PADR-M101

User’s Manual

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版本信息

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JHC assumes no liability under the terms of this warranty as a consequence of such events.

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1. Collect all the information about the problem encountered. (For example, CPU speed, JHC products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from JHC. Please contact your local supplier for ordering information. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B 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 resident installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, in which case the user will be required to correct the interference at his own expense.

Technical Support and Assistance

Step 1. Visit the JHC web site at www.jhctech.com.cn where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or JHC's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

CONTENTS

CHAPTER 1

General Information

1.1 Introduction

PADR-M101 is an embedded industrial Box Computer of JHCTECH. with SGCC box structure design and built-in 4-wire debugging fan for silent heat dissipation. With Intel® Whiskey lake U CPU + PCH Multi-Chip Package, the motherboard supports DDR4 SO DIMM 2400MHz memory, up to 32GB.

PADR-M101 offers 1*48-bit eDP，1*HDMI，1*DP, 2* GbE LANs, 4*USB3.0, 2*USB2.0, 4*COM，1*8-bit GPIO，1* M.2 2230 E-key，1* F-Mini PCIe with SIM slot support Mini PCIe and mSATA signal which can set by BIOS, supports 4G LTE module, 1*SATA 3.0 HDD/SSD used for storage, DC 12V power input. You can also choose the power board OFX-075to support 9-36V wide voltage input. The computer is compact in size and fully functional, which is easily to customize for embedded system applications, and very suitable for ITS, AI edge computing, intelligent manufacturing, intelligent security and other fields.

1.2 Features

Key Features

- General aluminum rectangular profile heat dissipation shell, SGCC box body, built-in 4-wire debugging fan for silent heat dissipation
- Intel® Whiskey lake U CPU 2.2-4.6GHz, 4 cores 8threads
- 2*SODIMM, support DDR4 2400MHz, up to 32GB
- 1*F-mini PCIe with SIM slot, can be set to Mini PCIe or mSATA by BIOS, support 4G LTE
- 1*M.2 2230 E-Key, support WiFi 6/BT5.0
- 1*SATA HDD/SSD bay, 1*Msata(Optional) for storage
- 1*eDP, 1*HDMI, 1*DP, support 3 independent display
- Optional Realtek ALC662VD controller, supports 5.1 channel
- 2*Intel I210AT PCIe Gigabit Ethernet, Integrated 10/100/1000M
- 8-bit DIO(1x2*5pin header, 4*USB3.0 gen1.0, type A, support max 5Gbps, 2USB2.0 (2x2*4pin header), 4*COM(4x2*5pin header 2*RS232/422/485, 2*RS232), optional support TPM2.0
- Windows 10 IoT enterprise, Andriod, Ubuntu, Suse, Red Hat enterprise, Wind River Vxworks 7,

Yocto

- DC 12V power input, optional support 9-36V wide power input through by one 75W power board OFX-075, have 3* CPU working status LED.
- AT/ATX pins are facilitate the setting of power-on mode. CMOS data pins are to facilitate the user to clear CMOS operation.

1.3 Specifications

1.3.1 General

CPU: Intel® Whiskey lake U Celeron /Core I3/I5/I7 CPU

System chipset: Intel® PCH Muti-Chip Package

BIOS: 128M-bit AMI EFI BIOS

Memory: 2*260-pin DDR4 SODIMM, Up to 32GB

Watchdog Timer: 255-level interval timer, setup by software

USB: 4*USB 3.0 Type A ports, 2*USB2.0 2*4pin header;

Serial port： 2*RS-232/422/485 2*5pin DB header，2*RS232 2*5pin DB header

GPIO: 8bit GPIO 2*5pin header

Expansion Interface:

1* Full size mini-PCIe (PCIex1+USB+mSATA signal) with SIM slot

1* M.2 2230 E-key，support WiFi6/BT5.0

Storage:

1*mSATA(Optional)

1*SATA3.0 HDD/SSD

1.3.2 Display

- **Chipset:** Intel® Gen. 9 UHD Graphics
- **Display Memory:** Shared system memory
- **Resolution：** HDMI4096*2304@24Hz; eDP 4096x2304@60Hz; 1*DP 4096*2304@60Hz

1.3.3 Ethernet

- **Chipset:** 2*Intel® I210AT Ethernet controllers

- **Speed:** 10/100/1000 Mbps Integrated
- **Interface:** 2*RJ45

1.3.4 Audio

- **Chipset:** Realtek ALC662VD controller
- **Interface:** 2*5pin header

1.3.5 Power Consumption

- **Input Voltage:** DC 12V, optional support 9-36V wide power input through by one 75W power board OFX-075
- **Power Consumption:** 19.92W (I5-8265U, 8GB DDR , 1*500G SSD)
- **Power Adapter:** AC to DC 12V/5A, 60W

1.4 Environmental Specifications

- **Operating temperature:** -0 ~50° C
- **Relative humidity:**10%-90%@40°C (无凝结)
- **Storage temperature:** -40 ~ 85°C (-40 ~ 185°F)
- **EMC:** CE, FCC B级

1.5 PADR-M101 Specification

Model NO.	CPU	Introduction
PADR-M101/S001	Intel® Core I3-8145U	嵌入式箱体电脑，双通道 DDR4 2*SO-DIMM，1*HDMI，1*DP，1*Line out&Mic（可选），2*LAN，4*USB3.0，3/4*COM，8-bit DIO，1*M.2，1*Mini PCIe/mSATA，1*2.5”SATA，DC 12V
PADR-M101/S002	Intel® Core I5-8265U	嵌入式箱体电脑，双通道 DDR4 2*SO-DIMM，1*HDMI，

		1*DP，1*Line out&Mic（可选）， 2*LAN，4*USB3.0，3/4*COM，8-bit DIO，1*M.2，1*Mini PCIe/mSATA，1*2.5”SATA，DC 12V
PADR-M101/S003	Intel® Core I7-8565U	嵌入式箱体电脑，双通道 DDR4 2*SO-DIMM，1*HDMI，1*DP，1*Line out&Mic（可选）， 2*LAN，4*USB3.0，3/4*COM，8-bit DIO，1*M.2，1*Mini PCIe/mSATA，1*2.5”SATA，DC 12V
PADR-M101/S004	Intel® Celeron 4305U	嵌入式箱体电脑，双通道 DDR4 2*SO-DIMM，1*HDMI，1*DP，1*Line out&Mic（可选）， 2*LAN，4*USB3.0，3/4*COM，8-bit DIO，1*M.2，1*Mini PCIe/mSATA，1*2.5”SATA，DC 12V
OFX-075	75W power board，DC IN 9-36V，DC OUT 12V, 38*53mm, TDP mini 54W, max 78W	

1.6 Mechanical Specifications

PADR-M101 embedded industrial box computer is assembled by JHC SBC（Single Board Computer ECM-I910）, optional adapter card（ECD-9100）, optional wide voltage module（OFX-075）installed in general In the case of aluminum rectangular profile.

警告：一定要关电源并且拔掉插头才能进行安装，禁止带电操作！

SBC ECM-I910 (Front view)

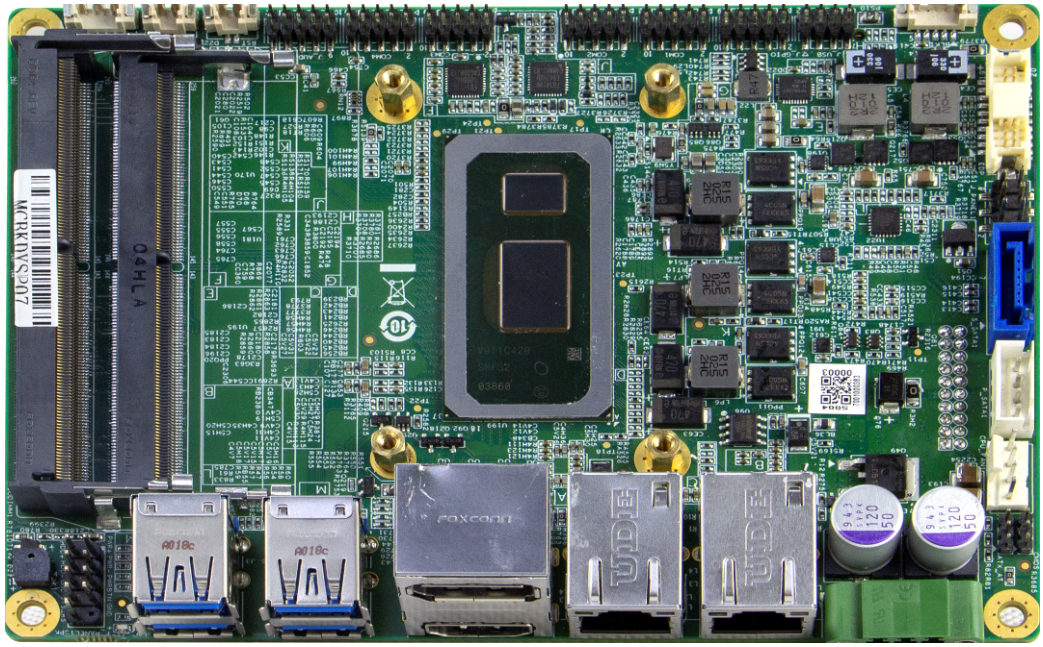

Figure 1. 1

SBC ECM-I910（Rear view）

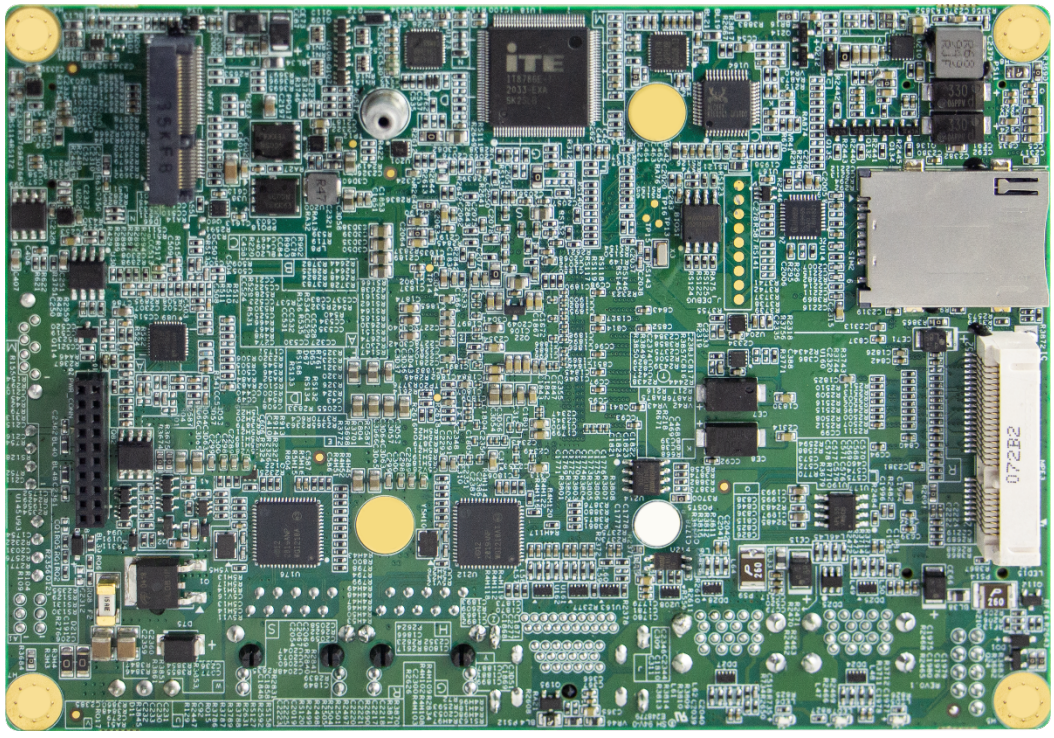

Figure 1. 2

Expansion power module（OFX-075）

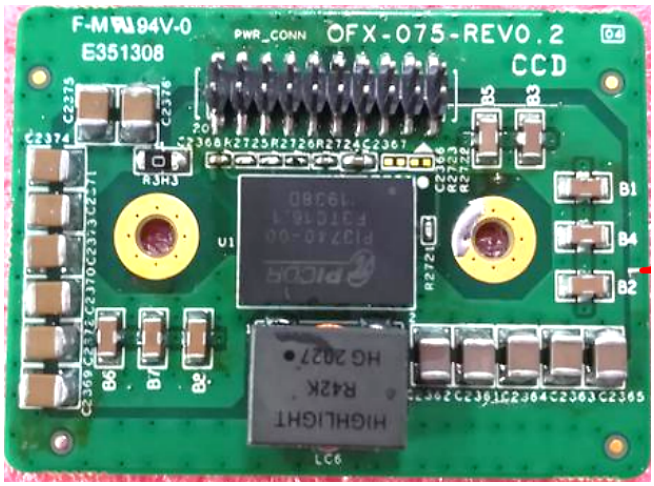

Figure 1. 3

Expansion adapter（ECD-9100）

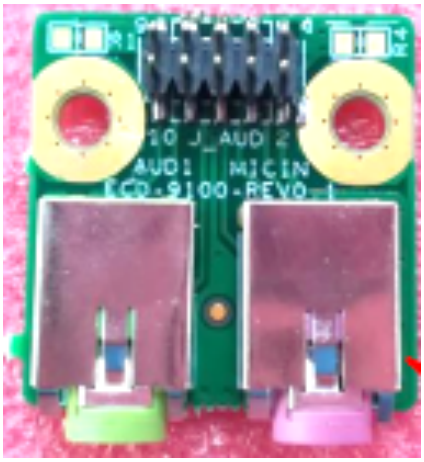

Figure 1. 4

PADR-M101 Dimension： **Unit: mm**

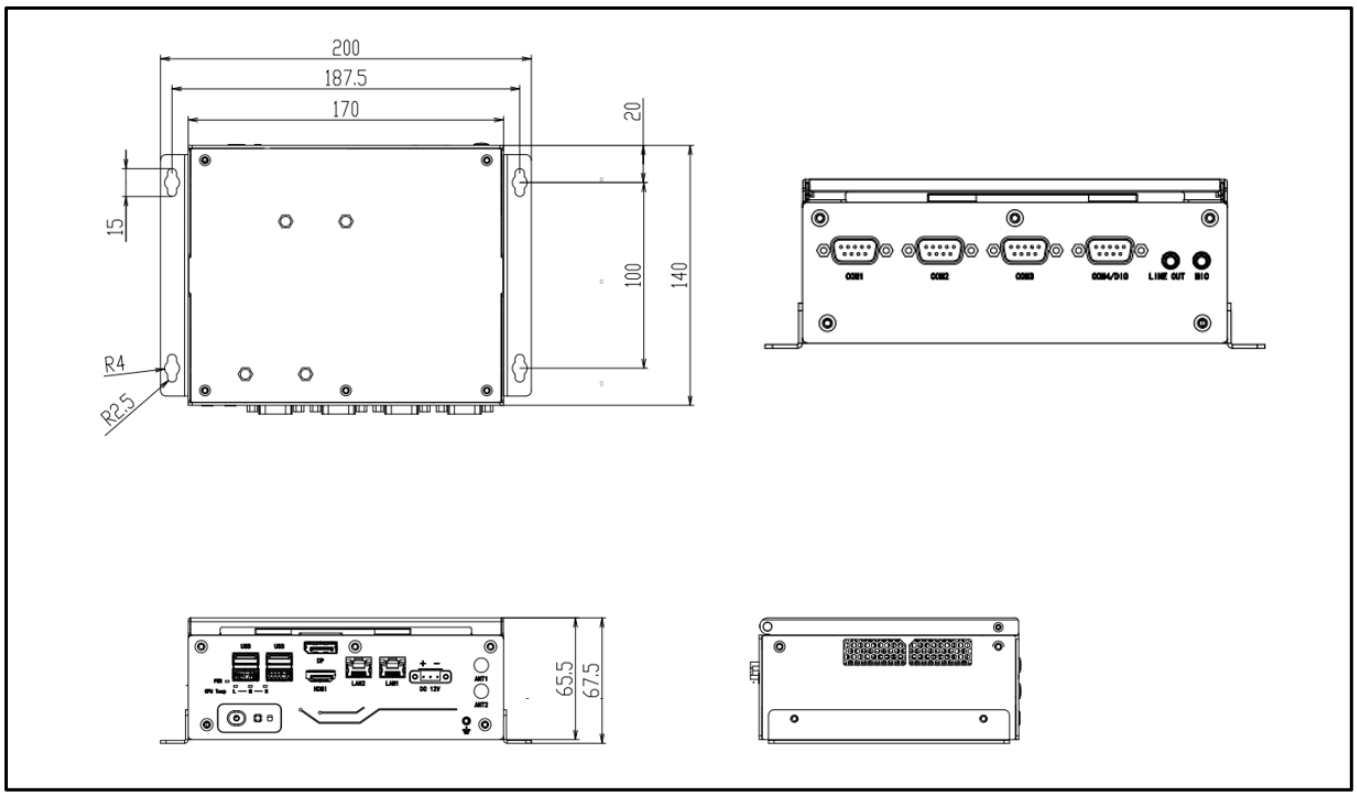

Figure 1. 5

Unit: mm

CHAPTER 2

Hardware Installation

2.1 Introduction

The following chapters will state the product's mainboard DIP switch settings, external and internal connectors, and corresponding pin assignments.

