

2I130DW

Intel® Raptor Lake Core™ I

/ Pentium processor,

DDR5 LAN / HDMI / USB / M.2 / COM

All-In-One

Intel® 13th Gen Raptor Lake-U i7 / i5 / i3, Pentium CPU

1 x HDMI, 2 x M.2, USB

4 x LAN, 2 x COM, 1 x Nano SIM

Wide Range DC IN +9~36V

CAUTION

**RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.**

**DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS**

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User Manual edition 0.1, JAN. 2024

Warning !

1. Battery
Batteries on board are consumables.
The life time of them are not guaranteed.
2. Fanless solution with HDD
The specification & limitation of HDD should be considered carefully when the fanless solution is implemented.
3. We will not give further notification in case of changes of product information and manual.
4. SATA interface does not support Hot SWAP function.
5. There might be a 20% inaccuracy of WDT at room temperature.
6. Please make sure the voltage specification meets the requirement of equipment before plugging in.
7. There are two types of SSD, commercial grade and industrial grade, which provide different read / write speed performance, operation temperature and life cycle. Please contact sales for further information before making orders.
8. Caution! Please notice that the heat dissipation problem could cause the MB system unstable. Please deal with heat dissipation properly when buying single MB set.
9. Please avoid approaching the heat sink area to prevent users from being scalded with fanless products.
10. If users repair, modify or destroy any component of product unauthorizedly, We will not take responsibility or provide warranty anymore.
11. DO NOT apply any other material which may reduce cooling performance onto the thermal pad.
12. It is important to install a system fan toward the CPU to decrease the possibility of overheating / system hanging up issues, or customer is suggested to have a fine cooling system to dissipate heat from CPU.

* Hardware Notice Guide

1. Before linking power supply with the motherboard, please attach DC-in adapter to the motherboard first. Then plug the adapter power to AC outlet.
Always shut down the computer normally before you move the system unit or remove the power supply from the motherboard. Please unplug the DC-in adapter first and then unplug the adapter from the AC outlet.
Please refer photo 1 as standard procedures.
2. In case of using DIRECT DC-in (without adapter), please check the allowed range for voltage & current of cables. And make sure you have the safety protection for outer issues such as short / broken circuit, overvoltage, surge, lightning strike.
3. In case of using DC-out to an external device, please make sure its voltage and current comply with the motherboard specification.
4. The total power consumption is determined by various conditions (CPU / motherboard type, device, application, etc.). Be cautious to the power cable you use for the system, one with UL standard will be highly recommended.
5. It's highly possible to burn out the CPU if you change / modify any parts of the CPU cooler.
6. Please wear wrist strap and attach it to a metal part of the system unit before handling a component. You can also touch an object which is ground connected or attached with metal surface if you don't have wrist strap.
7. Please be careful to handle & don't touch the sharp-pointed components on the bottom of PCBA.
8. Remove or change any components from the motherboard will VOID the warranty of the motherboard.
9. Before you install / remove any components or even make any jumper setting on the motherboard, please make sure to disconnect the power supply first. (follow the aforementioned instruction guide)
10. "POWERON after PWR-Fail" function must be used carefully as below:
When the DC power adaptor runs out of power, unplug it from the DC current;
Once power returns, plug it back after 5 seconds.
If there is a power outage, unplug it from the AC current, once power returns, plug it back after 30 seconds. Otherwise it will cause system locked or made a severe damage.

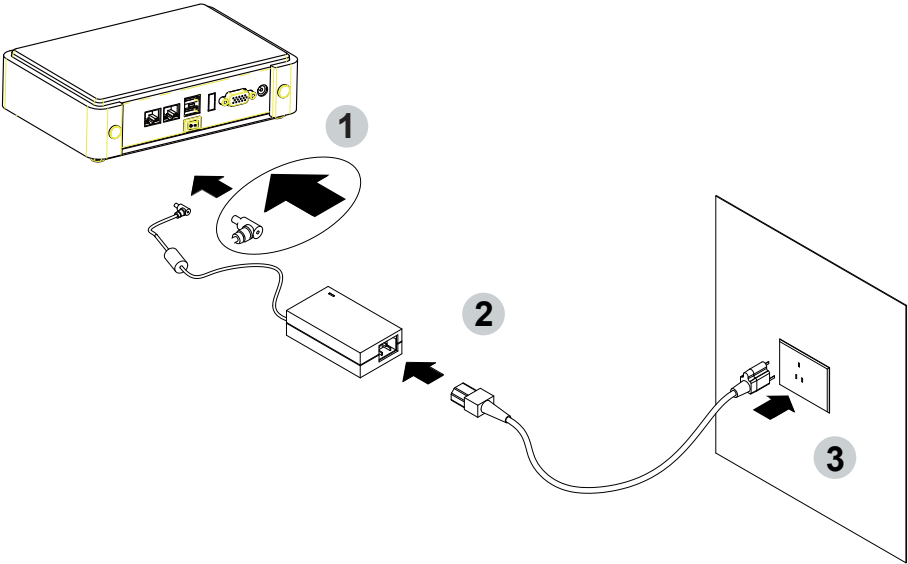
Remark 1:

Always insert / unplug the DC-in horizontally & directly to / from the motherboard. DO NOT twist, it is designed to fit snugly.

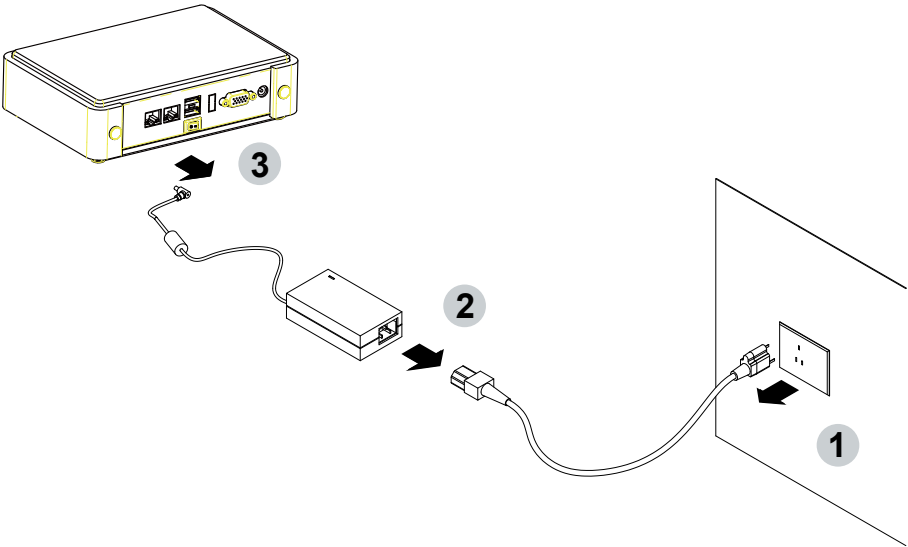
Moreover, erratic pull / push action might cause an unpredictable damage to the component & system unit.

Photo 1

Insert



Unplug



Chapter-1

General Information

The 2I130DW is the 2.5" Plus SBC with Intel® 13th Gen Raptor Lake-U & 12th Gen Alder Lake-U i7 / i5 / i3 / Celeron processor designed for high performance Edge Computing and AI computing. The 2I130DW combines Intel's new graphics architecture and up to 32GB DDR5 memory to ensure improved graphics performance. The 2I130DW also provides high-speed 4 x 2.5 GbE LAN ports, wide range 9~36V DC input, HDMI, eDP, 3 x USB 3.0, 4 x USB 2.0, 2 x serial ports, 1 x M.2 B-Key & 1x M.2 M-key supports NVMe. The compact form factor also makes the 2I130DW a small, rugged and ideal platform for implementing artificial intelligence solutions for user intelligent transportation, factory automation and telemedicine applications.

