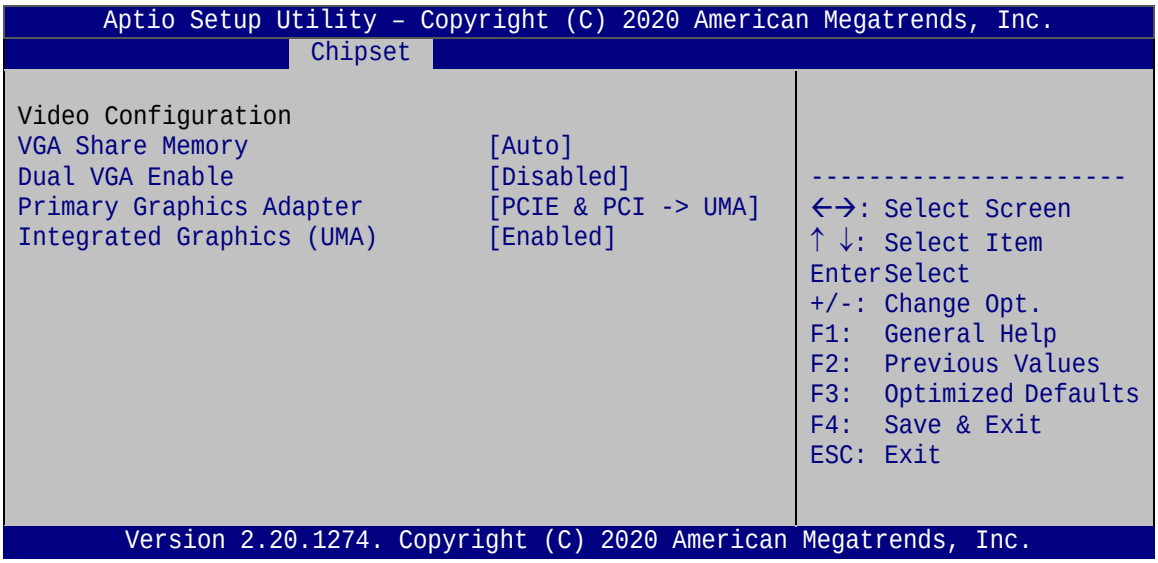
Use the **DRAM Configuration** menu (**BIOS Menu 18**) to view memory information.



BIOS Menu 18: DRAM Configuration

5.4.1.2 Video Configuration

The **Video Configuration** menu (**BIOS Menu 19**) configures the graphics settings.



BIOS Menu 19: Video Configuration

➔ **VGA Share Memory [Auto]**

Use the **VGA Share Memory** option to select the amount of system memory that can be used by the internal graphics device.

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

➔ **Dual VGA Enable [Disabled]**

Use the **Dual VGA Enable** option to enable or disable dual VGA.

➔ **Disabled** **DEFAULT** Disables dual VGA.

➔ **Enabled** Enables dual VGA.

➔ **Primary Graphics Adapter [PCIE & PCI -> UMA]**

Use the **Primary Graphics Adapter** option to select the graphics controller used as the primary boot device. Configuration options are listed below:

- PCIE & PCI --> UMA **DEFAULT**
- UMA --> PCIE & PCI

➔ **Integrated Graphics (UMA) [Enabled]**

Use the **Integrated Graphics (UMA)** option to enable or disable the integrated graphics controller.

➔ **Disabled** The integrated graphics controller is disabled

➔ **Enabled** **DEFAULT** The integrated graphics controller is enabled

5.4.1.3 PCIE Configuration

The **PCIE Configuration** menu (**BIOS Menu 20**) configures PCIe settings.

```
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
                    Chipset
PCIE Configuration                          Enable/Disable Reset
                                            PCIE When Link Fail.
Reset PCIE When Link Fail          [Disabled]
PCIEX16 Slot Capability Control    [Auto]   ----------------------
PCIEX16 Slot                       [Enabled] ←→: Select Screen
SSC Manual Control                 [Disabled] ↑ ↓: Select Item
                                            Enter Select
                                            +/-: Change Opt.
                                            F1:  General Help
                                            F2:  Previous Values
                                            F3:  Optimized Defaults
                                            F4:  Save & Exit
                                            ESC: Exit
Version 2.20.1274. Copyright (C) 2020 American Megatrends, Inc.
```

BIOS Menu 20: PCIE Configuration

➔ **Reset PCIE When Link Fail [Disabled]**

Use the **Reset PCIE When Link Fail** option to configure whether to reset PCI Express device when link fail.