2.2 Jumpers and Connectors

There are dial switches on the motherboard of PADR-M101, which is convenient for users to set according to different configuration requirements. The following table lists the functions of the DIP switches on the motherboard.

Table 2.1: Switches and Jumpers	
Label	**Function**
ATX_AT	Set Power-on mode at AT or ATX
CMOS/CLR	Clear CMOS Data Setting
J_PANEL1	eDP screen 3.3V/5V/12V Power supply Select

2.2.1 Board layout: Jumper/Switch and Connector Locations

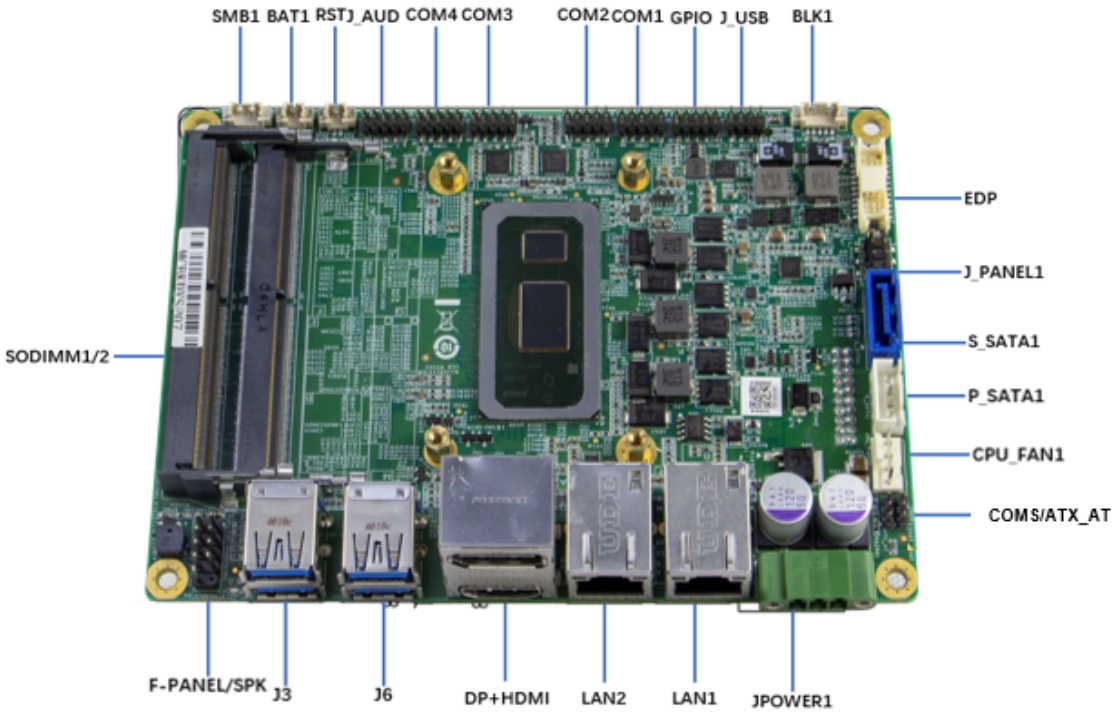

Figure 2.1 Jumper and Connector Location

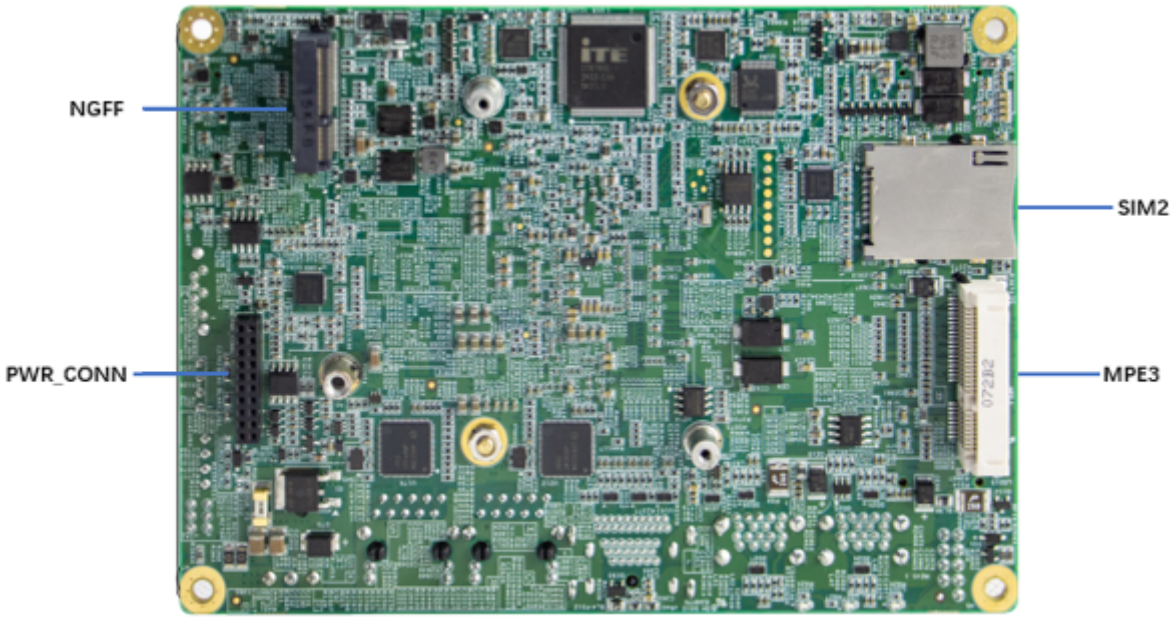

Figure 2.2 Jumper and Connector Location

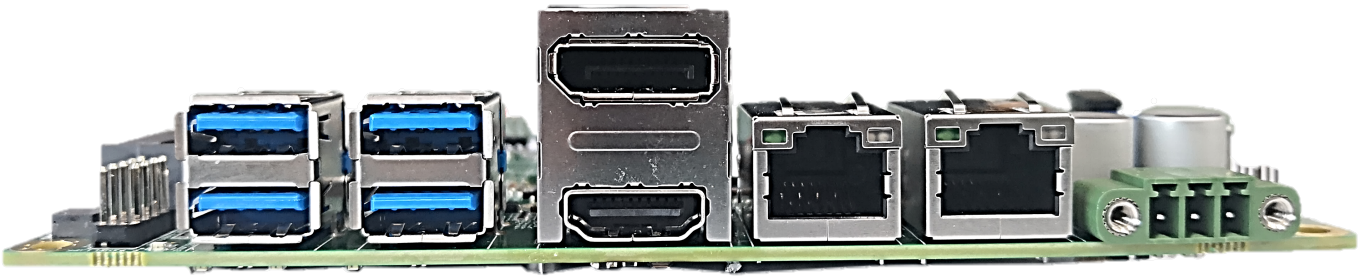

Figure 2.3 I/O Connector

2.2.2 COMS-Clear CMOS data

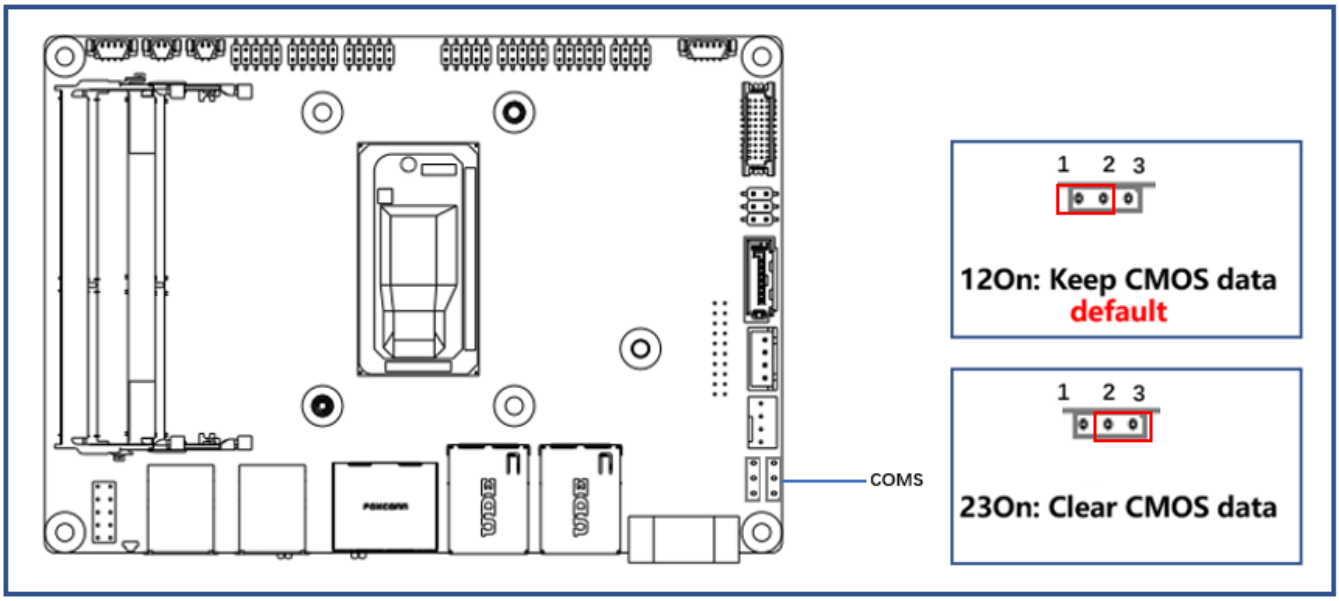

Figure 2.4

The motherboard coastline of PADR-M101 contains a switch that can erase CMOS data and reset the system BIOS information. Normally this switch should be set with pins 1-2 closed. If you want to reset the CMOS data, set SW2 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its default setting.

2.2.3 SW1-Power on mode AT or ATX selection

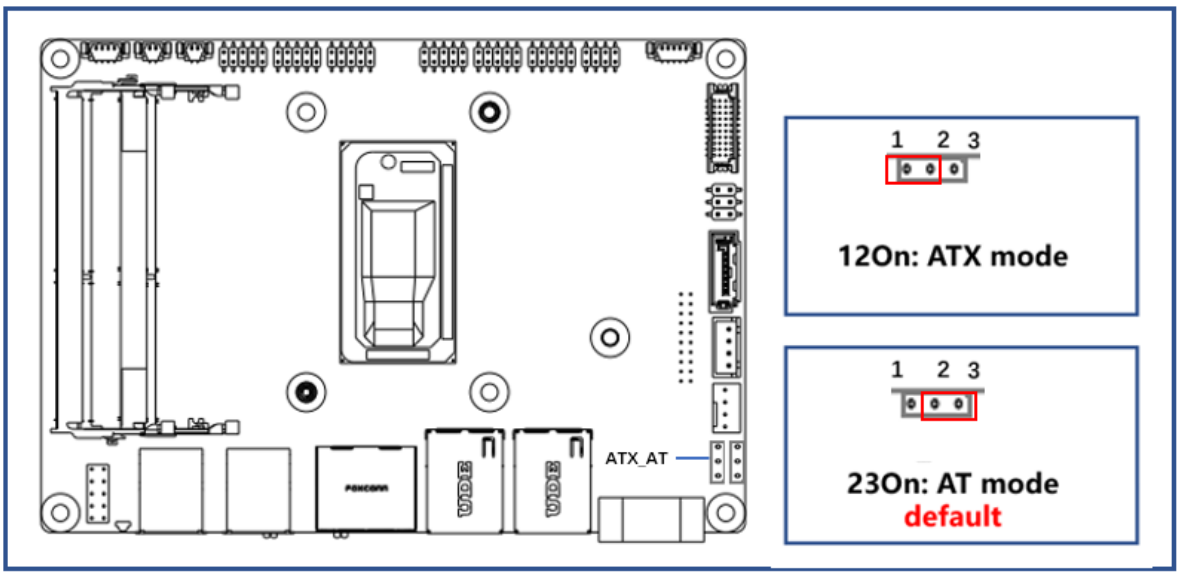

Figure 2.5

The motherboard coastline of PADR-M101 provides a AT/ATX Switch, which users can set Power-on

mode by it. When you dial it at AT, it means power on by AC Power; When you dial it at ATX, it means power on by Power button.

2.2.4 J-Panel eDP Power supply 12V/5V/3.3V Mode Select

J_PANEL1 is used to select the power supplied of LVDS panel.

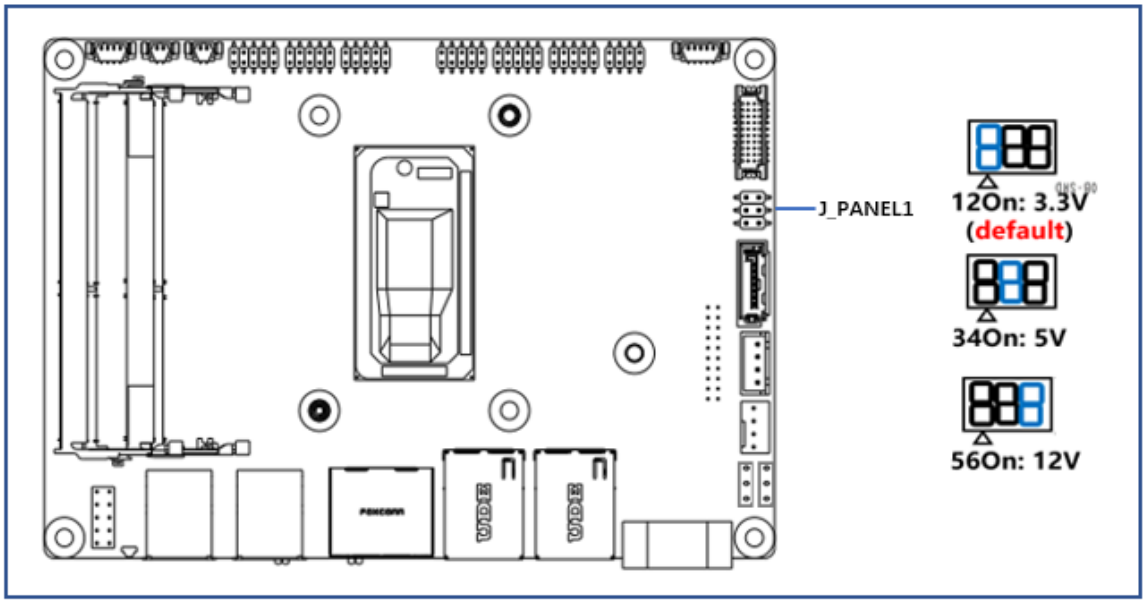

Figure 2.6

2.3 I/O Interface/LED

PADR-M101 Front view:

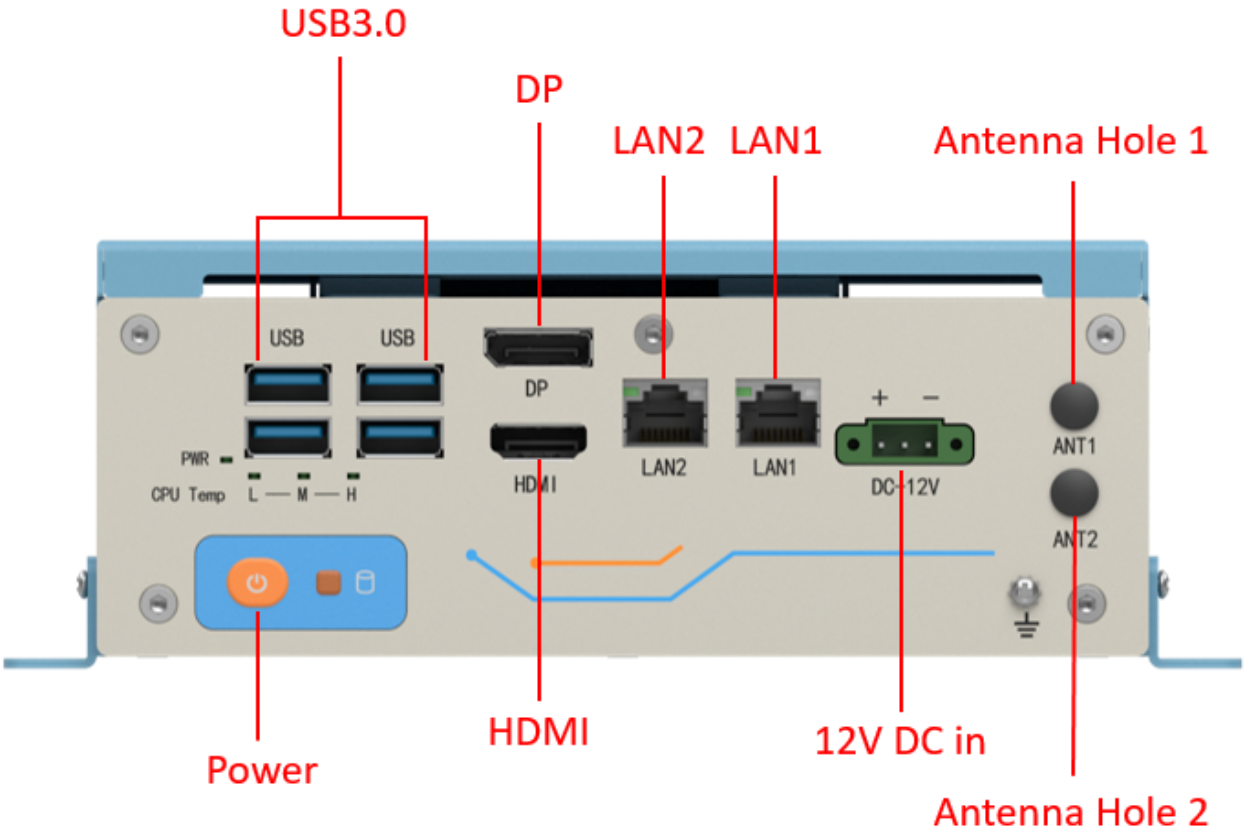

Figure 2.7

I/O interface included on the front panel:

- 1*DC-in Power jack;
- 2*Antenna Hole;
- 1*Mic, 1*Line out: 3.5mm phone jack;
- 1*DP, 1*HDMI;
- 2*USB 3.0 Type A;
- 2* LAN;
- Power button
- HDD LED, CPU LEDs

PADR-M101 Rear view:

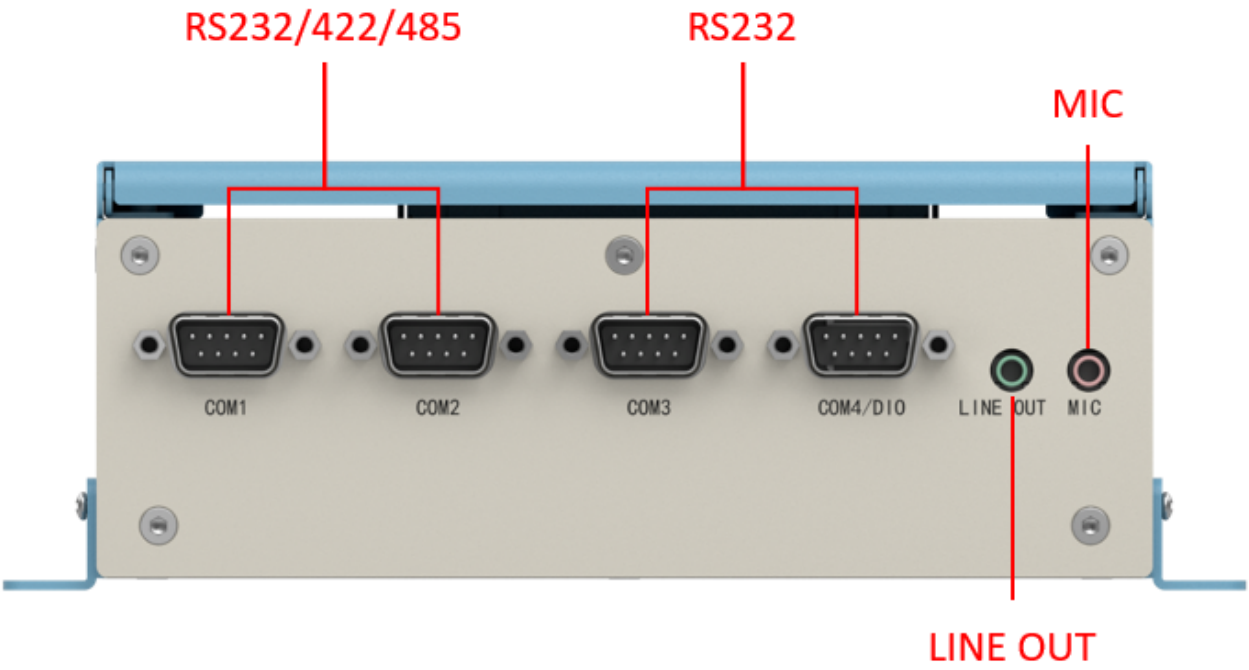

Figure 2. 8

I/O interface included on the rear panel:

- 4*COM: DB9 2*RS232, 2*RS232/422/485
- 1*Mic, 1*Line out: 3.5mm phone jack

PADR-M101 Side view

Figure 2. 9

Figure 2.10

2.3.1 Power Input Connector (CN1)

PADR-M101 uses a power 1x3PIN 3.81mm phoenix connector that supports up to 60W of power and is a low-power solution. Use a 12V adapter to input voltage and a DC power supply to the outlet. If the voltage used is greater than the recommended voltage, the system will not boot or even damage the motherboard.

Table 2.2: DC IN connector pin assignments			
Pin	Signal	Pin	Signal
1	DC IN 12V	2	NC
3	GND		

2.3.2 Ethernet port (LAN1/LAN2)

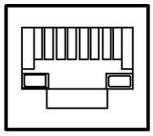

Table 3.1: Ethernet 10/100/1000 Mbps RJ-45 port			
Pin	10/100/1000BaseT Signal	Pin	10/100/1000BaseT Signal

1	TX+(10/100), LAN_DA+(GHz)	5	LAN_DC-(GHz)
2	TX-(10/100), LAN_DA-(GHz)	6	RX-(10/100), LAN_DB-(GHz)
3	RX+(10/100), LAN_DB+(GHz)	7	LAN_DD-(GHz)
4	LAN_DC+(GHz)	8	LAN_DD-(GHz)

2.3.3 HDMI(L3/L4)

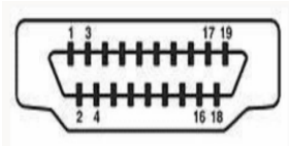

Table 2.4：HDMI Pin Assignments					
Pin	Signal	Pin	Signal	Pin	Signal
1	DATA2_P	8	GND	15	SCL
2	GND	9	DATA0_N	16	SDA
3	DATA2_N	10	CLK_P	17	GND
4	DATA1_P	11	GND	18	VCC
5	GND	12	CLK_N	19	DETECT
6	DATA1_N	13	NC		
7	DATA0_P	14	NC		

2.3.4 DP(L3/L4)

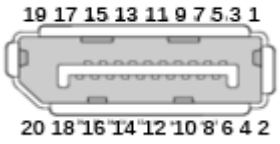

Table 2.5：DP connector Pin Assignments					
Pin	Signal	Pin	Signal	Pin	Signal
1	DATA0_P	8	GND	15	AUXP
2	GND	9	DATA2_N	16	GND
3	DATA0_N	10	DATA3_P	17	AUXN
4	DATA1_P	11	GND	18	HPD
5	GND	12	DATA3_N	19	GND

6	DATA1_N	13	CTRL	20	PWR
7	DATA2_P	14	GND		

2.3.5 USB3.0(J6/J3)

There are 4*USB 3.0 ports on the PADR-M101 panel. Table 2.6 for USB3.0（type A）pin assignments.

Table 2.6：USB3.0 type A Port Pin Assignments			
Pin	Signal	Pin	Signal
1	USB1_VCC	6	StdA_SSRX+
2	D1-	7	GND7
3	D1+	8	StdA_SSTX1-
4	GND	9	StdA_SSTX1+
5	StdA_SSRX-	10	USB2_VCC
11	USB1_VCC	12	StdA_SSRX+
13	D2-	14	GND13
15	D2+	16	StdA_SSTX2-
17	GND16	18	StdA_SSTX2+
5	StdA_SSRX-	Shell	Shield

2.3.6 Front PANEL(F_PANEL)

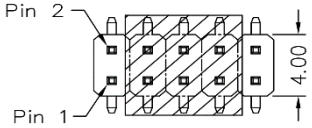

Table 2.7 shows the detailed pin assignment introduction

Table 2.7：F-PANEL Pin Assignments			
Pin	Signal	Pin	Signal

1	HDD_LED+	6	PWRBTN#
2	PWR_LED+	7	SYS_RST#
3	HDD_LED-	8	GND
4	PWR_LED-	9	SPK_OUT-
5	GND	Shell	Shield

2.3.7 M.2 E-Key

Standard M.2 2230 E-Key slot，signal：PCIe，USB, CNVio

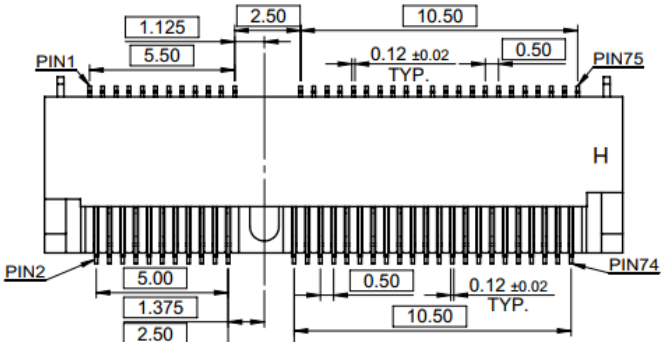

Table 2.8：M.2 E-Key 2230 （NGFF2）pin Assignments			
Pin	Signal	Pin	Signal
1	GND	2	+V3.3M2SB
3	USB_P5	4	+V3.3M2SB
5	USB_N5	6	NC
7	GND	8	M.2_BT_PCMCLK
9	CNV_WR_D1_DN	10	M.2_BT_PCMFRM_CRF_RST_N
11	CNV_WR_D1_DP	12	M.2_BT_PCMIN
13	GND	14	M.2_BT_PCMOUT_CLKREQ
15	CNV_WR_D0_DN	16	NC
17	CNV_WR_D0_DP	18	GND
19	GND	20	UART_BT_WAKE_N
21	CNV_WR_CLK_DN	22	M.2_CNV_BRI_DT_BT_UART0_RX
23	CNV_WR_CLK_DP	32	M.2_CNV_RGI_DT_BT_UART0_TX
33	GND	34	M.2_CNV_RGI_RSP_BT_UART0_CTS
35	PCIE_X4_TX12+	36	M.2_CNV_BRI_DT_BT_UART0_RTS

37	PCIE_X4_TX12-	38	M.2_WLAN_CL_RST_N
39	GND	40	M.2_WLAN_CL_DATA
41	PCIE_X4_RX12+	42	M.2_WLAN_CL_CLK
43	PCIE_X4_RX12-	44	DISC_WLAN_WWAN_COEX3
45	GND	46	DISC_WLAN_WWAN_COEX2
47	CLK_PCIe_P14	48	DISC_WLAN_WWAN_COEX1
49	CLK_PCIe_N14	50	SUSCLK
51	GND	52	PLTRST_M2_N
53	CLK_REQ14#	54	NC
55	PCH_WAKE_N	56	NC
57	GND	58	NC
59	CNV_WT_D1_DN	60	NC
61	CNV_WT_D1_DP	62	NC
63	GND	64	PULSAR_38P4M_REFCLK
65	CNV_WT_D0_DN	66	NC
67	CNV_WT_D0_DP	68	GPPC_B10_CLKREQ5_WIGIG_R_N
69	GND	70	+V3.3M2SB
71	CNV_WT_CLK_DN	72	+V3.3M2SB

2.3.8 1*Mini-PCIe

Signal：PCIe_L12，Via SATA_P1，USB2.0_P6，with SIM1 Slot

Remarks: Automatic detection and switching can be realized through BIOS to realize dual purpose of single slot.

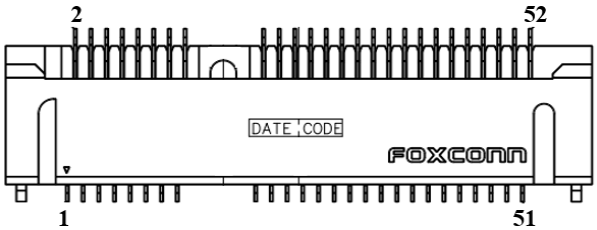

Table 2.9：mini-PCIe pin Assignments

Pin	Signal	Pin	Signal
1	PCIE_WAKE_N	2	+V3.3_MINICARD2
3	NC	4	GND

5	NC	6	+V1.5
7	CLKREQ#	8	+VUIM_PWR
9	GND	10	UIM_DATA
11	CLK_MIO1_PCIE-	12	UIM_CLK
13	CLK_MIO1_PCIE+	14	UIM_RESET
15	GND	16	+VUIM_VPP
17	NC	18	GND
19	NC	20	WIFI2_DISABLE#
21	GND	22	PLTRST#
23	PCIE_MINI_RX2-	24	+V3.3_MINICARD2
25	PCIE_MINI_RX2+	26	GND
27	GND	28	+V1.5
29	GND	30	SMB_SCL_RSM
31	PCIE_MINI_TX2-	32	SMB_SDA_RSM
33	PCIE_MINI_TX2+	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+V3.3_MINICARD2	40	GND
41	+V3.3_MINICARD2	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+V1.5
49	NC	50	GND
51	NC	52	+V3.3_MINICARD2

2.3.9 1*SATA power (P_SATA1)

1x4 Pin 2.5mm

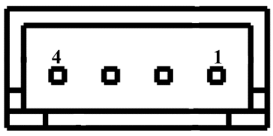

Table 2.10： SATA power connector			
Pin	Signal	Pin	Signal
1	5V	3	GND
2	GND	4	12V

2.3.10 2*USB2.0 Header

Table 2.11 for USB2.0(2*4pin header) pin assignments.

Table 2.11: USB2.0(pin header) pin assignments			
Pin	Signal	Pin	Signal
1	+V5SB_USB	5	USB_z_P8
2	+V5SB_USB	6	USB_z_P7
3	USB_z_N8	7	GND
4	USB_z_N7	8	GND

2.3.11 COM1/2 (RS232/422/485)

The back panel of PADR-M101 provides 2 serial ports of COM1/2 by 2x2*5pin connectors. COM1/2 can be configured as RS232、RS422 or RS485 by BIOS setup. Table 3.13 for pin assignments.

Table 2.12 for pin assignments.

Table 2.12： COM1/2 Serial Ports Pin Assignments			
Pin	RS-232 Signal	RS-422 Signal	RS-485 Signal

1	DCD	TX-	DATA-
2	RxD	TX+	DATA+
3	TxD	RX+	NC
4	DTR	RX-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.3.12 COM3/4 (RS232)

Table 2.13：COM3/4 Serial Ports Pin Assignments

Pin	RS-232 Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
10	NC

2.3.13 8-bit GPIO Connector (GPIO)

PADR-M101 provides a 8-bit DIO by a 2*5pin connector. Table 2.14 for pin assignments.

Table 2.14：8-bit DIO Pin Assignments

Pine	DIO Signal	Pin	DIO Signal
1	+V5_GPIO	6	GP76
2	GP74	7	GP72
3	GP70	8	GP77
4	GP75	9	GP73
5	GP71	10	GND

2.3.14 J_AUD

Table 2.15 for Pin assignments.