1-1 Major Feature

1. Intel® U300E Processor 1.1GHz / 4.3GHz (5 core), Intel® Core i3-1315UE Processor 1.2GHz / 4.5GHz (6 core), Intel® Core i5-1335UE Processor 1.3GHz / 4.5GHz (10 core) Intel® Core i7-1365URE Processor 1.7GHz / 4.9GHz (10 core)
2. Intel® UHD Graphics for 13th Gen Intel® Processors
3. DDR5 SODIMM slot x 1, up to 32GB
4. Support 4 x 2.5Gbps Intel LAN port.
5. Support 2 x RS232 selectable to RS485 / RS422 by BIOS
6. 3 x USB 3.0 and 4 x USB 2.0
7. Support extended 1 x M.2 2280 M-Key for SATA / PCIe x 4, 1 x M.2 3042 B-Key for PCIe x 2 and USB 3.0 / 2.0 interface with Nano SIM socket.
8. Support 1 SATA port
9. Hardware digital Input & Output, 4 x DI / 4 x DO, Hardware Watch Dog Timer, 0~255 sec programmable
10. Wide range power input +9V~+36V

1-2 Specification

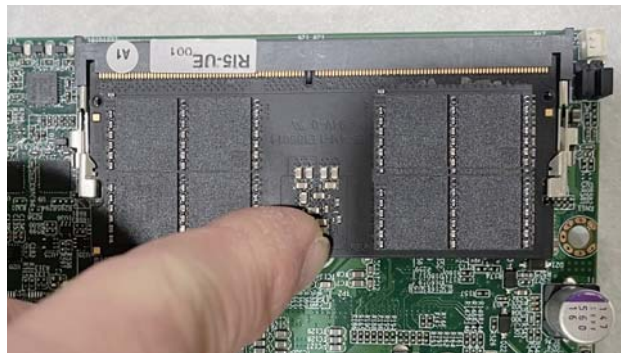
1. **SOC:** Intel® U300E Processor 1.1GHz / 4.3GHz (5 core), Intel® Core i3-1315UE Processor 1.2GHz / 4.5GHz (6 core), Intel® Core i5-1335UE Processor 1.3GHz / 4.5GHz (10 core) Intel® Core i7-1365URE Processor 1.7GHz / 4.9GHz (10 core)
2. **Memory:** DDR5 SODIMM slot x 1, up to 32GB
3. **Display:** HDMI, eDP
4. **SATA:** Integrated Serial ATA Host Controller 1 SATA port, SATA Gen3 Data transfer rates up to 6.0 Gb/s (600 MB/s).
5. **LAN:** 4 Intel I226-IT LAN chipset with 2.5Gbps for PCIe x 1 V2.1
6. **I/O Chip:** Switch chipset for 2 port RS232 / RS422 / RS485 selected by BIOS
7. **USB:** 3 type A USB 3.0 and 4 USB 2.0 (internal)
8. **WDT/DIO:** Hardware digital Input & Output, 4 x DI / 4 x DO (Option) / Hardware Watch Dog Timer, 0~255 sec programmable
9. **Expansion interface:** 1 x M.2 2280 M-Key for SATA / PCIe x 4, 1 x M.2 3042 B-Key for PCIe x 2 and USB 3.0 / 2.0 interface with Nano SIM socket.
10. **BIOS:** AMI UEFI BIOS
11. **Dimension:** 108 x 102 mm
12. **Power:** On board DC +9V~+36V

1-3 Installing the SO-DIMM

1. Align the SO-DIMM with the connector at a 45 degree angle.

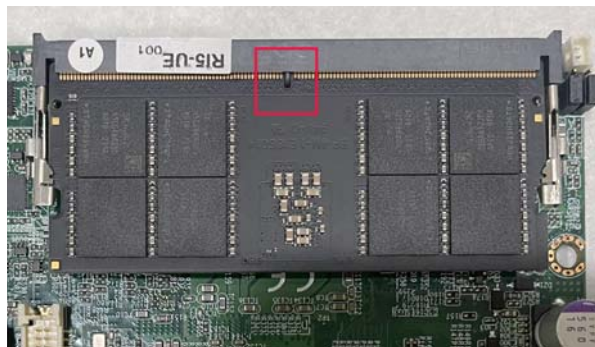


2. Press the SO-DIMM into the connector until you hear a click.

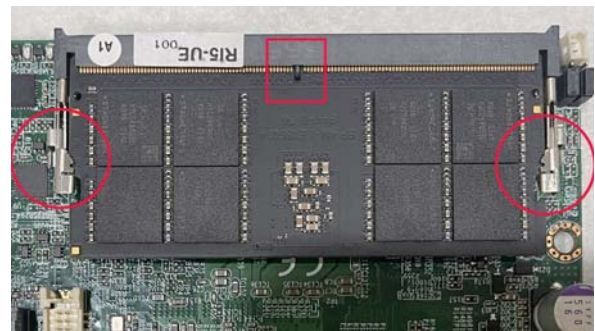


Notices:

1. The connectors are designed to ensure the correct insertion. If you feel resistance, check the connectors & golden finger direction, and realign the card.



2. Make sure the retaining clips (on two sides of the slot) lock onto the notches of the card firmly.



1-3-1-1 Removing the SO-DIMM

1. Release the SO-DIMM by pulling outward the two retaining clips and the SO-DIMM pops up slightly.

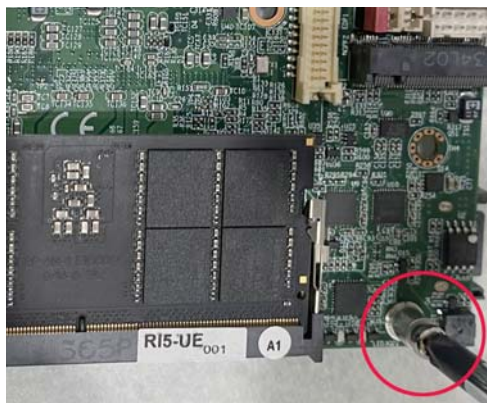


2. Lift the SO-DIMM out of its connector carefully.

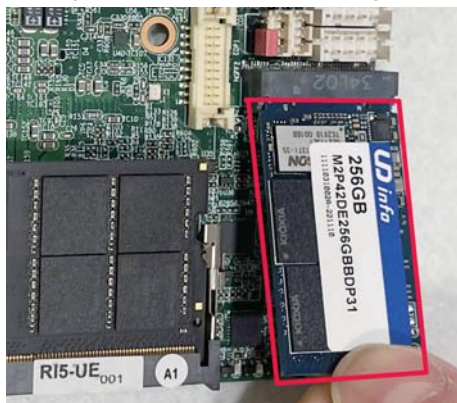


1-4 Directions for installing the M.2 B Key Mini Card

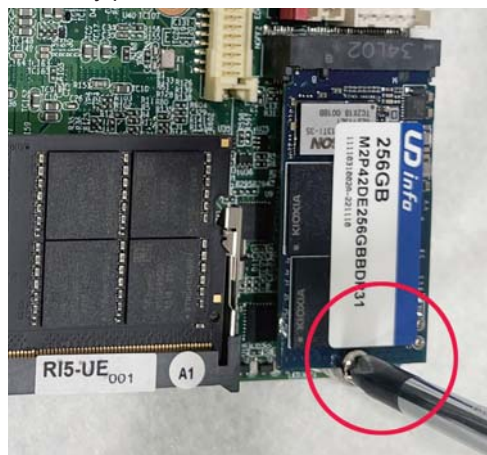
1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle

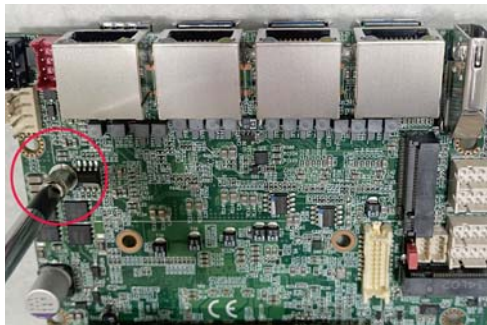


3. Gently push down the Mini Card and screw the screw back.

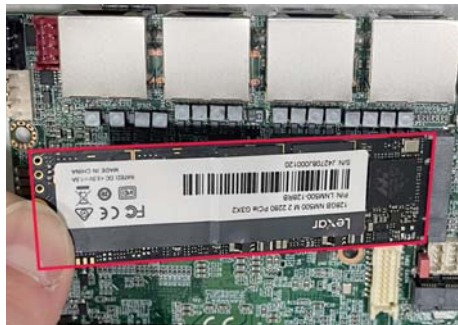


1-5 Directions for installing the M.2 M Key Mini Card

1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle

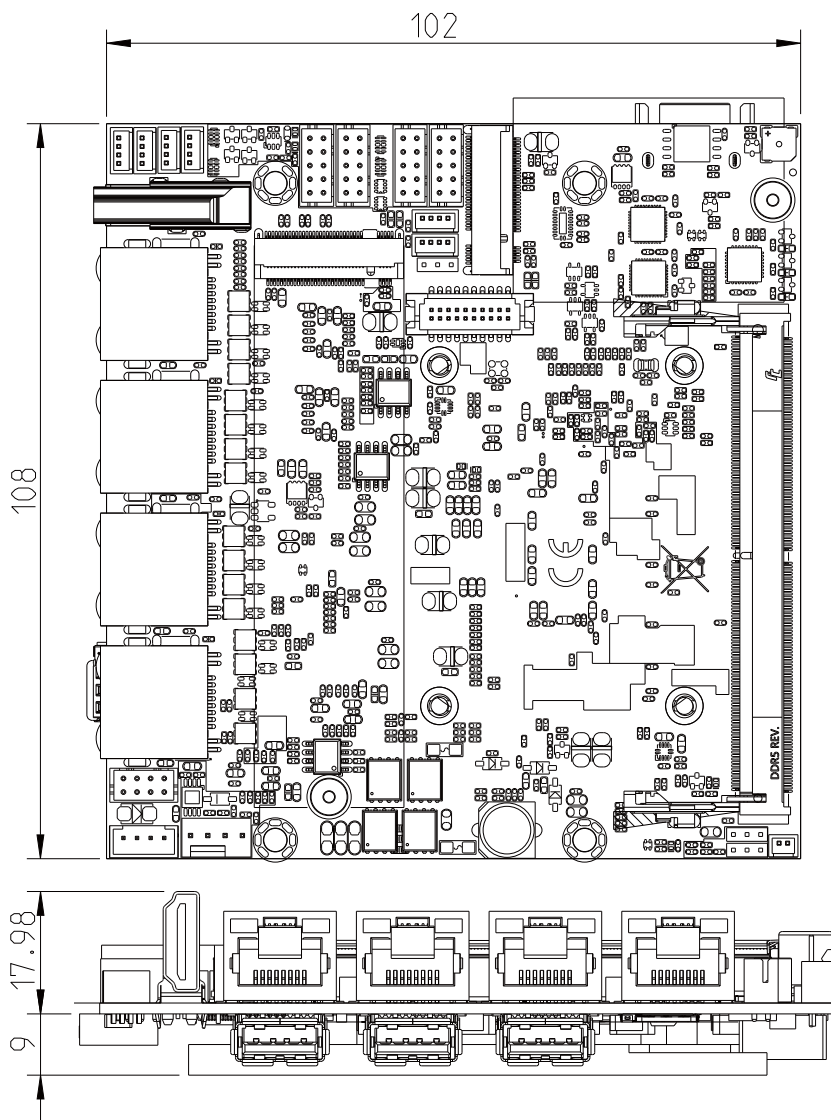


3. Gently push down the Mini Card and screw the screw back.



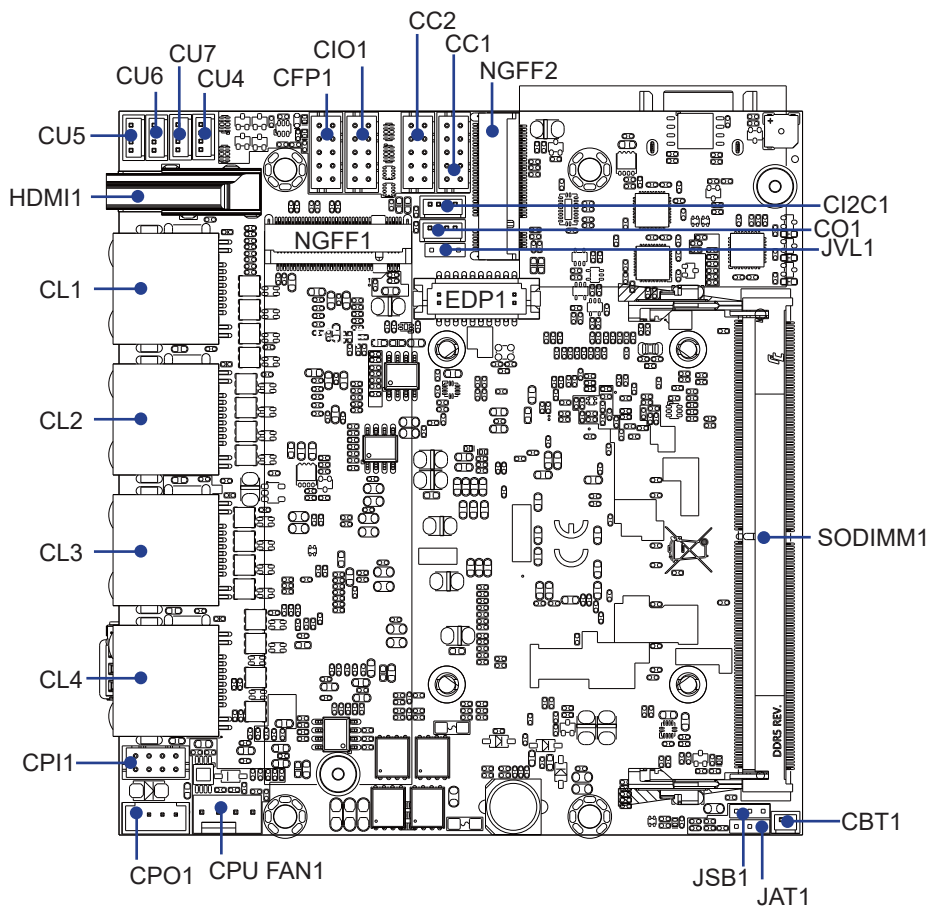
Chapter-2

2-1 Dimension-2I130DW

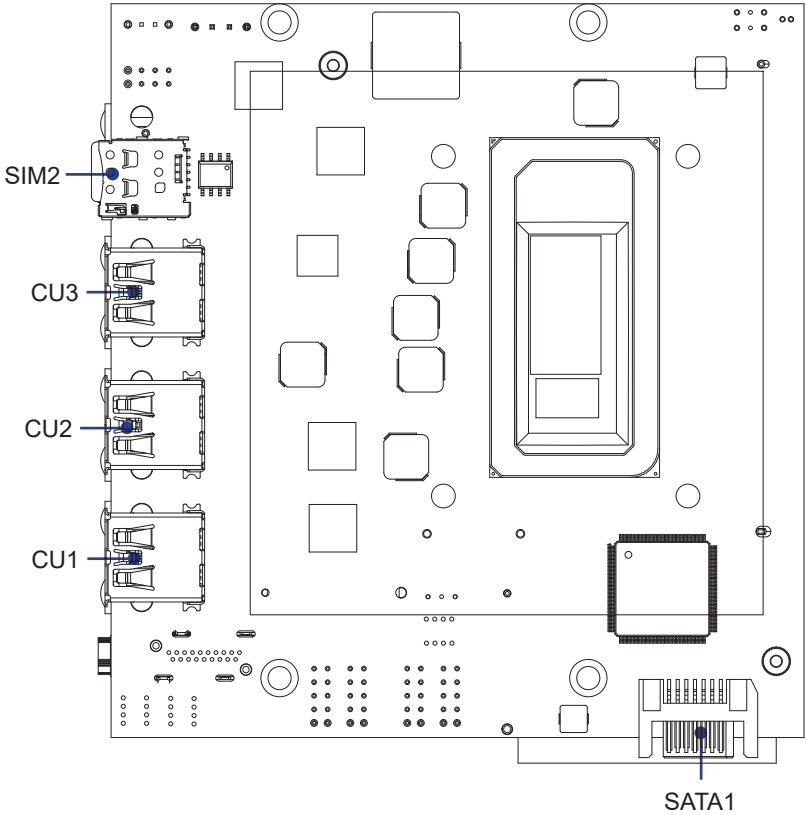


2-2 Layout-2I130DW-Connector and Jumper

TOP

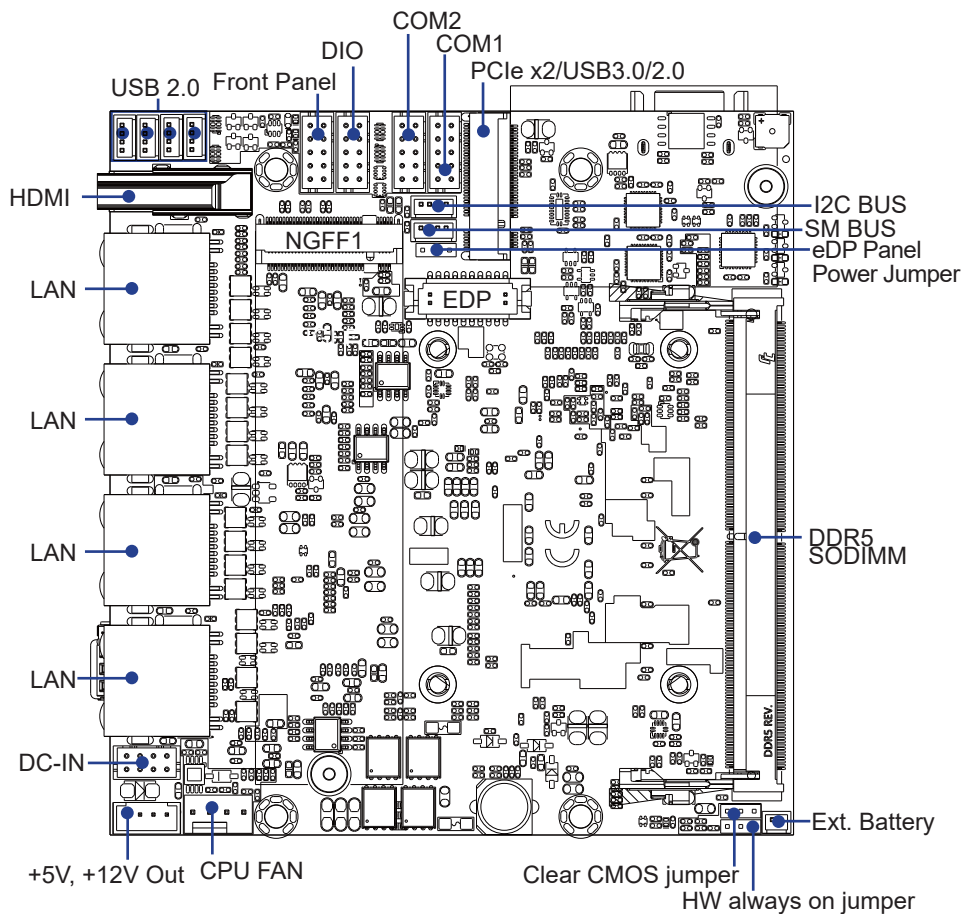