➔ **Disabled**	**DEFAULT**	Do not reset PCI Express device when link fail.
➔ **Enabled**		Reset PCI Express device when link fail.

➔ **PCIEX16 Slot Capability Control [Auto]**

Use the **PCIEX16 Slot Capability Control** option to select the maximum link speed of the PCI Express x16 slot. The following options are available:

- Auto **Default**
- Force Gen 1
- Force Gen 2
- Force Gen 3

➔ **PCIEX16 Slot [Enabled]**

Use the **PCIEX16 Slot** option to enable or disable the PCIe x16 slot.

➔ **Disabled**		Disables the PCIe x16 slot.
➔ **Enabled**	**DEFAULT**	Enables the PCIe x16 slot.

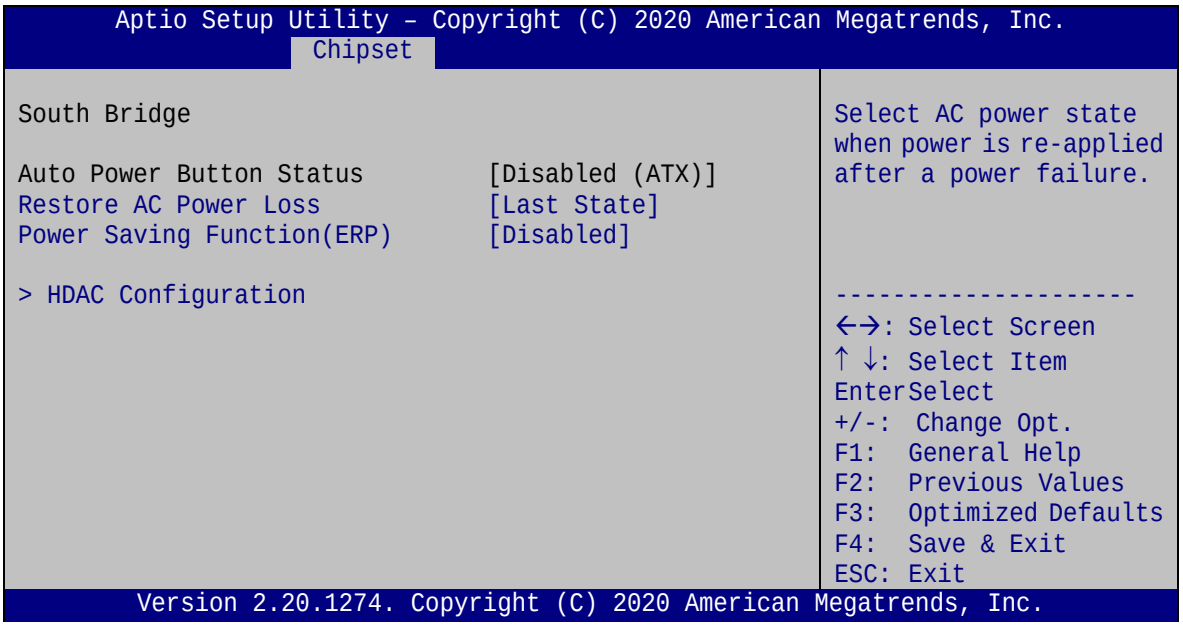
➔ **SSC Manual Control [Disabled]**

Use the **SSC Manual Control** option to enable or disable SSC manual control. The system must be reboot after changing this setting.