Table 2.15：J_AUD Pin Assignments			
Pin	Signal	Pin	Signal
1	MCIN1_L	6	NC
2	GND_AUD	7	GND_AUD
3	MCIN1_R	8	FRONT_LINOUT
4	FRONTR_LINOUT	9	LINE1_L_R
5	LINE1_R-R	10	GND_AUD

2.3.15 CPU_FAN1

Table 2.16：CPU_FAN1 pin Assignments			
Pin	Signal	Pin	Signal
1	GND	2	VCC
3	Control	4	Tachometer

2.3.16 EDP connector

2X10Pin 1.25mm SMD LVDS_2X10P_1R25_S 712-76-20GWE0

Table 2.17 for EDP connector pin assignments.

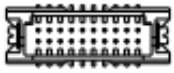

Table 2.17：EDP connector Pin Assignments			
Pin	Signal	Pin	Signal
1	/	11	PANEL_TXP1
2	/	12	PANEL_AUXN
3	PANEL_TXN0	13	/
4	PANEL_TXN3	14	PANEL_AUXP
5	PANEL_TXP0	15	PANEL_TXN2
6	PANEL_TXP3	16	/
7	/	17	PANEL_TXP2
8	/	18	/
9	PANEL_TXN1	19	VDD_PANEL
10	/	20	VDD_PANEL

2.3.17 J_PANEL1

Table 2.18：J_PANEL1 pin Assignments	
Pin	Signal
1	V3.3
2	VDD_PANEL
3	VDD_PANEL
4	+V5
5	+V12
6	VDD_PANEL

2.3.18 J-BLK 5PIN

Table 2.19：J-BLK pin Assignments	
Pin	Signal
1	12V
2	GND
3	BLEN
4	BLCTL
5	5V

2.3.19 Reset connector (J_RST1)

Table 2.20：Reset connector pin assignments	
Pin	Signal
1	SYS_RST#
2	GND

2.3.20 SMBUS Connector (SMB1)

Table 2.21：SBM1 Pin Assignments	
Pin	Signal
1	GND
2	SMB_STB_z_DAT
3	SMB_STB_z_CLK
4	+V5

2.3.21 Serial ATA1 (S_SATA1)

Table 2.22: Serial ATA1 pin assignments			
Pin	Signal	Pin	Signal
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND		

2.3.22 COMS battery connector (BAT1)

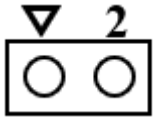

Table 2.23: CMOS battery connector pin assignments			
Pin	Signal	Pin	Signal
1	BAT+	2	GND

2.4 Installation

2.4.1 Install/replace HDD/SSD

Step 1: Unscrew the 5 screws on the hard disk cover, and then remove the hard disk cover.

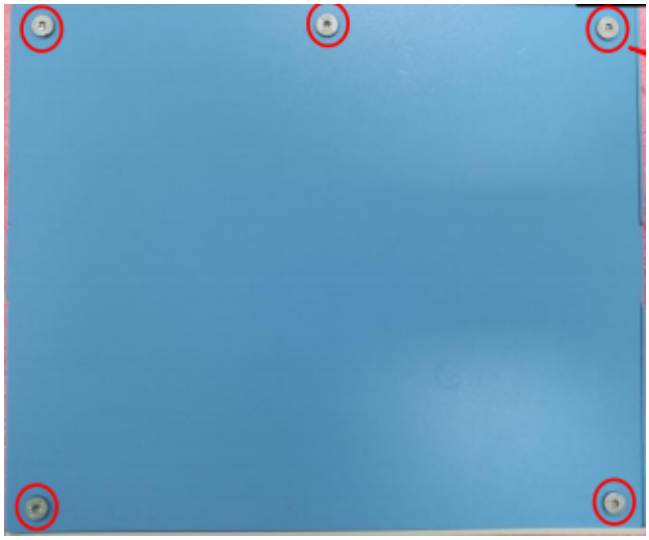

Figure 2.1

Step 2: Unplug the original SATA hard drive cable.

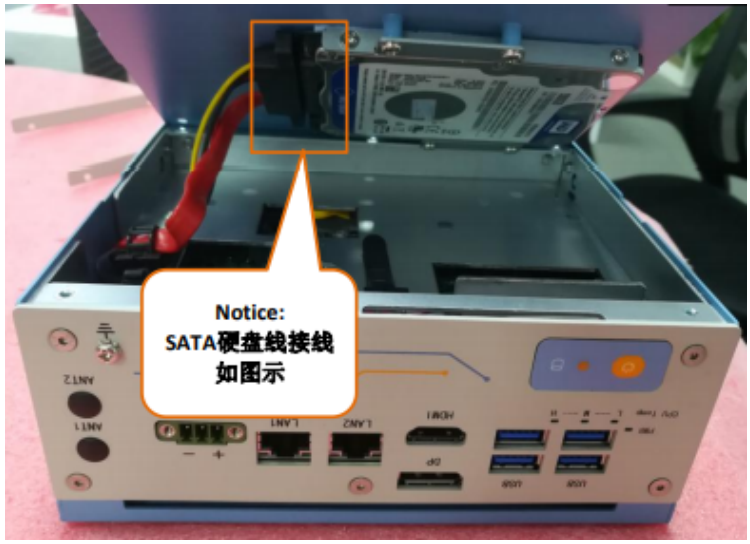

Figure 2.2

Step 3: Unscrew the 4 screws on the hard disk bracket, and then remove the hard disk bracket.

Figure 2.3

Step 4: Unscrew the 4 fixing screws, remove the original hard drive, and then install the new HDD/SSD hard drive in the hard drive bay, and tighten the 4 screws to fix the hard drive.

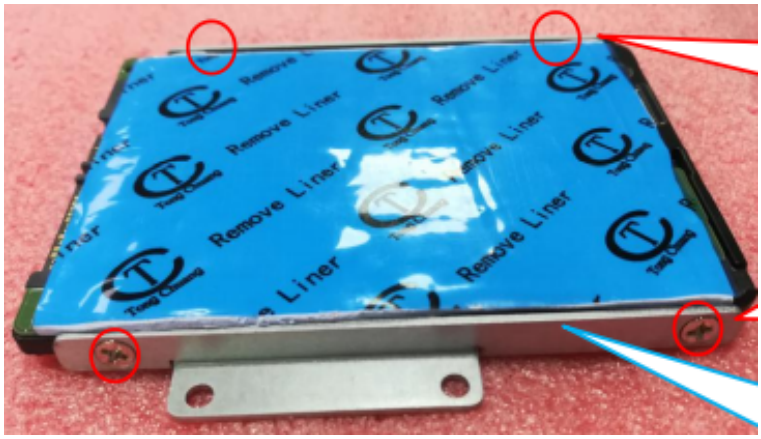

Figure 2.4

Step 5: Put the hard disk and the hard disk bracket into the hard disk slot, and tighten the 4 screws to fix the hard disk bracket according to step 3.

Step 6: Install the hard disk cover, and tighten the 5 screws according to step 1.

Figure 2.5

2.4.2 Install OFX-075 expansion power module (to be determined)

Tips： If you want to install the OFX-075 power module, remove the R3H2 resistor on the motherboard. The position of the resistor on the motherboard is as follows.

(This step requires professional guidance, please operate with caution)

Similarly, if you want to remove OFX-075, please be sure to solder R3H2 back to the designated position on the motherboard.

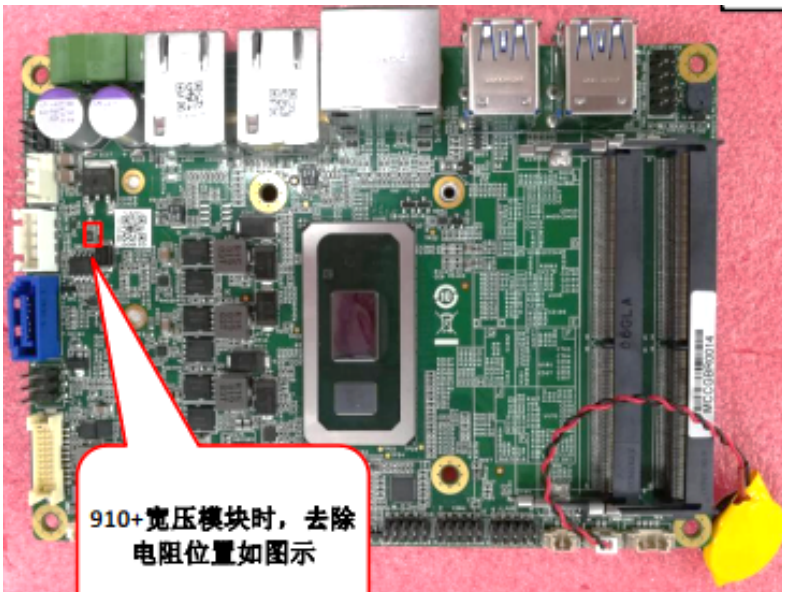

Figure 2.6

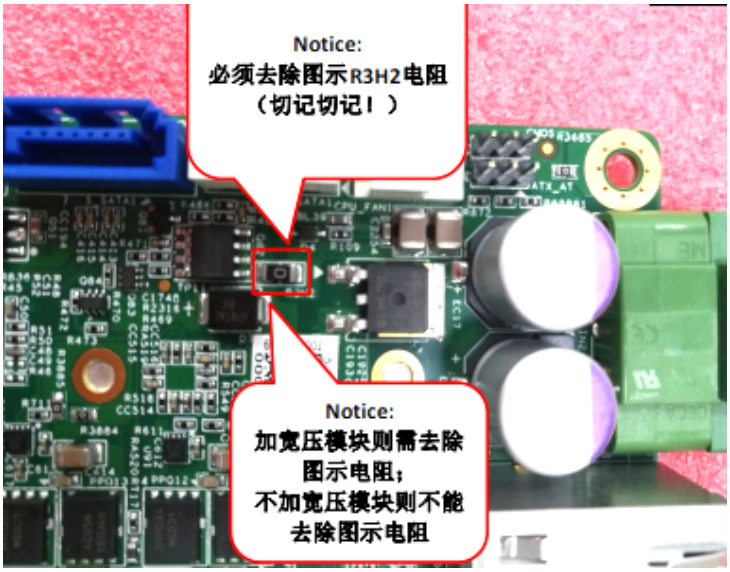

Figure 2.7

Installation step 1: ame as steps one and two in 2.4.1, unscrew and remove the SARA hard disk cable to remove the hard disk cover assembly;

Step 2: Install the power module upside down in the position shown in the figure, and tighten 2 screws to fix the power module.

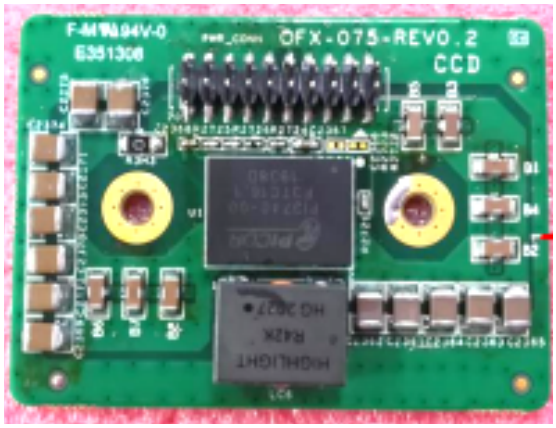

Figure 2.8

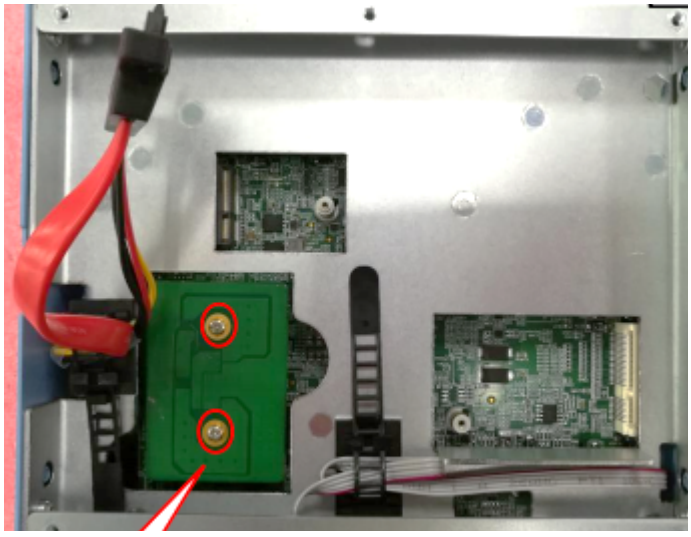

Figure 2.9

Step 4: Follow the disassembly and assembly steps and use the opposite steps to complete the hard disk cover installation.

2.4.3 Install the memory module

Step 1: Same as steps one and two in 2.4.1, unscrew and remove the SARA hard disk cable and then remove the hard disk cover assembly;

Step 2: If there is an OFX-075 module, remove the wide voltage module;

Step 3: Remove the SATA cable as shown in the figure;

Figure 2.10

Step 4: Unscrew a total of 6 screws on the front and rear panels as shown in the figure, then remove the fan cover and turn the machine upside down.

Figure 2.11

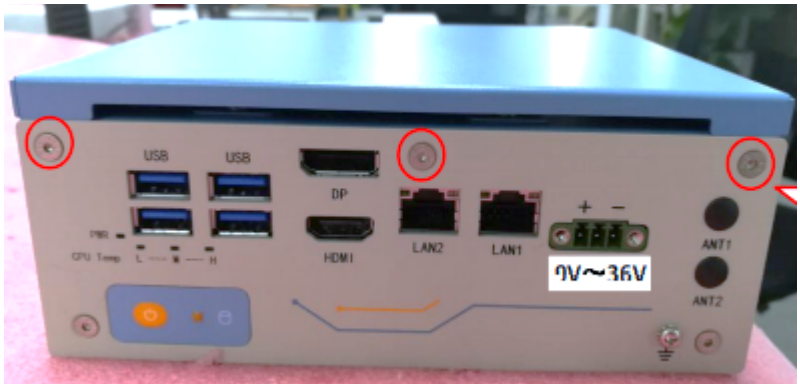

Figure 2.12

Figure 2.13

Step 5: Unscrew the six screws as shown in the figure, and remove the radiator holder.

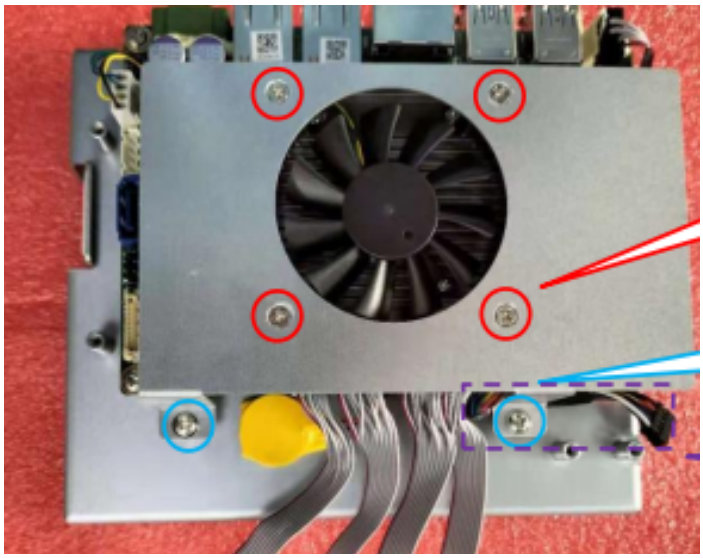

Figure 2.14

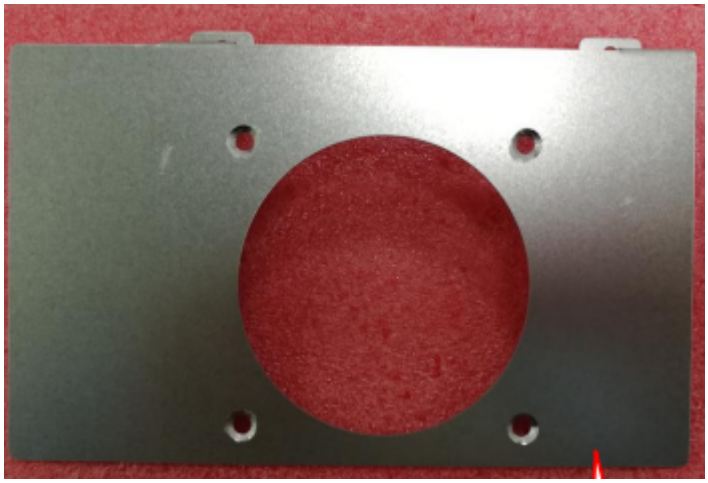

Figure 2.15

Step 6: Unscrew the four CPU screws as shown in the figure, and remove the heat dissipation shell assembly.