2-2-1 Layout-2I130DW-Connector and Jumper Bottom
BOT



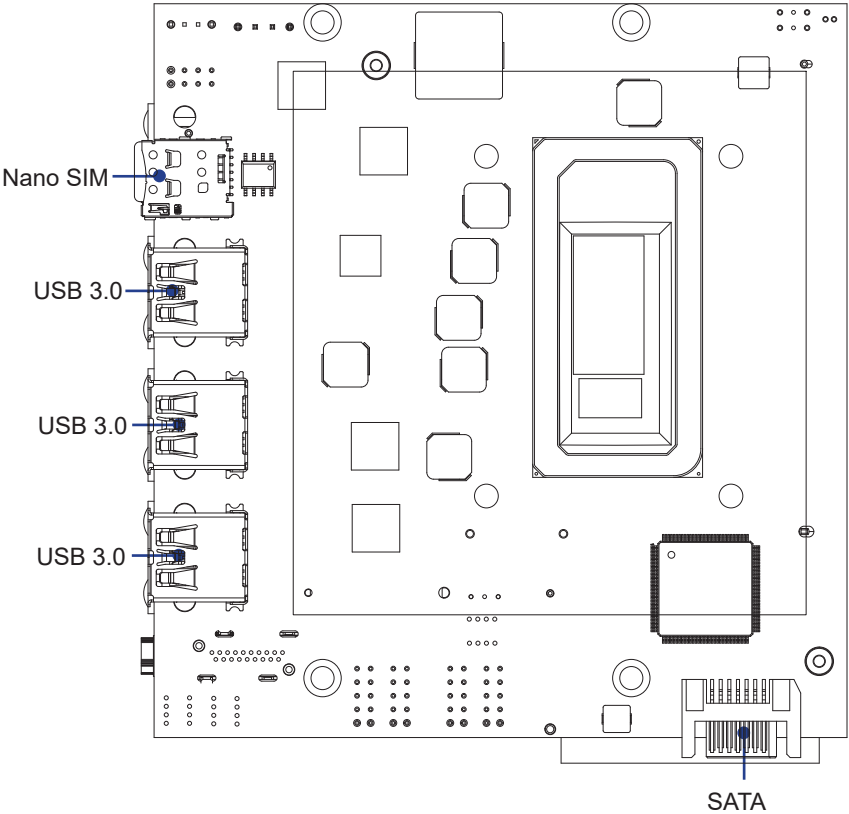
2-3 Layout-2I130DW-Function MAP

TOP



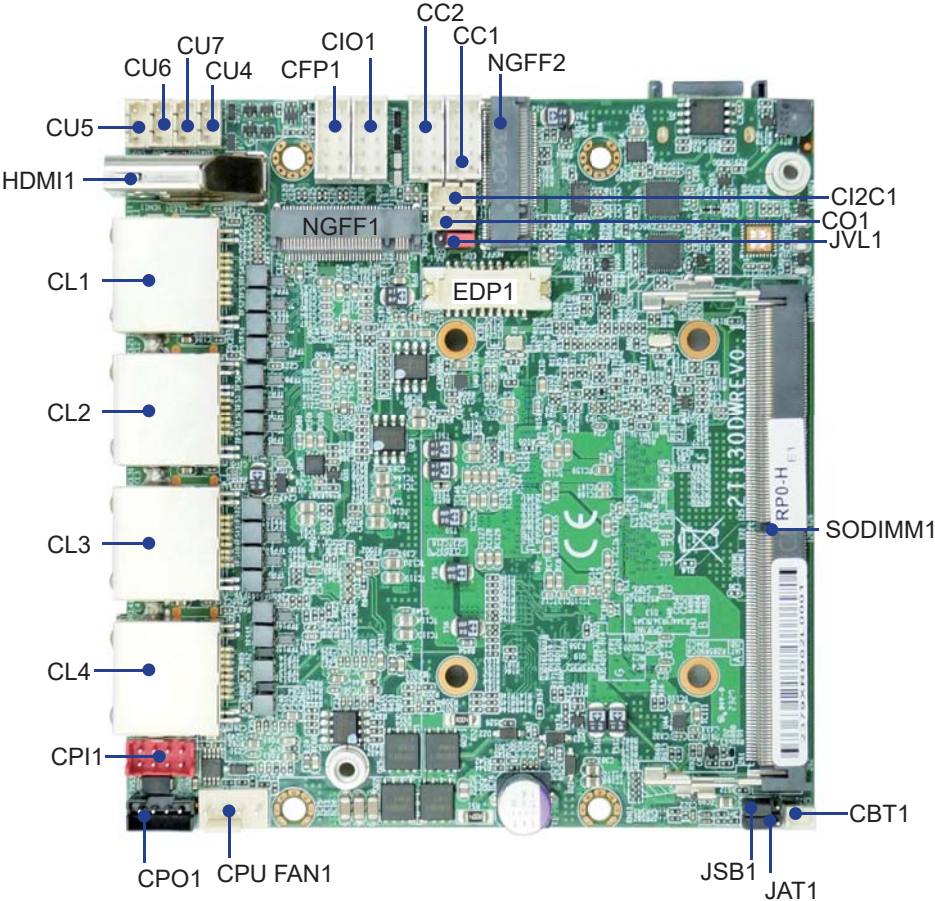
2-3-1 Layout-2I130DW-Function MAP

BOT

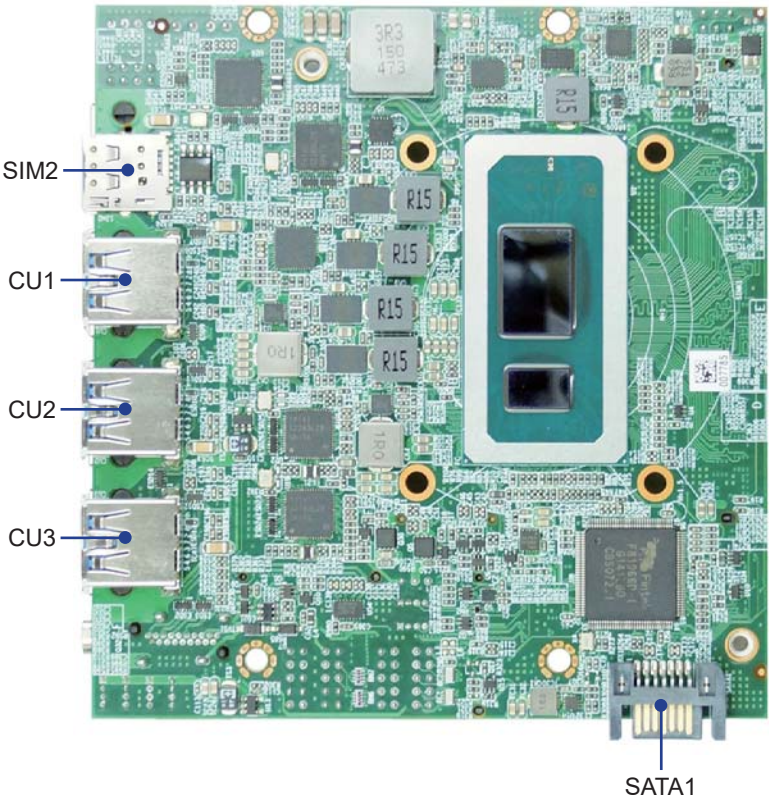


2-4 Diagram- 2I130DW

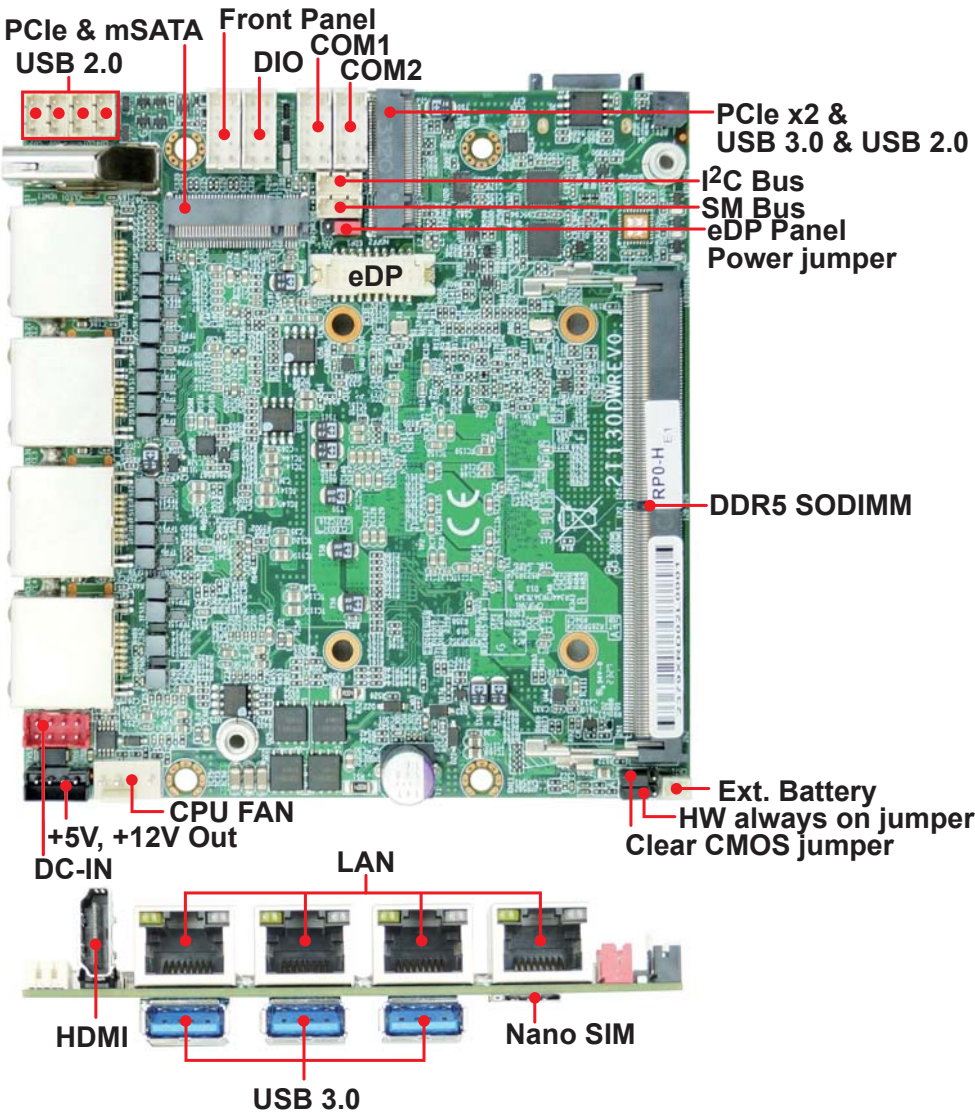
TOP



2-4-1 Diagram- 2I130DW
BOT



2-5 Function MAP- 2I130DW



2-6 List of Jumpers

- JSB1: CMOS DATA Clear
- JAT1: HW system always on
- JVL1: eDP panel power select

2-7 Jumper Setting Description

A jumper is ON as a closed circuit with a plastic cap covering two pins. A jumper is OFF as an open circuit without the plastic cap. Some jumpers have three pins, labeled 1, 2, and 3. You could connect either pin 1 and 2 or 2 and 3.

The below figure 2.2 shows the examples of different jumper settings in this manual.

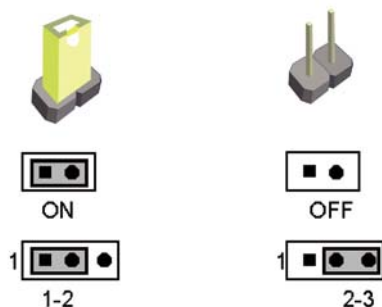


Figure 2.2

All jumpers already have its default setting with the plastic cap inserted as ON, or without the plastic cap as OFF. The default setting may be referred in this manual with a " * " symbol .