➔ **Disabled**	**DEFAULT**	Disables SSC manual control.
➔ **Enabled**		Enables SSC manual control.

5.4.2 South Bridge

Use the **South Bridge** menu (**BIOS Menu 21**) to configure the south bridge chipset.



BIOS Menu 21: South Bridge

➔ **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.

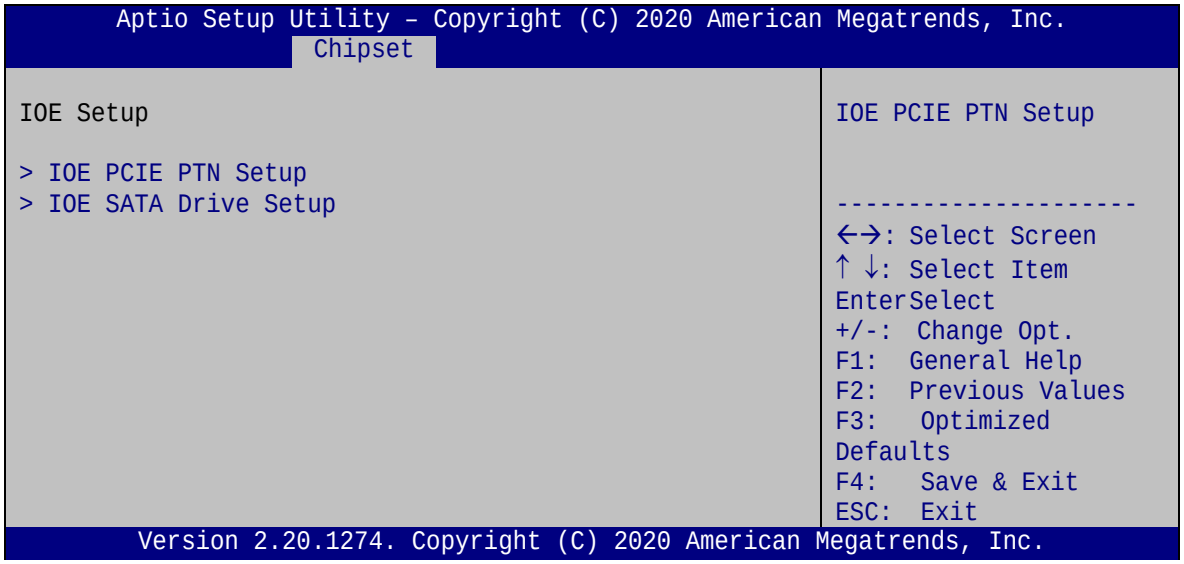
➔ **Power Saving Function(ERP) [Disabled]**

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.

5.4.3 IOE Setup

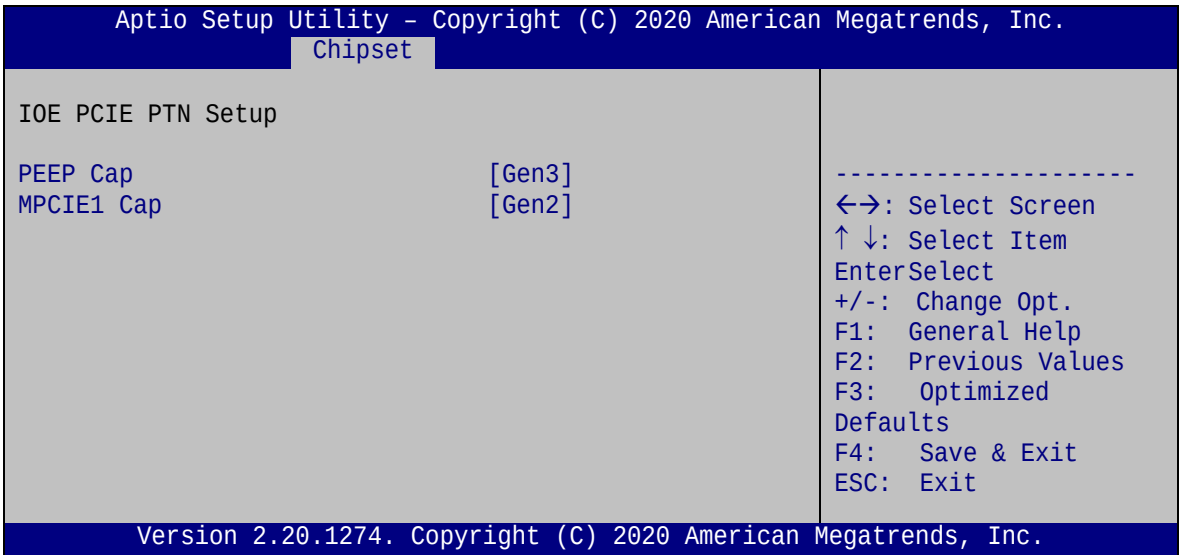
Use the **IOE Setup** menu (**BIOS Menu 22**) to configure the IOE of the system.