Figure 2.16

Step 5: Press the buckles on both sides of the memory module and remove the memory module from the original motherboard, take the new memory module, align the notches, tilt 30°, insert the memory module into the slot, and press the memory module down until the buckles on both sides of the memory module Buckle.

Figure 2.17

Step 6: Follow the disassembly and assembly steps and use the opposite steps to complete the product installation.

CHAPTER 3

BIOS Setup

3.1 BIOS Description

BIOS is the communication bridge between hardware and software. How to correctly set the BIOS parameters is crucial for the system to work stably and whether the system works at its best.

This chapter describes how to change the system settings through the BIOS settings.

Note: For the purpose of better product maintenance, the manufacture reserves the right to change the BIOS items presented in this manual. The BIOS setup screens shown in this chapter are for reference only and may differ from the actual BIOS.

You need to make SETUP settings as follows:

1. An error message appears on the screen during the system self-test and asks for the SETUP setting.
2. You want to change the factory default settings based on customer characteristics.

(But in general, customers are not recommended to set it up. In most cases, using the default value is already the best setting.)

The BIOS Setup Utility enables you to configure:

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

3.1.1 Entering the Setup Utility

When you power on the system, BIOS enters the Power-On Self-Test (POST) routines. POST is a series of built-in diagnostics performed by the BIOS. After the POST routines are completed, Press the "**DEL**" key to enter BIOS Setup Utility.

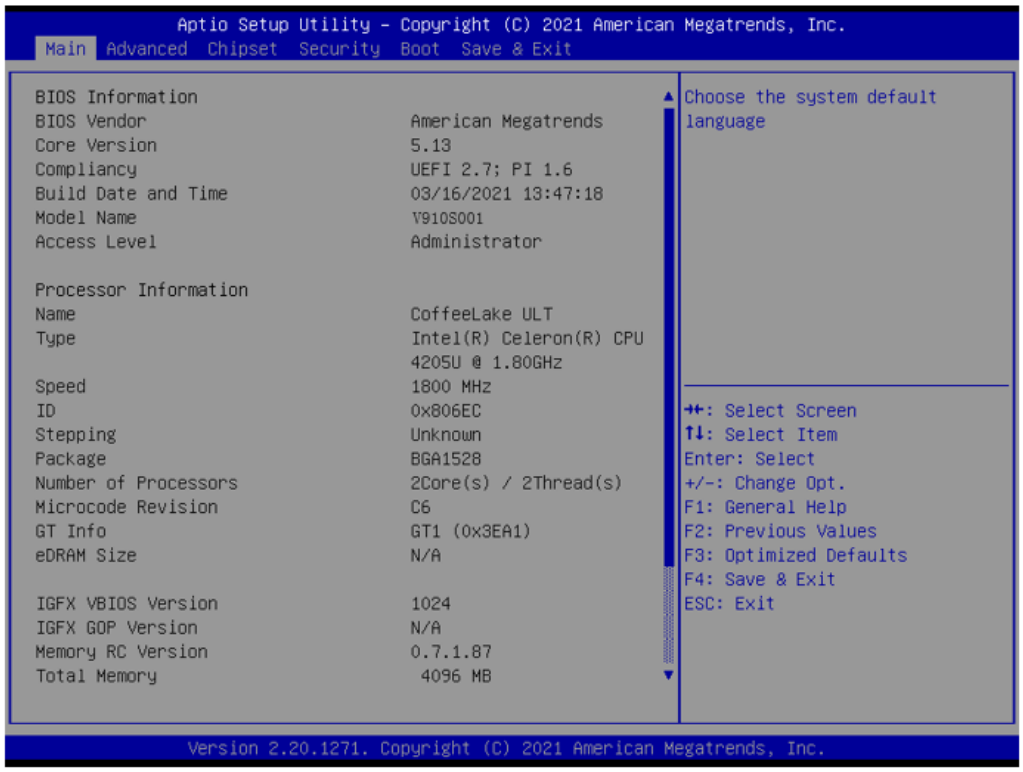

Figure 3.1

3.2 BIOS parameter settings

When you start the Setup Utility, the main menu appears. The main menu of the Setup Utility displays a list of the options that are available. A highlight indicates which option is currently selected. Use the cursor arrow keys to move the highlight to other options. When an option is highlighted, execute the option by pressing <Enter>.

Some options lead to pop-up dialog boxes that prompt you to verify that you wish to execute that option. Other options lead to dialog boxes that prompt you for information.

Some options (marked with a triangle ▶) lead to submenus that enable you to change the values for the option. Use the cursor arrow keys to scroll through the items in the submenu.

In this manual, default values are enclosed in parenthesis. Submenu items are denoted by a triangle ▶.

The default BIOS setting for this motherboard apply for most conditions with optimum performance. We do

not suggest users change the default values in the BIOS setup and take no responsibility to any damage caused by changing the BIOS settings.

3.2.1 BIOS Navigation Keys

Enter the SETUP settings interface, The BIOS navigation keys are listed below:

Table 3.1: The BIOS navigation keys

KEY	FUNCTION
ESC	Exit the current menu
↑↓→←	Scrolls through the items on a menu
+/-	Change Opt.
Enter	Select
F1	General Help
F2	Previous Values
F3	Optimized Defaults
F4	Save & Exit

3.2.2 Main Menu

When you enter the BIOS Setup program, the main menu appears, giving you an overview of the basic system information. Select an item and press <Enter> to display the submenu.

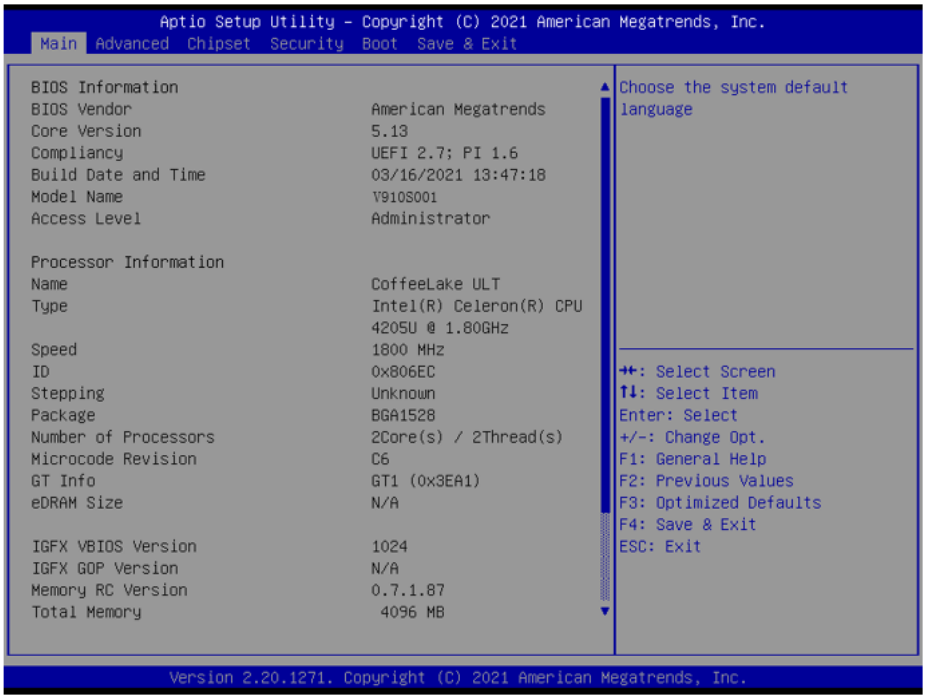

Figure 3.2

BIOS Vendor (American Megatrends)

This item shows the information of the BIOS vendor.

BIOS ID (0x806EC)

This item shows the information of the BIOS version.

OS Selection (Windows 7)

This item shows the OS Selection.

Build Date and Time (02/05/2018/ 19:26:45)

This item shows the information of the BIOS build date and time.

System Date & Time

The Date and Time items show the current date and time on the computer. If you are running a Windows OS, these items are automatically updated whenever you make changes to the Windows Date and Time Properties utility.

3.2.3 Advanced Menu

This page sets up more advanced information about your system. Handle this page with caution. Any

changes can affect the operation of your computer.

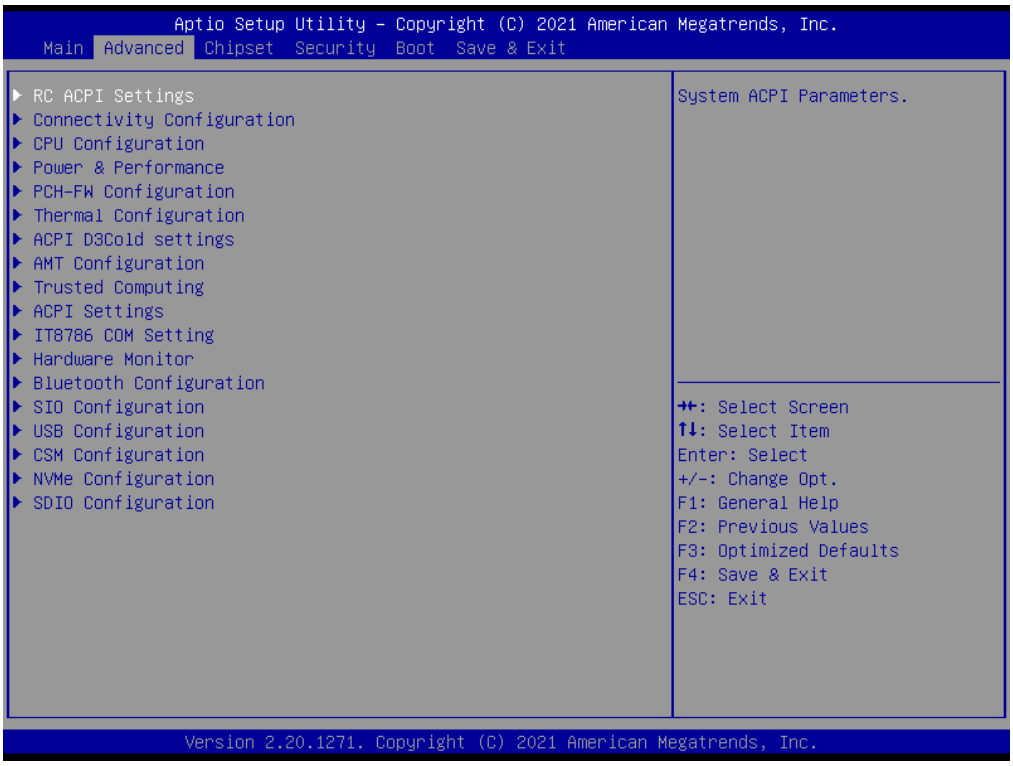

Figure 3.3

▶ACPI Settings

The item in the menu shows the highest ACPI sleep state when the system enters suspend.

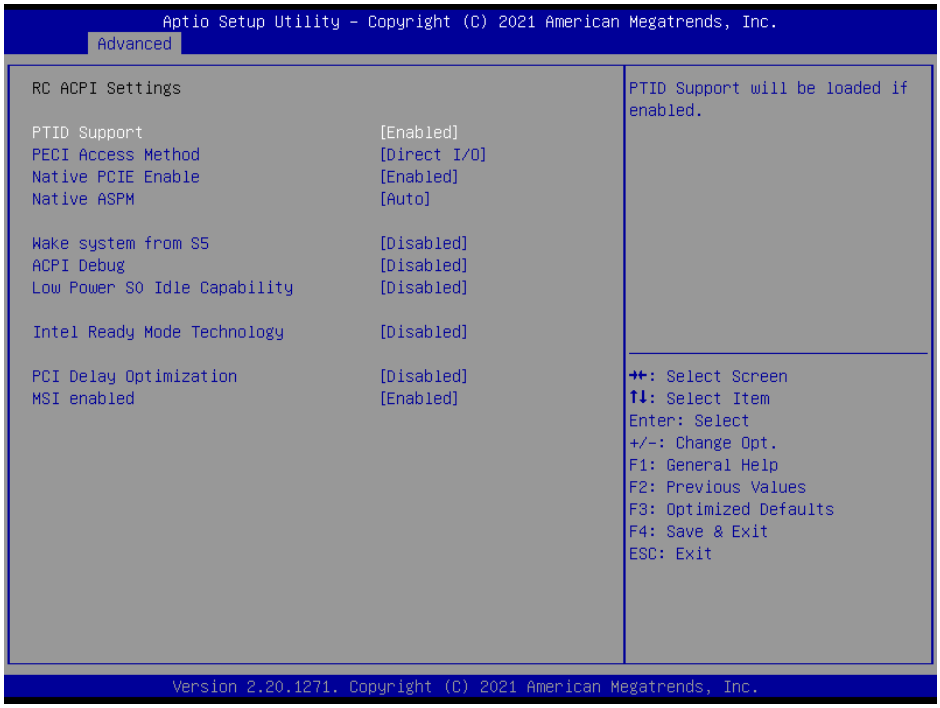

Figure 3.4

ACPI Sleep State

Suspend Disabled: Shut down system sleep

S3：Suspend to RAM

This item allows user to enter the ACPI S3 (Suspend to RAM) Sleep State (default).

Press <Esc> to return to the Advanced Menu page.

▸ IT8786 Supper IO Configuration

The item in the menu shows the information of RTC wake settings.

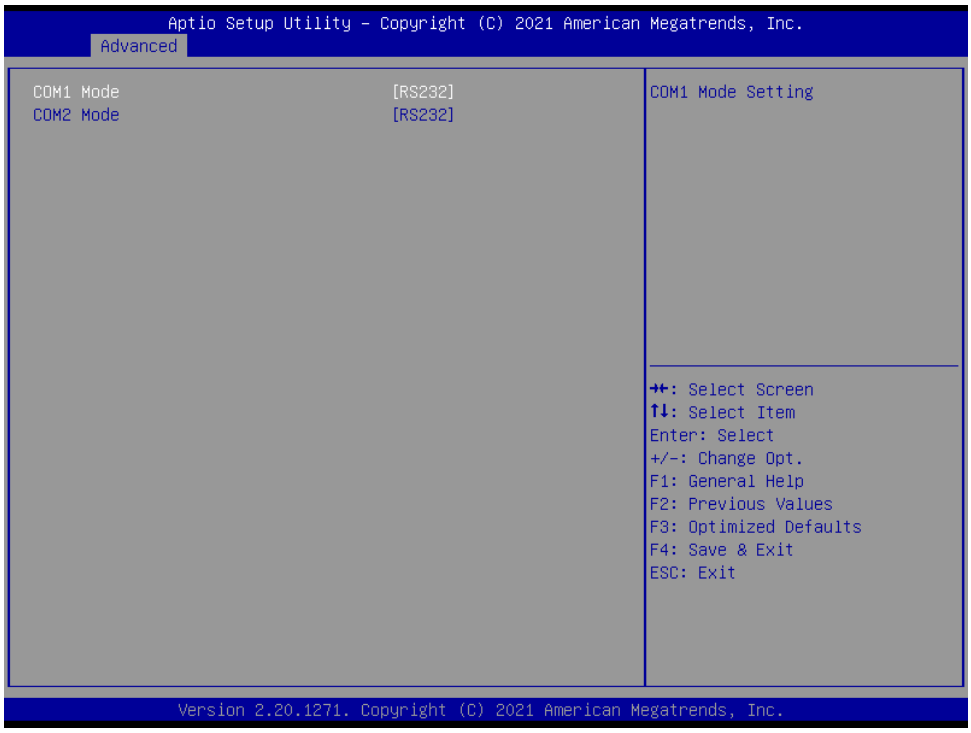

Figure 3.5

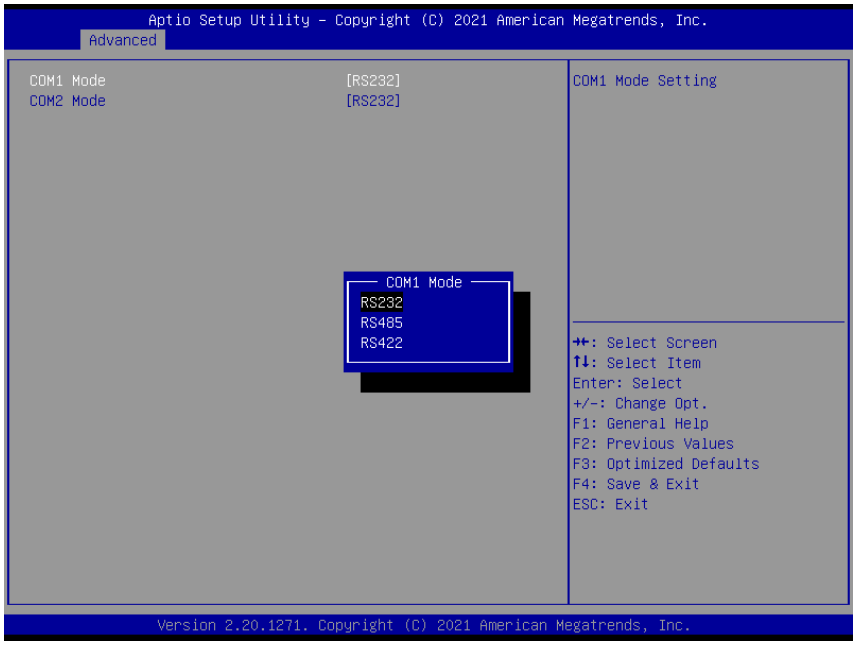

Figure 3.6

Serial Port

This item is used to set the serial interface to be turned on or off. The setting value is [Enabled] [Disabled]

Device Setting (Read Only)

This item displays the interrupt and address of the serial port.