2-8 JSB1: CMOS DATA Clear

A battery must be used to retain the motherboard configuration in CMOS RAM.
Close Pin1 and pin 2 of JSB1 to store the CMOS data.

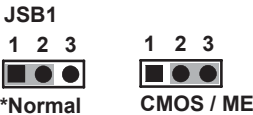
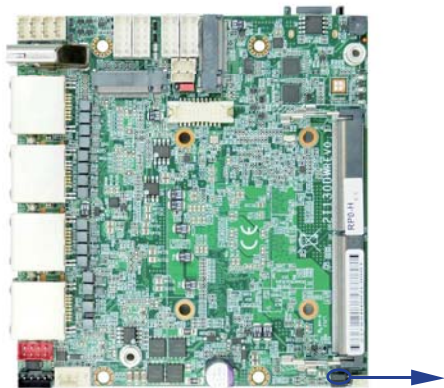
To clear the CMOS, follow the procedures below:

- 1. Turn off the system and unplug the AC power
- 2. Remove DC IN power cable from DC IN power connector
- 3. Locate JSB1 and close pin 1-2 for few seconds
- 4. Return to default setting by Close pin 1-2
- 5. Connect DC IN power cable back to DC IN Power connector

JSB1	DESCRIPTION
*1-2	Normal set
2-3	CMOS / ME data clear

Note: Do not clear CMOS unless

- 1. *Troubleshooting*
- 2. *Forget password*
- 3. *You fail over-clocking system*



2-9 JAT1: HW system always on

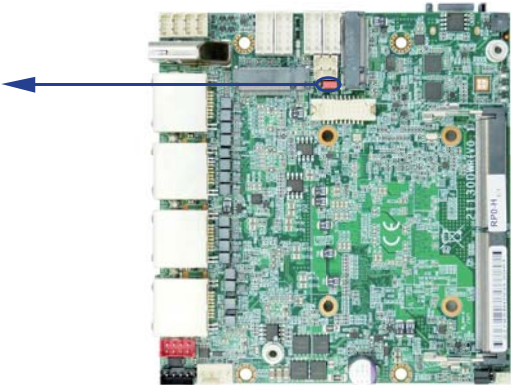
JAT1	DESCRIPTION
*1-2	Normal Set
2-3	HW system always on



2-10 JVL1: eDP panel power select

JVL1	DESCRIPTION
1-2	+5V
*2-3	+3.3V

Note: Attention! Check Device Power in spec



Chapter-3

Connection

This chapter provides all necessary information of the peripheral's connections, switches and indicators. Always power off the board before you install the peripherals.

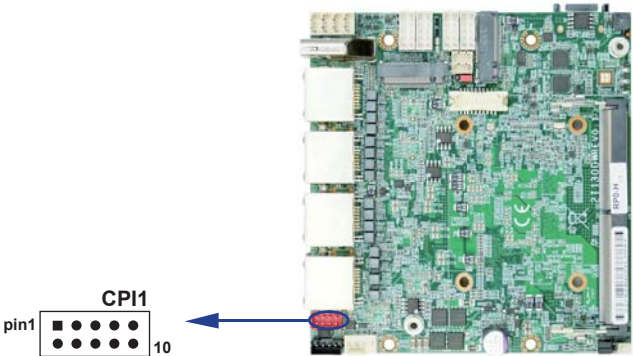
3-1 List of Connectors

CPI1:	DC-IN 2x4 pin (2.0mm) Red wafer
CPO1:	+12V / +5V power output 4 pin (2.0mm) Black wafer
CBT1:	COMS battery 1x2 pin (1.25mm)wafer
CC1~CC2:	COM 2x5 pin (2.0mm) wafer
CFP1:	Front Panel connector 2x5 pin (2.0mm) wafer
CIO1:	4DI / 4DO 2x5 pin (2.0mm) wafer
CPU FAN1:	CPU Fan 1x4 pin (2.54mm) wafer
EDP1:	EDP Panel 2x10 pin (1.25mm) wafer
HDMI1:	HDMI1 Connector
CU1~CU3:	USB 3.0 Type A connector
CU4~7:	USB 2.0 port 1x4 pin (1.25mm) wafer
CL1~CL4:	LAN RJ45 Connector
CO1:	SM Bus 1x4 pin (1.25mm) wafer
CI ² C1:	I ² C Bus 1x4 pin (1.25mm) wafer
SATA1:	SATA connector 7pin
SODIMM1:	DDR5 Channel A SODIMM H: 9.2mm
NGFF1:	M.2 NGFF M key sockets 75pin H: 8.5mm
NGFF2:	M.2 NGFF B key sockets 75pin H: 8.5mm
SIM2:	Nano SIM card socket

3-2 CPI1: DC Power input (2x4 pin 2.0mm Wafer) (Red)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	DC-IN	4	DC-IN
5	DC-IN	6	DC-IN
7	GND	8	GND

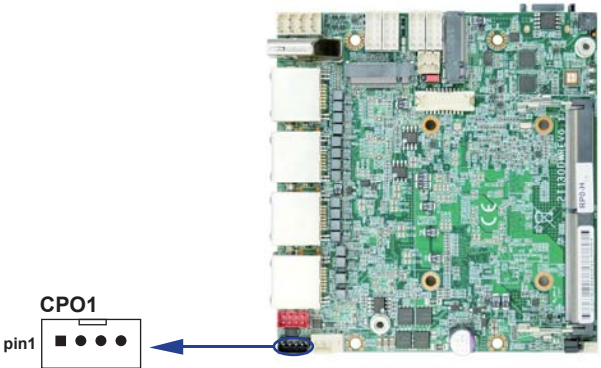
Note: 1. Very important check DC-in Voltage.



3-3 CPO1: DC +5 / +12V output (1x4 pin 2.0mm Wafer) (Black)

PIN NO.	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V

Note: Attention! Check Device Power in spec



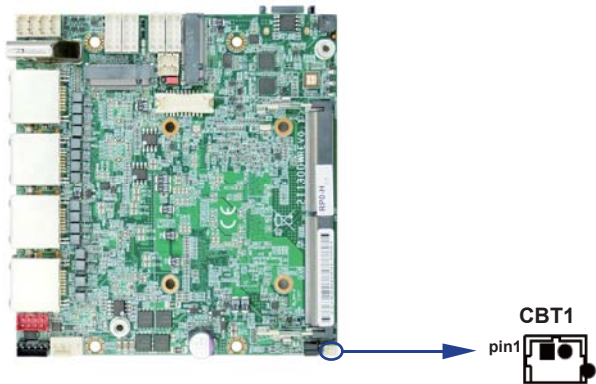
3-4 CMOS battery connector

• CBT1: CMOS Battery 1x2 pin (1.25mm) Wafer.