BIOS Menu 22: IOE Setup

5.4.3.1 IOE PCIE PTN Setup

Use the **IOE PCIE PTN Setup** menu (**BIOS Menu 23**) to configure the FCH configuration.



BIOS Menu 23: IOE PCIE PTN Setup

➔ **PEEP Cap [Gen3]**

Use the **PEEP Cap** option to select the maximum link speed of the PEEP. The following options are available:

- Gen1
- Gen2
- Gen3 **Default**

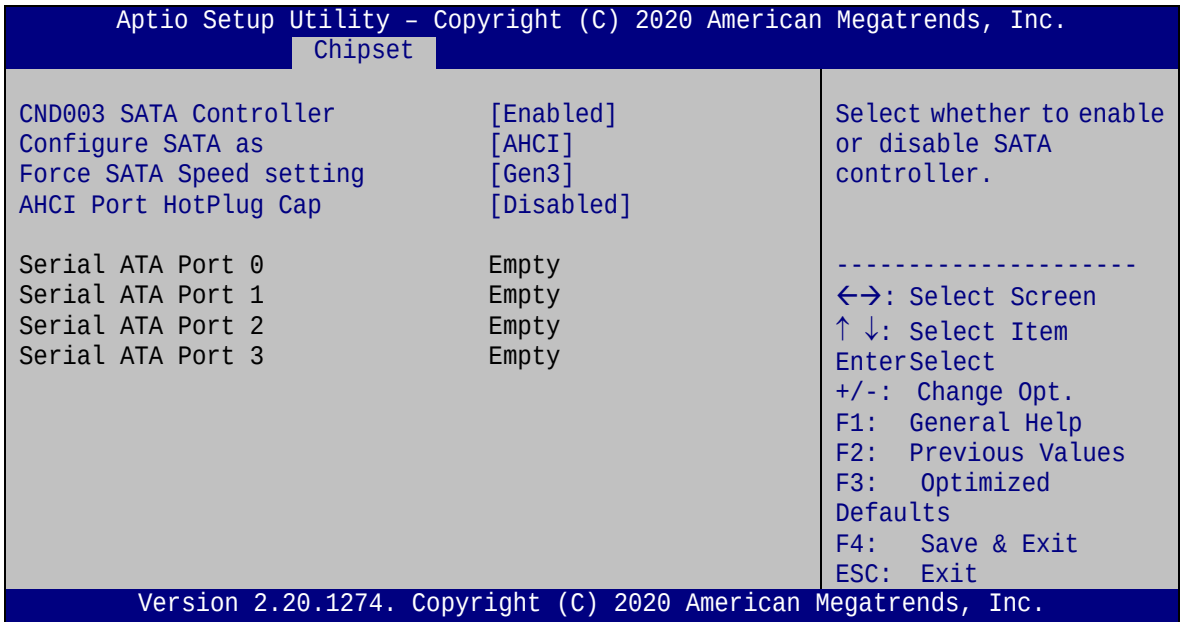
➔ **MPCIE1 Cap [Gen3]**

Use the **MPCIE1 Cap** option to select the maximum link speed of the PCIe Mini slot. The following options are available:

- Gen1
- Gen2 **Default**

5.4.3.2 IOE SATA Drive Setup

Use the **IOE SATA Drive Setup** menu (**BIOS Menu 24**) to configure Serial ATA.