Change Setting

Set port interrupt and address of the serial port.

Serial MODE

Set the mode of the serial port

▶ H/W Monitor

PC Health Status

This item is used for hardware security detection. The BIOS will display the current CPU and system temperature.

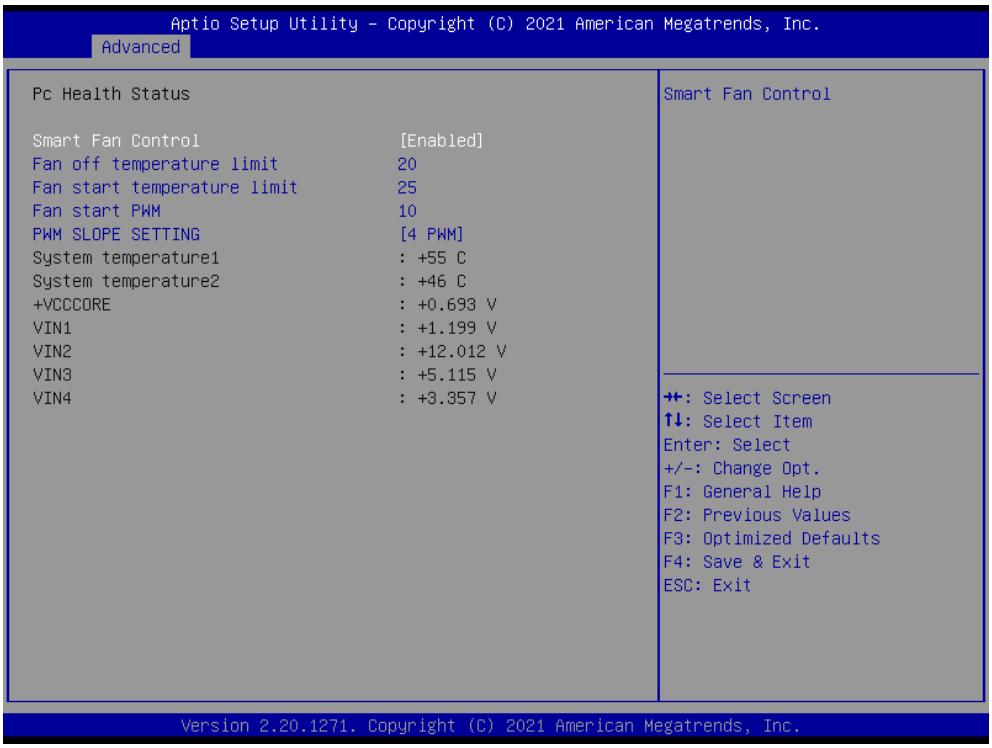

Figure 4.7

▶ S5 RTC Wake Settings

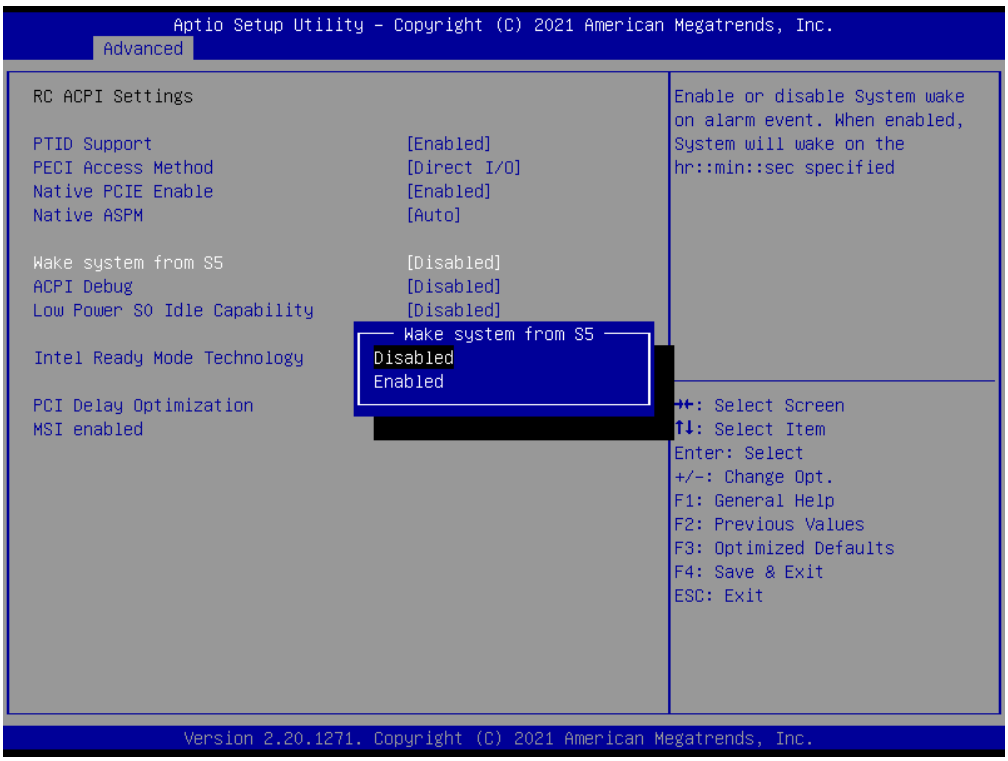

Figure 3.8

Wake system from S5

This item is used to set whether to power on regularly. The setting value is [Enabled] [Disabled].

If you select [Enabled], set the hour, minute, and second in the pop-up options.

▸ CNVi Presen

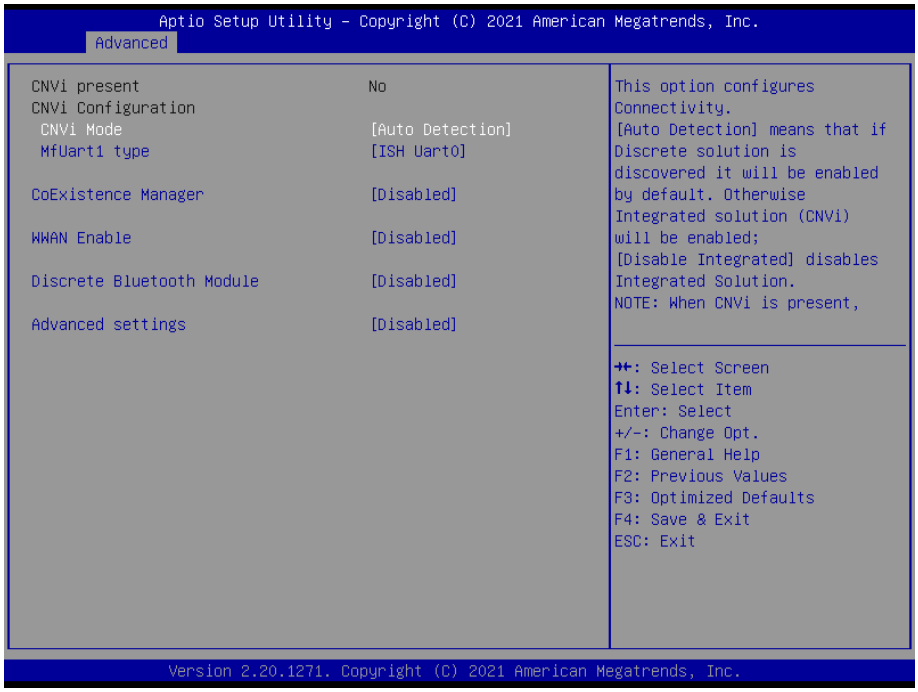

Figure 3.9

CNVi Present

This is used to set wireless card parameters.

▶ CPU Configuration

This item in the menu shows the information of the CPU.

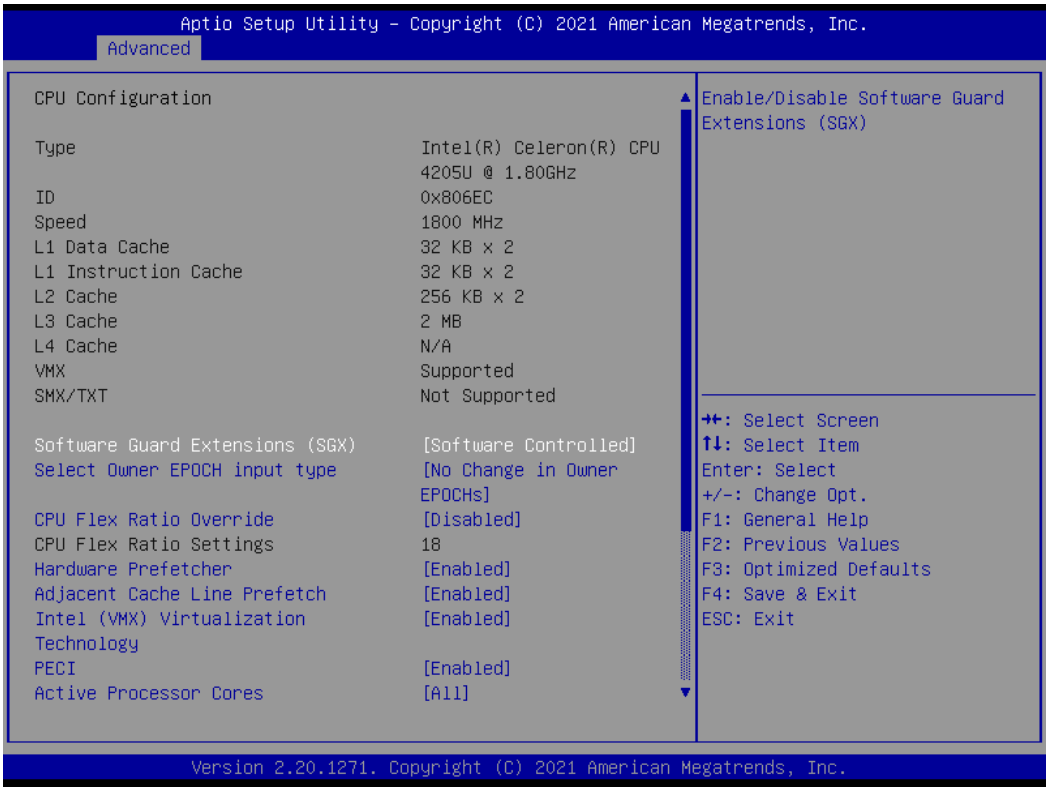

Figure 3.10

Socket 0 CPU Information

This item contains detailed information about the CPU, including the CPU manufacturer, model, frequency, L1 cache size, and L2 cache size.

CPU Speed

This item shows the processor speed.

64-bit

This item shows whether 64-bit operations are supported.

Limit CPUID Maximum

CPUID refers to CPU information, including model number, CPU family, cache size, clock speed and brand, as well as transistor number, pin type, size, etc. In the BIOS setup options of the Intel platform, it is usually Limit CPUID MAX to 3. The meaning is: limit the execution of the CPUID instruction to return a value

greater than 3. Because return values greater than 3 may cause some operating system wrong, generally set this option to [Disabled] on Windows systems for better overclocking. The default value is [Disabled].

Execute Disabled Bit

The Execution Disable bit is a hardware feature of the Intel CPU that enables the CPU to avoid certain malicious attacks based on buffer overflow viruses. In addition, the execution of the prohibition bit requires Windows XP SP2, Windows Server 2003 SP1 and other OS to work properly. The implementation principle is that the processor divides several areas in memory, some areas can execute application code, while others do not allow. The setting items are Disabled/Enabled, and the default is Enabled.

Intel Virtualization Technology

Intel Virtualization is the system hypothesis technology used in Intel's CPU. It enables multiple OS to run on a single PC. VT technology will play a very important role in various types of processors (including dual-core processors). This technology enables the processor to have and/or virtualization technology. With Virtualization Technology, we can run two operating systems simultaneously on the same machine.

Power Technology

This item sets the way of Power management.

▶ PPM Configuration

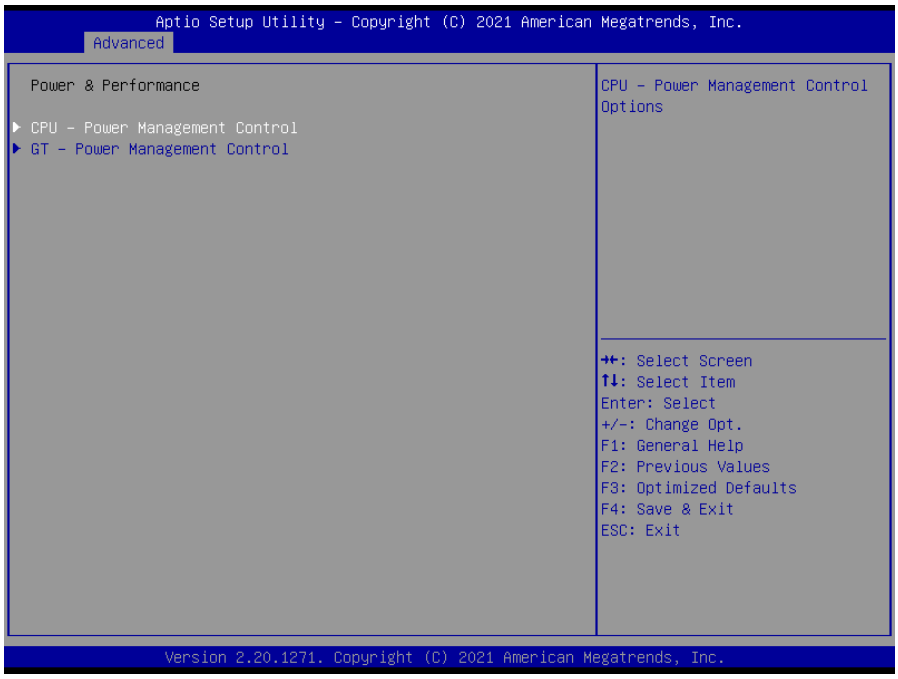

Figure 3.11

CPU C state Report

Whether to enable the CPU power status report, the setting values are: [Disabled], [Enabled]. When set to Enabled, the option Max CPU C-state appears and the Max CPU C-state value can be set.