PIN NO.	DESCRIPTION
1	GND
2	+3V

Note:

- 1. When the board without Adaptor plug in, this board power RTC consumption about 2.7uA
- 2. If adaptor always plug in RTC power consumption about 0.1uA



3-5 COM interface

CC1 / CC2: COM 2x5 pin (2.0mm) Wafer

• (RS232 Mode)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	RXD
3	TXD	4	DTS
5	GND	6	DSR
7	RTS	8	CTS
9	RI / VCC	10	+5V

• (RS485 Mode)

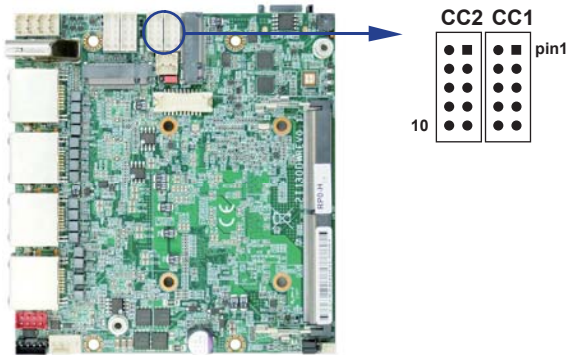
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data-	2	Data+
3	NC	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC	10	+5V

• (RS422 Mode)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TX-	2	TX+
3	RX+	4	RX-
5	GND	6	NC
7	NC	8	NC
9	NC	10	+5V

Note:

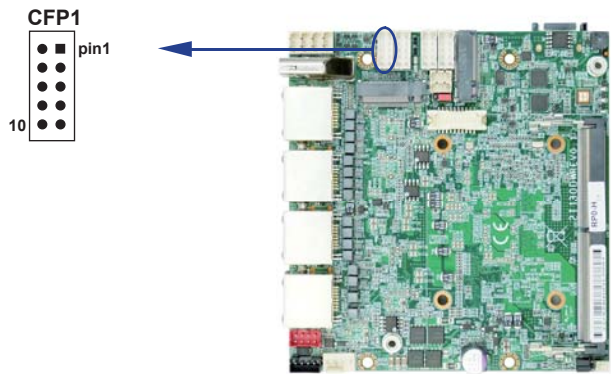
- 1. Pin 9 RI and Voltage setting only for COM 1/2 ports, is used BOM control.
- 2. Default support RS232 / RS422 / RS485 by BIOS selected, default set RS232.



3-6 Front Panel Pin Header

• CFP1: Front Panel connector 2x5 pin (2.0mm) Wafer

PIN NO.	Description	PIN NO.	Description
1	Power button	2	GND
3	Reset	4	GND
5	Power LED-	6	Power LED+
7	HDD LED-	8	HDD LED+
9	LAN LED-	10	LAN LED+

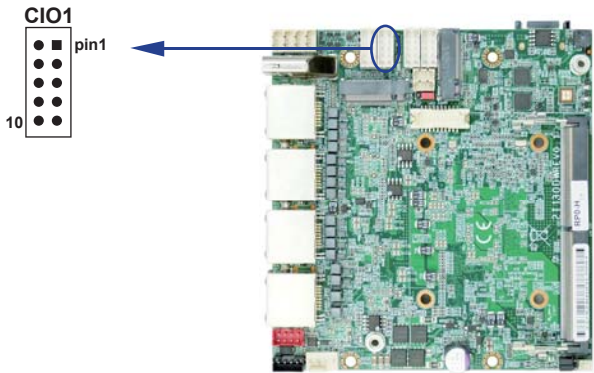


3-7 DIO Interface

• CIO1: 4DI / 4DO 2x5 pin (2.0mm) Wafer

PIN NO.	Description	PIN NO.	Description
1	DI-0	2	DO-3
3	DI-1	4	DO-2
5	DI-2	6	DO-1
7	DI-3	8	DO-0
9	GND	10	+5V

Note: 1. DIO and WDT function from SIO F81966D-I.



• WDT For F81966D-I watch dog timer device:

DC spec:

Input low Voltage (VIL): +0.8 Max

Input High Voltage(VIH): +2V Min

Output low Current (IOL): 10mA (Min) VOL=0.4V

Output High Current (IOH): -10mA (Min) VOH=2.4V

Watch Dog Time value 0~255 sec

The system will be issued reset. When WDT is enable the hardware start down counter to zero.

The reset timer have 10~20% tolerance upon the Temperature.

Note: If want to SDK support. Please contact to sales window.

3-7-1 IO Device:F81966 LPC DIO under Windows

The Sample code source you can download from

http://tprd.info/lexwiki/index.php/IO_Device:F81966_LPC_DIO_under_Windows

<Google Drive>

Source file: F81966_LPC_GPIO_Utility_v1.5.4_Src

Binary file: F81966_LPC_GPIO_Utility_Bin_x86_v1.5.4 F81966_LPC_GPIO_Utility_Bin_x64_v1.5.4

F81966 DLL : F81966_DLL_v1.1.1_x86 F81966_DLL_v1.1.1_x64

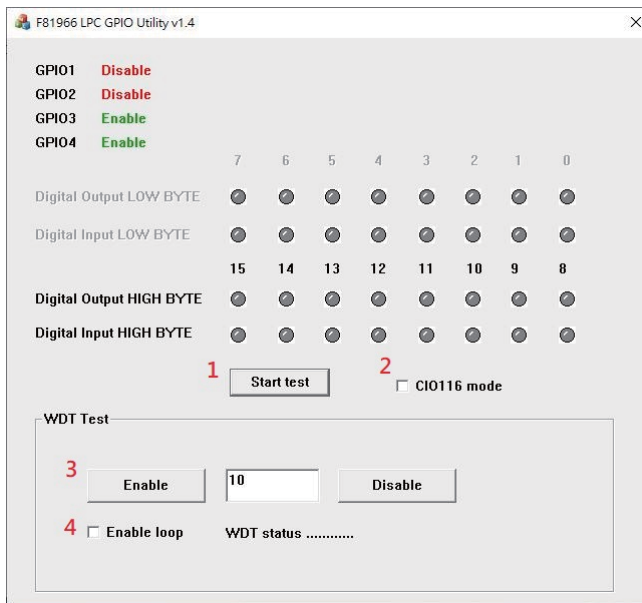
<FTP>

Source file: F81966_LPC_GPIO_Utility_Src_v1.5.4

Binary file: F81966_LPC_GPIO_Utility_Bin_x86_v1.5.4 F81966_LPC_GPIO_Utility_Bin_x64_v1.5.4

F81966 DLL : F81966_DLL_v1.1.1_x86 F81966_DLL_v1.1.1_x64

Introduction F81966 DIO



1. run as administrator
2. Start test Button, Send bits one by one and one by one receive
3. CIO116 mode for CIO116 module use
4. Set time countdown, If the end of the countdown, the trigger signal to reboot
5. Enable loop, Continuously reset the WDT to ensure that when the system is normal, the restart signal will not be triggered

F81966_DLL Function

```

F81966_DLL_API bool F81966_LPC_Init(pF81966_status status);

F81966_DLL_API BYTE F81966_LPC_Digital_Read_LOW();
F81966_DLL_API void F81966_LPC_Digital_Write_LOW(BYTE byteValue);
F81966_DLL_API BYTE F81966_LPC_Digital_Read_HIGH();
F81966_DLL_API void F81966_LPC_Digital_Write_HIGH(BYTE byteValue);

F81966_DLL_API void F81966_LPC_Set_WDT_Enable(BYTE byteValue);
F81966_DLL_API void F81966_LPC_Set_WDT_Disable();

```

Digital Input / Output test

Note when using the following boards: 2I130DW
CIO1 needs to be controlled by CIO3

	Digital output Low Byte		Digital iutput Low Byte	
CIO1	Do	0	Di	0
	Do	1	Di	1
	Do	2	Di	2
	Do	3	Di	3
CIO2	Do	4	Di	4
	Do	5	Di	5
	Do	6	Di	6
	Do	7	Di	7

	Digital output High Byte		Digital iutput High Byte	
CIO3	Do	8	Di	8
	Do	9	Di	9
	Do	10	Di	10
	Do	11	Di	11
CIO4	Do	12	Di	12
	Do	13	Di	13
	Do	14	Di	14
	Do	15	Di	15

sample code

```
Set CIO1 CIO2 Digital Output all high  
F81966_LPC_Digital_Write_LOW(256);
```

```
Set CIO1 CIO2 Digital Output all low  
F81966_LPC_Digital_Write_LOW(0);
```

```
Set CIO1 Digital Output bit 4 high  
F81966_LPC_Digital_Write_LOW(16);
```

```
Set CIO2 Digital Output bit 10 high  
F81966_LPC_Digital_Write_HIGH(4);
```

```
Read Din  
value = F81966_LPC_Digital_Read_LOW();
```

Watch Dog test sample code

```
Set WDT 10 sec  
F81966_LPC_Set_WDT_Enable(10);
```

```
Disable WDT  
F81966_LPC_Set_WDT_Disable();
```