BIOS Menu 24: IOE SATA Drive Setup

➔ **CND003 SATA Controller [Enabled]**

Use the **CND003 SATA Controller** option to enable or disable the on-chip SATA controller.

➔ **Disabled** Disables the SATA controller.

➔ **Enabled** **DEFAULT** Enables the SATA controller.

➔ **Configure SATA as [AHCI]**

Use the **Configure SATA as** option to configure SATA devices as IDE or AHCI devices.

➔ **IDE** Configures SATA devices as IDE device.

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

➔ **Force SATA Speed setting [Gen3]**

Use the **Force SATA Speed setting** option to select the maximum link speed of the SATA ports. The following options are available:

- Gen1
- Gen2
- Gen3 **Default**

➔ **AHCI Port HotPlug Cap [Disabled]**

Use the **AHCI Port HotPlug Cap** option to enable or disable the hot plug function when the SATA devices are configured as AHCI devices.

➔ **Disabled** **DEFAULT** Disables the hot plug function.

➔ **Enabled** Enables the hot plug function.

5.5 Security

Use the **Security** menu (**BIOS Menu 25**) to set system and user passwords.

```
      Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
  Main    Advanced  Chipset  Security    Boot    Save & Exit

Password Description                              Set Administrator
                                                  Password
If ONLY the Administrator's password is set,
then this only limits access to Setup and is      ---------------------
only asked for when entering Setup                ←→: Select Screen
If ONLY the User's password is set, then this     ↑ ↓: Select Item
is a power on password and must be entered to     EnterSelect
boot or enter Setup. In Setup the User will       F1   General Help
have Administrator rights.                        F2   Previous Values
The password length must be:                      F3    Optimized
Minimum length                  3                 Defaults
Maximum length                  20                F4    Save
                                                  ESC   Exit
Administrator Password
User Password

       Version 2.20.1274. Copyright (C) 2020 American Megatrends, Inc.
```

BIOS Menu 25: Security

➔ **Administrator Password**

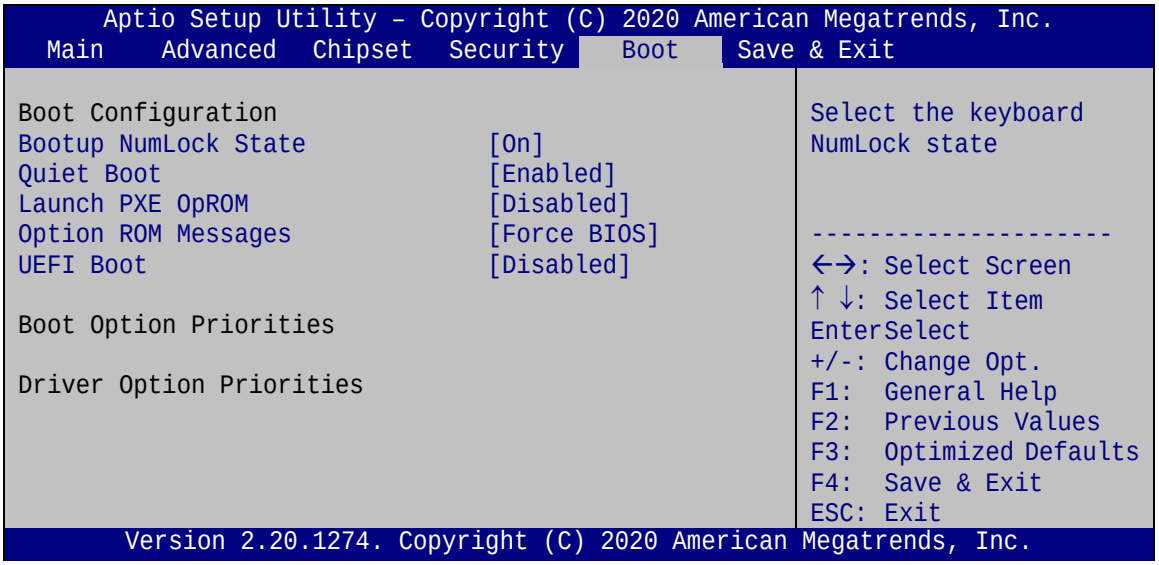
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.6 Boot