▶ CSM Configuration

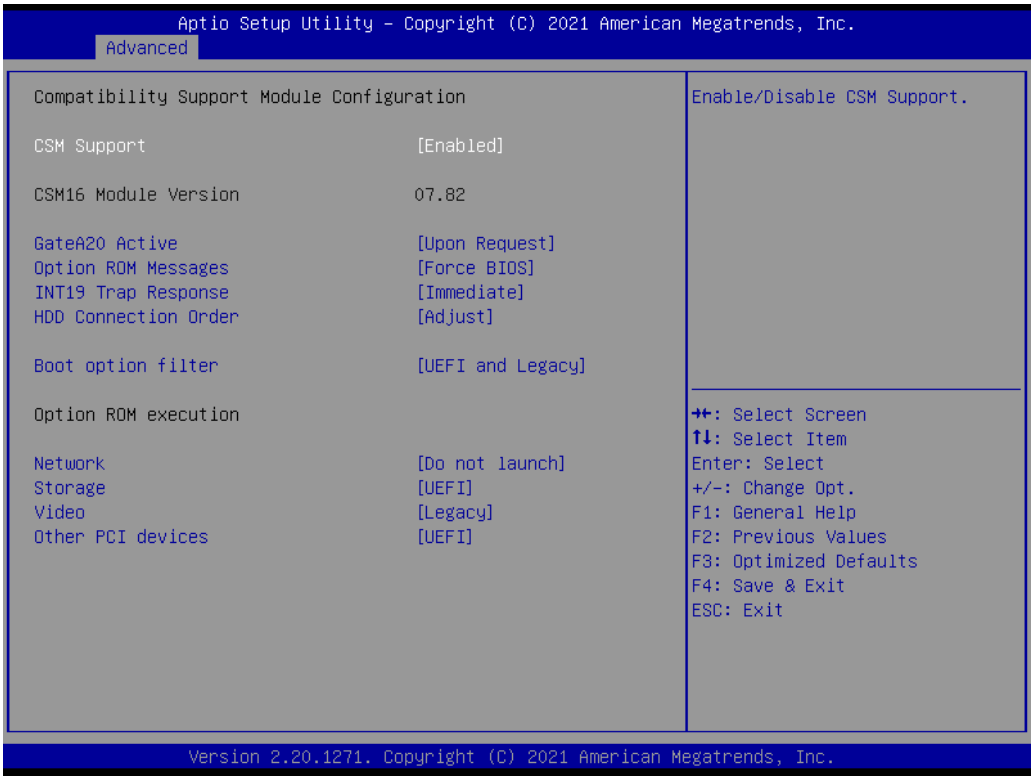

Figure 3.12

CSM Support

Compatibility Support Module, which is a compatibility support module, is a special module of UEFI and provides compatibility support for systems that do not support UEFI.

GateA20 Active

This item indicates whether to disable GA20 through the BIOS server or keep the activation status all the time.

Option ROM Messages

This item shows the display mode of option ROM Message.

Boot option filter

This item indicates the boot priority of controlling EFI or Legacy OpROM.

Network

This item is used to set the EFI network card OpROM boot or the traditional network card OpROM boot or priority boot.

Storage

This item is used to set the EFI storage OpROM boot or the traditional storage OpROM boot.

Video

This item is used to set EFI display OpROM startup or traditional display OpROM startup.

Other PCI devices

This item is used to set the EFI PCI device OpROM boot or the traditional PCI device OpROM boot

▶ USB Configuration

Use this item to show the information of USB configuration.

Figure 3.13

Legacy USB Support

This item is used to set the USB interface support. If you need to support USB devices under DOS, such as U disk, USB keyboard, etc., set this item to [Enabled] or [Auto]. Otherwise, select [Disabled].

USB 2.0 (EHCI) Support

[Enabled]: Allows USB EHCI transport protocol with a maximum transfer rate of 480Mpbs

[Disabled]: Disable the USB2.0 interface, the traditional transfer rate is 12Mpbs.

USB 2.0 Controller Mode

This item sets USB 2.0 device works in full speed mode (FullSpeed) or high speed mode (HiSpeed).

EHCI Hand-off

This option is used to determine whether to cut the USB port into USB 2.0 mode before entering the OS. Set to Disable, It will operate in USB 1.1 compatibility mode before giving ownership to the OS.

USB Mass Storage Driver Support

USB mass storage device support switch.

USB Transfer time-out

This item Sets the timeout period for control, batch, and interrupt transmission. The default is 20 seconds.

Device reset time-out

This item sets boot command timeout of the large capacity USB disk. The default is 20 seconds.

Device Power-up Delay

This item sets the maximum delay time that the USB device reports to the primary controller.

Mass Storage Devices

This item is used to set the specific type of connected USB device. The setting value is [Auto][Floppy][Forced FDD][Hard Disk][CD-ROM], the default is Auto.

3.2.4 Chipset Menu

The chipset menu items allow you to change the settings for the North Bridge chipset, South Bridge chipset and other system.

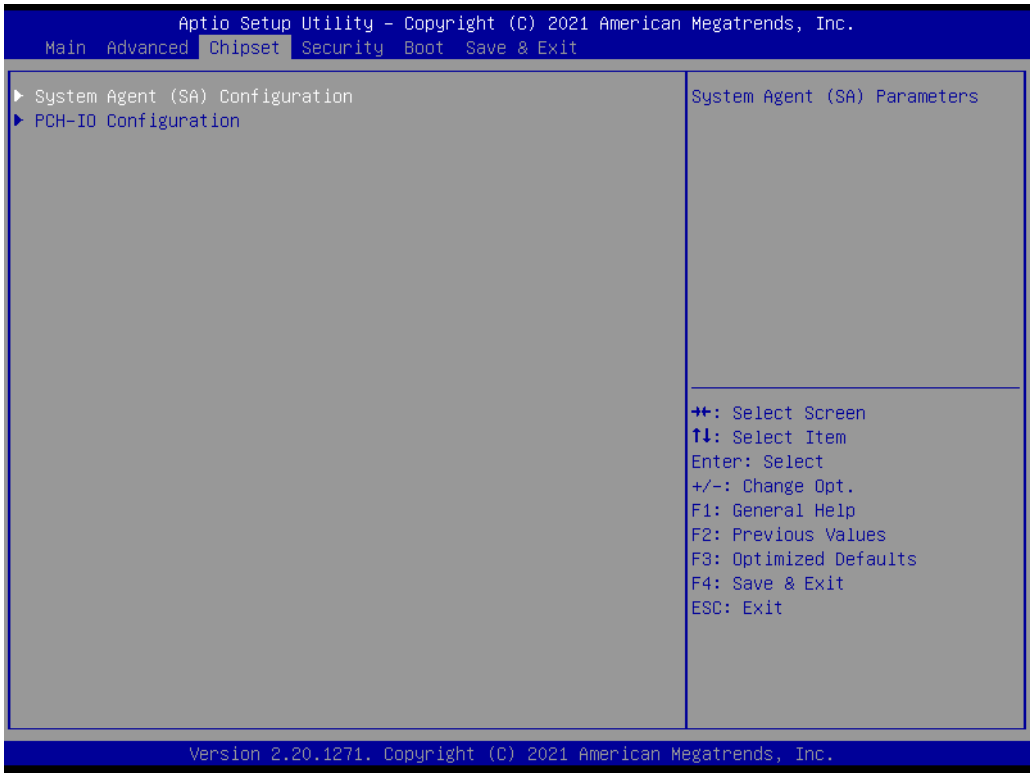

Figure 3.14

▶North Bridge

Scroll to this item and press <Enter> and view the following screen:

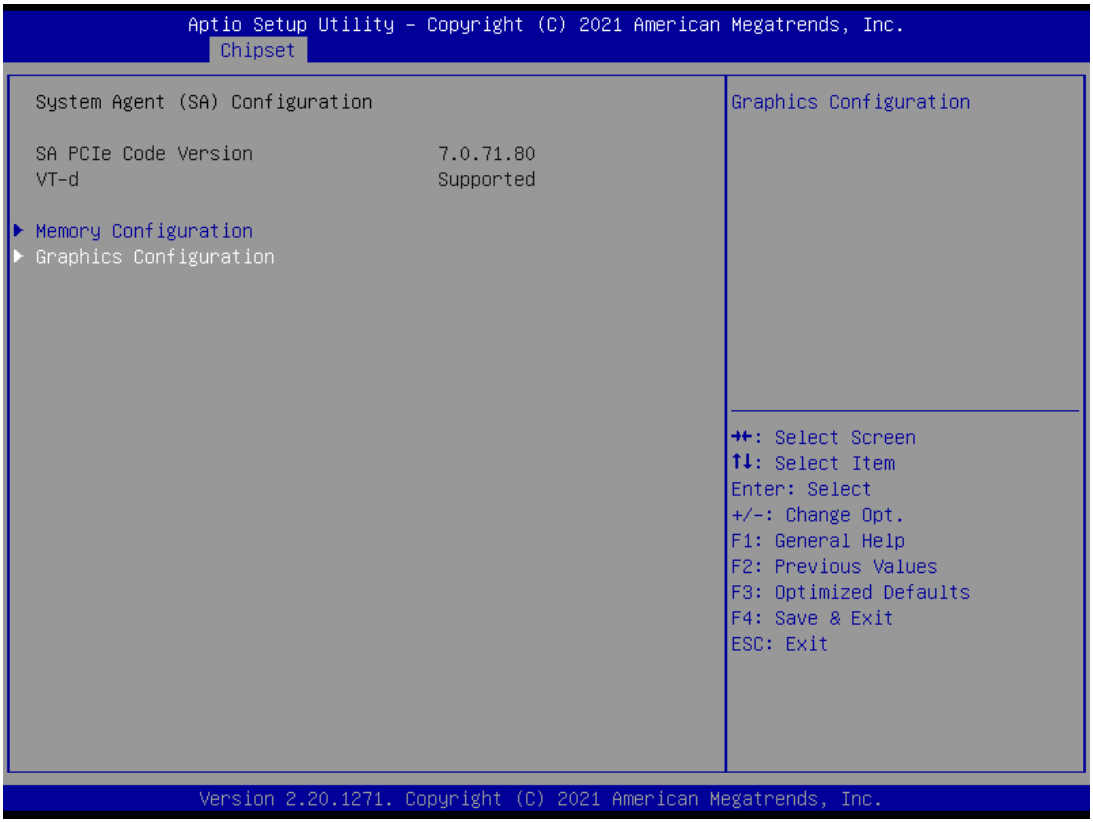

Figure 3.15

Integrated Graphics Device

This item indicates whether integrated graphics is enabled.

Primary Display

This item shows the main output display device when the system starts up.

DVMT pre-AIIocated

This item sets the memory size pre-assigned to the motherboard integrated graphics in DVMT mode.

DVMT Total Gfx Mem

This item shows how much dynamic memory is allocated to the integrated graphic in total.

LCD Control

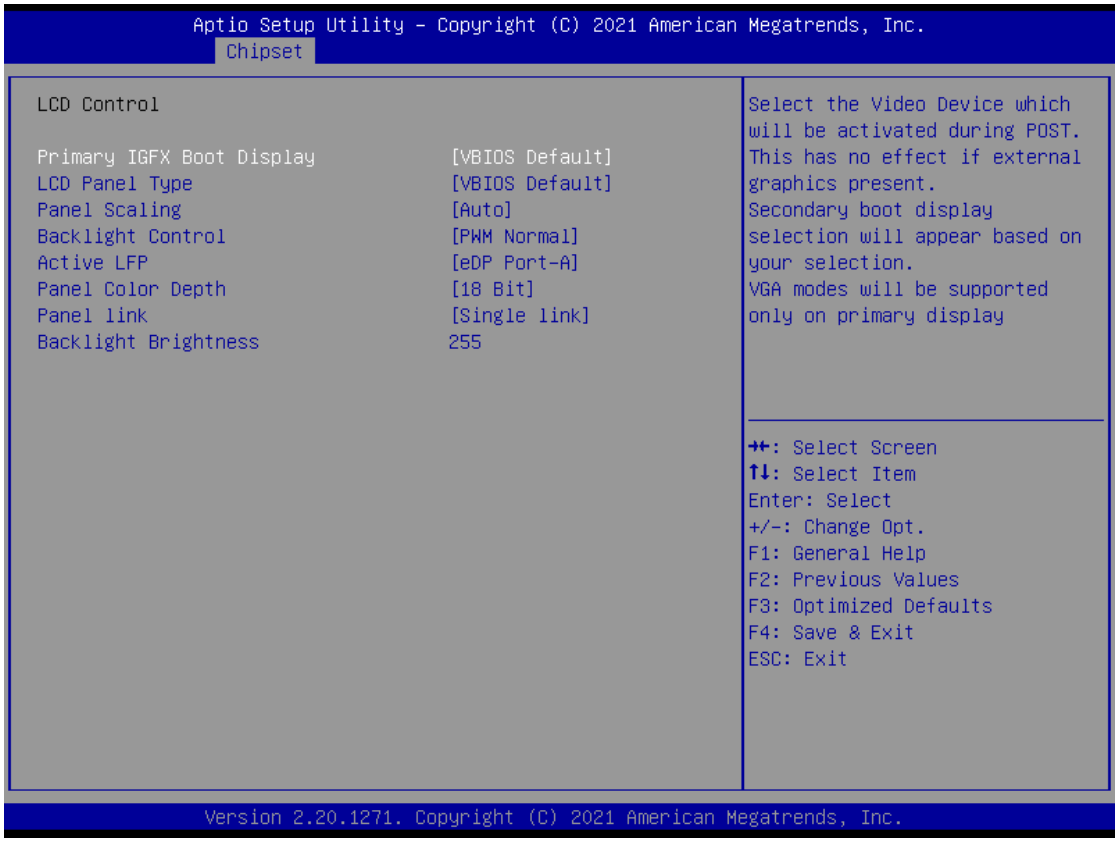

Figure 3.16

Primary IGFX Boot Display

This item sets IGFX main display device on POST stage, not affected by external graphics card, options are LVDS, CRT, HDMI. It defaults by VBIOS.

Secondary IGFX Boot Display

This item sets IGFX second display device on POST stage.

LCD Panel Type

This item sets resolution of the motherboard LVDS screen.

Press <Esc> to return to the Chipset Menu page.

▶South Bridge

Scroll to this item and press <Enter> and view the following screen:

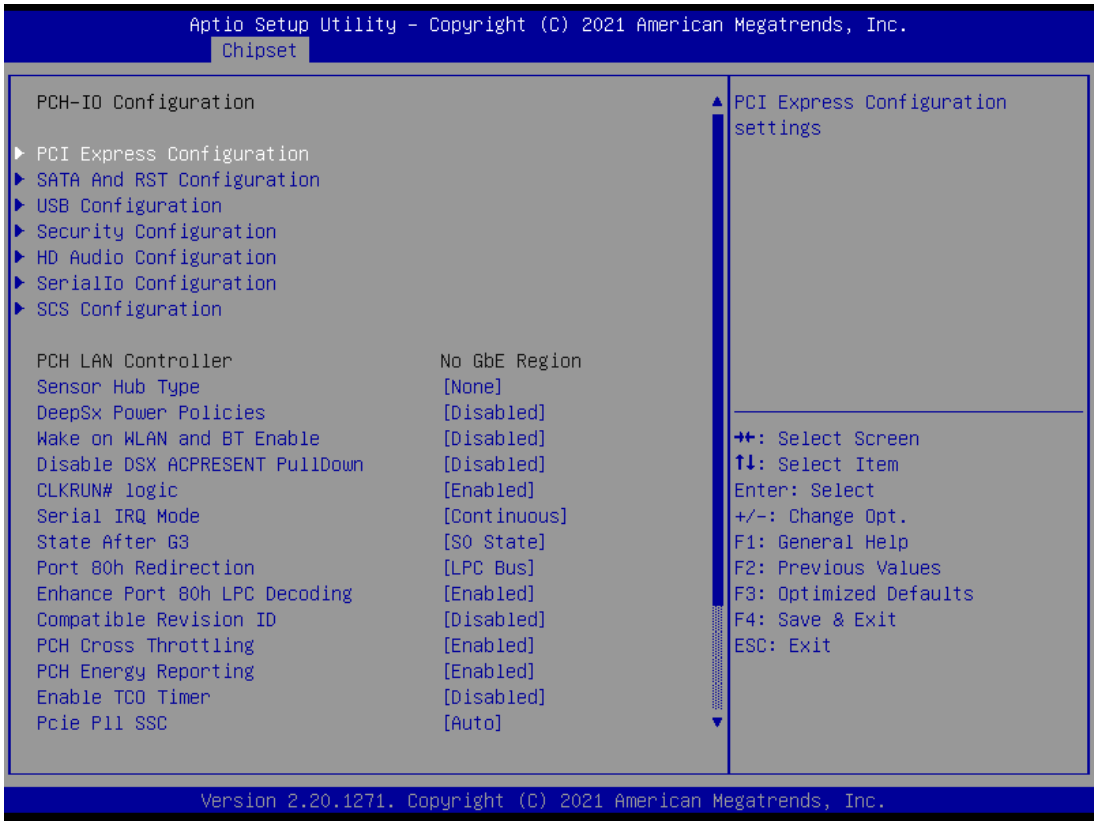

Figure 3.17

Restore AC Power Loss

This item sets the power-on status after power-on. If Power Off is selected, you need to press the power button to power on after power-on. If Power On is selected, it will be powered on directly after power-on. If Last State is selected after power-on, it will be restored to the state before power-off.

order to use this feature.

Press <Esc> to return to the Chipset Menu page.

3.2.5 Boot Menu

This page enables you to set the keyboard NumLock state and devices boot sequence.

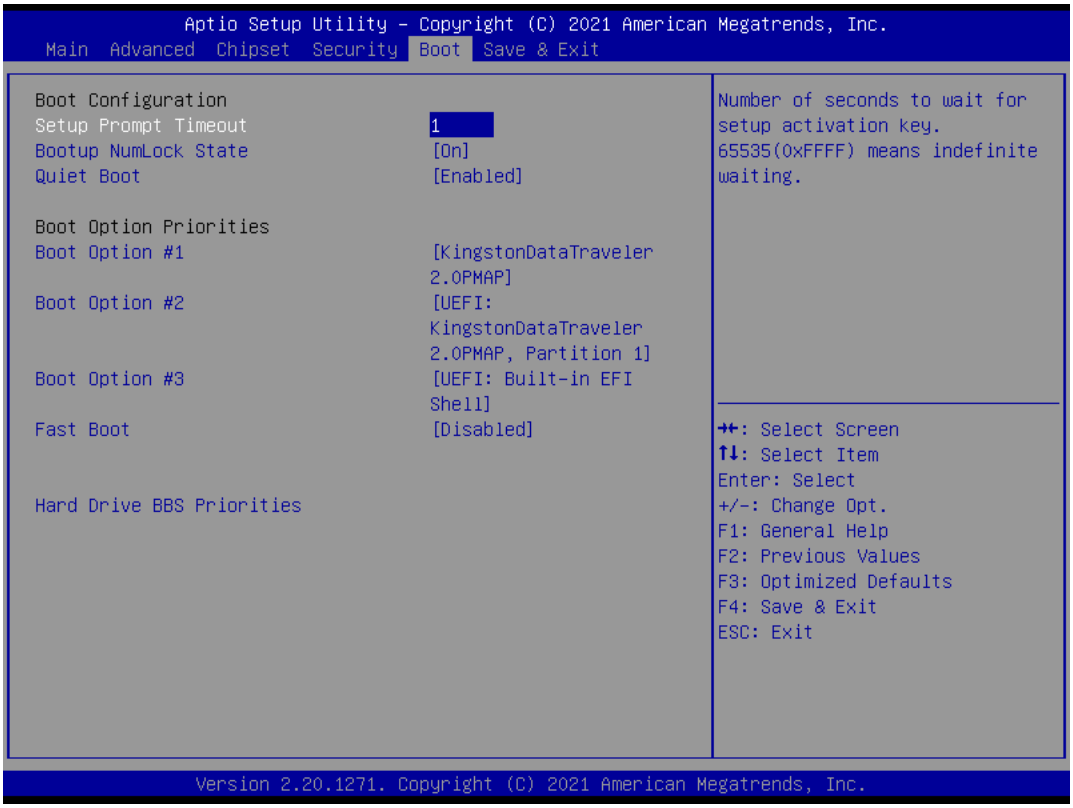

Figure 3.18

Setup Prompt Timeout

This item sets the wait time for the Setup shortcut. If you do not press the Setup shortcut within the set time, it will continue to boot.

Bootup Numlock State

This item determines if the NumLock key is active or inactive at system start-up time. The default value is On, which is a digital lock on when the system starts. Set to Off, the keypad is in cursor control state at startup.

Show Full Logo

This item shows the vendor logo on the startup screen.

[Enabled]: Display static LOGO screen at startup;

[Disabled]: Display self-test information at start.

Boot Option #1/#2

These items show the boot priorities.

#1 is the highest priority boot device in the boot option.

Hard Drive BBS Priorities

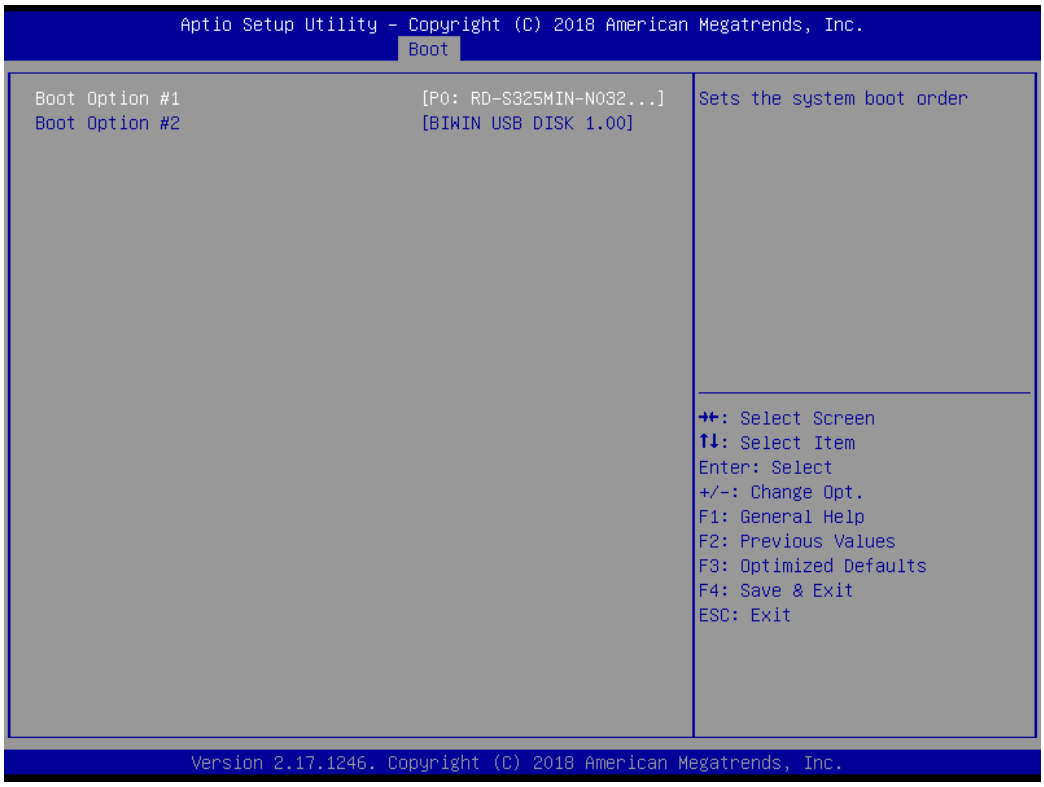

Figure 3.19

This item sets the hard disk that can be used as the boot device. If there are multiple hard disks, you should select the priority of these hard disks in the item. The highest priority hard disk will be displayed in Boot Option #1.

3.2.6 Security Menu

Scroll to this item and press <Enter> and view the following screen:

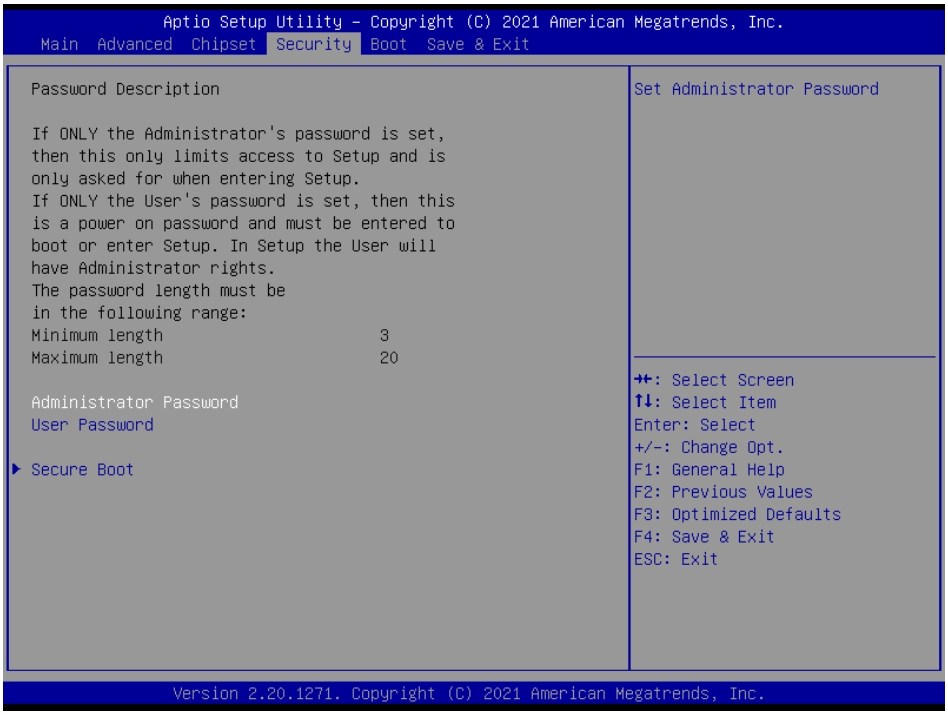

Figure 3.20

3.2.7 Save & Exit Menu

This page enables you to exit system setup after saving or without saving the changes.

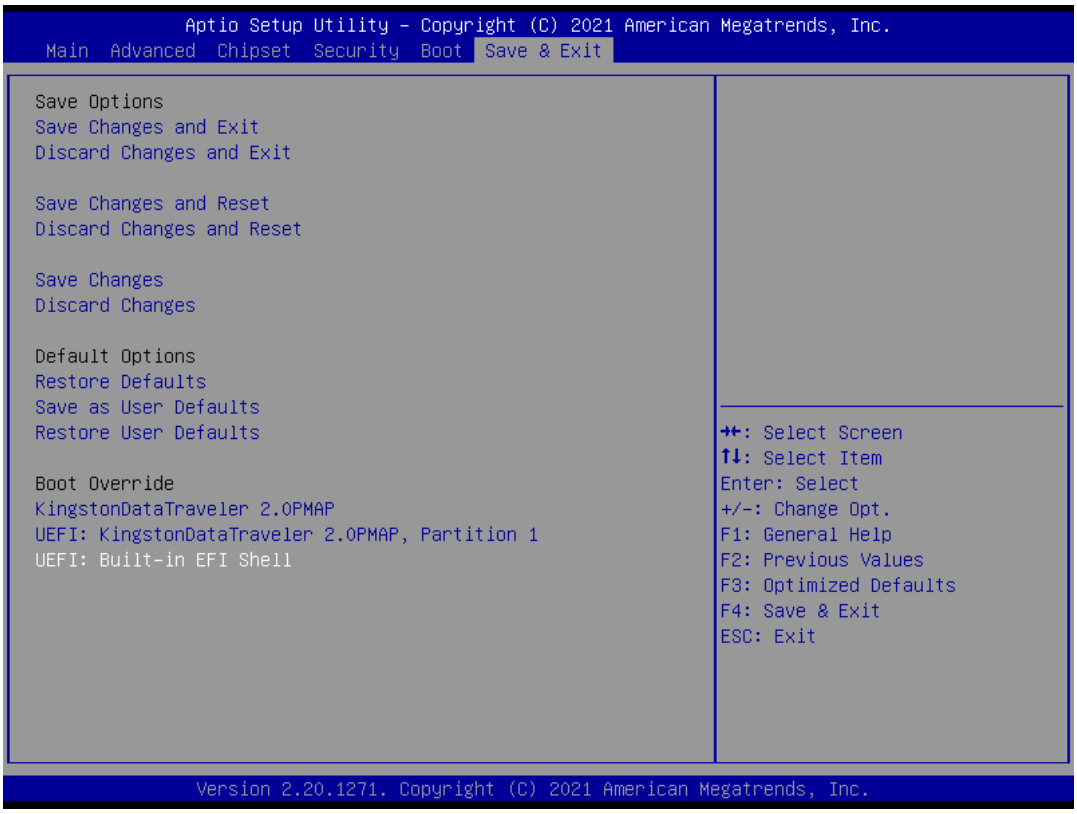

Figure 3.21

Save Changes and Exit

This item enables you to save the changes that you have made and exit.

Discard Changes and Exit

This item enables you to discard any changes that you have made and exit.

Restore Defaults

This item enables you to restore the system defaults.

3.3 Updating the BIOS

The BIOS (Basic Input and Output System) Setup Utility displays the system's configuration status and provides you with options to set system parameters. The parameters are stored in battery-backed-up CMOS RAM that saves this information when the power is turned off. When the system is turned back on, the system is configured with the values you stored in CMOS.

The BIOS provides the underlying driver for hardware resources and is the bridge between hardware and operating system. Now hardware and various applications are constantly updated. When your system encounters problems, such as the system does not support the latest published CPU, you need to upgrade your BIOS.

NOTE：

1. Only upgrade the BIOS if you encounter problems and need to.
2. To upgrade the BIOS, please use the BIOS read/write program attached to our driver CD or download the updated version of the program from the relevant website.
3. Do not turn off the power or reboot the system during the upgrade process, so your BIOS data will be damaged and the system may not boot.
4. After the refresh is complete, you need to manually optimize the LOAD Default.

5. To prevent accidents, please backup the current BIOS data first.

CHAPTER 4

SYSTEM RESOURCE

4.1 WDT and GPIO

4.1.1 WDT

/* ==========

1 * void jhctech_init();

2 * function description: library initializated, This function must be called before calling other functions

3 * parameter description：

4 * creation date：

5 *

==========*/

void jhctech_init();

/* ==========

1 * void jhctech_init();

2 * function description：library release，Pair with jhctech_init, release the library's occupied resources when not needed

3 * parameter description：

4 * creation date：

5 *

==========*/

void jhctech_deinit();

/* ==========

4.1.2 GPIO

/* ==========

1 * BYTE I910_MB_gpio_input(WORD port)

2 * function description：read the motherboard GPIO input level

3 * parameter description：

Return value：Return a byte (8 bit), each bit of the 8 bit corresponding to the level state of a GPIO pin.

Return value	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1

parameter：Port Fill in the motherboard GPIO port, which is a fixed value designed by the manufacturer

4 * creation date：

5 *

==========*/

BYTE I910_MB_gpio_input(WORD port);

/* ==========

1 * void I910_MB_gpio_output(WORD port, BYTE value);

2 * function description：high and low level output of the motherboard

3 * parameter description：

parameter：

Port Fill in the motherboard GPIO port, which is a fixed value designed by the manufacturer

Value 8 bits of a byte, each bit controls a GPIO pin output value

Bit =1, means output high level

Bit =0, means output low level

value	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1

```
4     * creation date：

5                                                                                *

==========================================================================*/

  void I910_MB_gpio_output(WORD port,BYTE value);


/* ==========================================================================

1    * void I910_MB_gpio_init();

2          * function description：Motherboard gpio initialization function, need to be called once before use

3          * parameter description：

4          * creation date：

5
*

==========================================================================*/

 void I910_MB_gpio_init();

void I910_MB_gpio_init();

/*==========================================================================

1     * void I910_watchdog_set(int time);


2     * function description：WDT function

3     * parameter：Time sets the dog feed time, the time value is 0-255,
```

Setting 0 means to turn off the watchdog

4 * creation date：

5 *

==========*/

void I910_watchdog_set(int time);

/* ==========

1 * void I910_2nd_gpio_mode(int port,int mode);

2 * function description： subcard input and output mode settings

3 * parameter description：

parameter：port fill in GPIO number， 1 or 2

mode 8 bits of a byte, each bit controls input and output mode of a GPIO pin

bit = 1, Corresponding pin as input

bit = 0, Corresponding pin as output

mode	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN 3	PIN2	PIN1

Note ： The output value is valid only when the pin is in output mode.

4 * creation date：

5 *

==========*/

void I910_2nd_gpio_mode(int port,int mode);

/*==========

1 * void I910_2nd_gpio_output(int port,int level);

2 * function description：subcard output high and low level

3 *parameter descirption：

parameter：port fill in GPIO number of the subcard, 1 or 2

level 8 bits of a byte, each bit controls a GPIO pin output value,

Bit =1, means output high level

Bit =0, means output low level

level	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1

description：The output value is valid only when the pin is in output mod

4 * creation date：

5 *

========== */

void I910_2nd_gpio_output(int port,int level);

/*==========

1 * int I910_2nd_gpio_input(int port);

2 * function description：read the motherboard GPIO input level

3 * parameter description：

Return value：return a byte (8 bit), each bit of the 8 bit corresponding to the level state of a GPIO pin

Value=1, means high level

Value=0, means low level

Return value	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1

parameter：port fill in subcard GPIO number, 1 or 2

descripiton：The read value is valid only when the pin is in input mode

4 * creation date：

5 *

==========*/

int I910_2nd_gpio_input(int port);