Use the **Boot** menu (**BIOS Menu 26**) to configure system boot options.



BIOS Menu 26: 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.

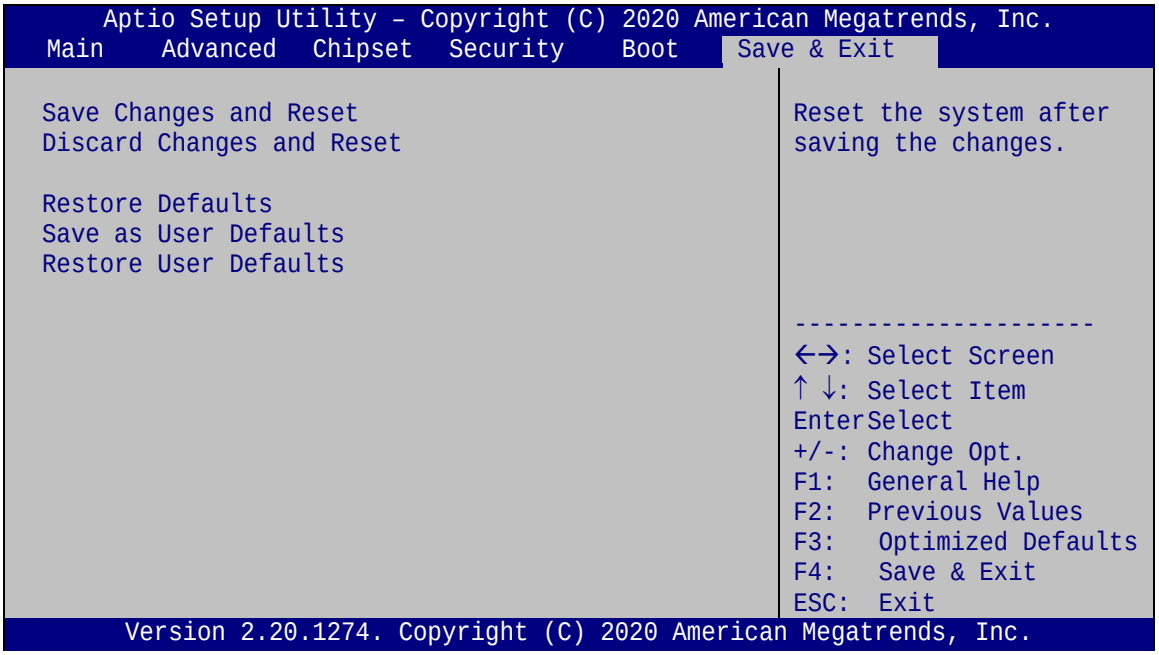
➔ **Disabled** **DEFAULT** Boot from UEFI devices is disabled.

➔ **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 27**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 27: 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.

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

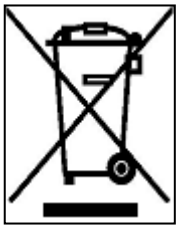
Product Disposal

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

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 D-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

E

Error Beep Code

E.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

E.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

F

Hazardous Materials Disclosure

F.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))	Polybromminated Biphenyls (PBB)	Polybromminated Diphenyl Ethers (PBDE)	Bis(2-etnyhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	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.

F.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
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。