3-7-2 IO Device:F81966 LPC DIO under Linux console

The Sample code source you can download from

http://tprd.info/lexwiki/index.php/IO_Device:F81966_LPC_DIO_under_Linux_console

<Google Drive>

Source file: F81966_DIO_v1.1L_Src

Binary file: F81966_DIO_v1.1L_Bin_x86 F81966_DIO_v1.1L_Bin_x64

F81966 Library : F81966_LIB_v1.1L_x86 F81966_LIB_v1.1L_x64

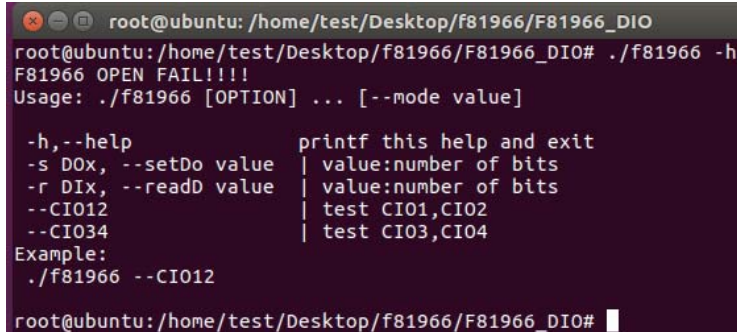
<FTP>

Source file: F81966_DIO_v1.1L_Src

Binary file: F81966_DIO_v1.1L_Bin_x86 F81966_DIO_v1.1L_Bin_x64

F81966 Library : F81966_LIB_v1.1L_x86 F81966_LIB_v1.1L_x64

Introduction F81966 DIO



```
root@ubuntu: /home/test/Desktop/f81966/F81966_DIO
root@ubuntu: /home/test/Desktop/f81966/F81966_DIO# ./f81966 -h
F81966 OPEN FAIL!!!!
Usage: ./f81966 [OPTION] ... [--mode value]

-h, --help                printf this help and exit
-s DOx, --setDo value     | value: number of bits
-r DIX, --readD value     | value: number of bits
--CIO12                   | test CIO1, CIO2
--CIO34                   | test CIO3, CIO4
Example:
./f81966 --CIO12

root@ubuntu: /home/test/Desktop/f81966/F81966_DIO#
```

1. Start test Button, Send bits one by one and one by one receive
2. CIO116 mode for CIO116 module use
3. Set time countdown, If the end of the countdown, the trigger signal to reboot
4. Enable loop, Continuously reset the WDT to ensure that when the system is normal, the restart signal will not be triggered

F81966_DLL Function

```
bool F81966_OPEN();
void F81966_Init();
void F81966_LPC_Write(BYTE LDNData, BYTE reg, BYTE value);
BYTE F81966_LPC_Read(BYTE LDNData, BYTE reg);
void F81966_LPC_Digital_Write_LOW(BYTE byteValue);
void F81966_LPC_Digital_Write_HIGH(BYTE byteValue);
BYTE F81966_LPC_Digital_Read_LOW();
BYTE F81966_LPC_Digital_Read_HIGH();
void F81966_LPC_Set_WDT_Enable(BYTE byteValue);
void F81966_LPC_Set_WDT_Disable();
void EntryLPC();
void ExitLPC();
```

Digital Input / Output test

Note when using the following boards: 2I130DW
CIO1 needs to be controlled by CIO3

	Digital output Low Byte		Digital iutput Low Byte	
CIO1	Do	0	Di	0
	Do	1	Di	1
	Do	2	Di	2
	Do	3	Di	3
CIO2	Do	4	Di	4
	Do	5	Di	5
	Do	6	Di	6
	Do	7	Di	7

	Digital output High Byte		Digital iutput High Byte	
CIO3	Do	8	Di	8
	Do	9	Di	9
	Do	10	Di	10
	Do	11	Di	11
CIO4	Do	12	Di	12
	Do	13	Di	13
	Do	14	Di	14
	Do	15	Di	15

sample code

```
Set CIO1 CIO2 Digital Output all high
F81966_LPC_Digital_Write_LOW(256);
```

```
Set CIO1 CIO2 Digital Output all low
F81966_LPC_Digital_Write_LOW(0);
```

```
Set CIO1 Digital Output bit 4 high
F81966_LPC_Digital_Write_LOW(16);
```

```
Set CIO2 Digital Output bit 10 high
F81966_LPC_Digital_Write_HIGH(4);
```

```
Read Din
value = F81966_LPC_Digital_Read_LOW();
```

Watch Dog test

sample code

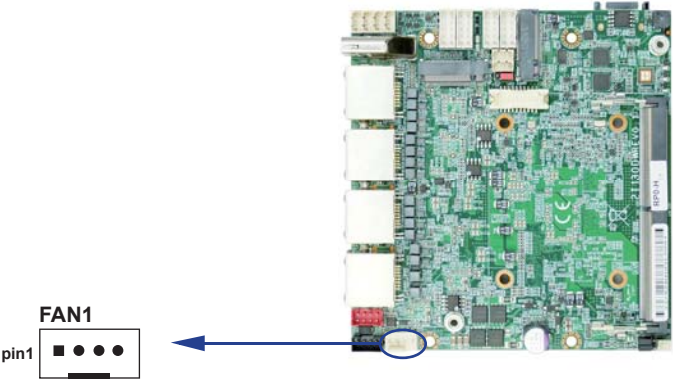
```
Set WDT 10 sec
F81966_LPC_Set_WDT_Enable(10);
```

```
Disable WDT
F81966_LPC_Set_WDT_Disable();
```

3-8 CPU FAN1: CPU Fan 1x4 pin (2.54mm) Wafer

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	CPU FAN-IN
4	CPU FAN-OUT

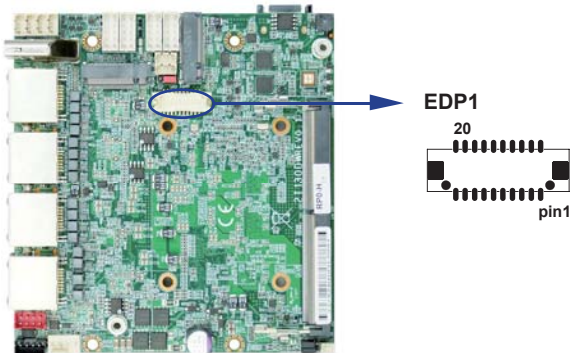
Note: DC in +12V by switch to FAN power +12V, so DC in need stable +12V input



3-9 EDP1: eDP Panel 2x10 pin (1.25mm) Wafer

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Lane-0-DATA-	2	+12V or +5V
3	Lane-0-DATA+	4	+12V or +5V
5	Lane-1-DATA-	6	GND
7	Lane-1-DATA+	8	GND
9	Backlight Enable	10	GND
11	PWM dimming for eDP	12	GND
13	I ² C Clock	14	+LCD (5V or 3.3V)
15	I ² C Data	16	+LCD (5V or 3.3V)
17	eDP Aux+	18	+LCD (5V or 3.3V)
19	eDP Aux-	20	EDP_HPDP

- Note:
- 1. eDP interface support 2 lanes.
 - 2. JVL1: eDP panel +5V / +3.3V (default) Voltage select.
 - 3. eDP1 pin9 for panel backlight enable. +3.3V Level
 - 4. eDP1 pin11 for panel backlight SOC dimming control
 - 5. eDP1 pin2, 4 backlight power default set +12V



3-10 HDMI1: HDMI Type A Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TMDS DATA2+	2	GND
3	TMDS DATA2-	4	TMDS DATA1+
5	GND	6	TMDS DATA1-
7	TMDS DATA0+	8	GND
9	TMDS DATA0-	10	TMDS CLK+
11	GND	12	TMDS CLK-
13	NC	14	NC
15	DDC CLOCK	16	DDC DATA
17	GND	18	+5V
19	H.P. Detect		



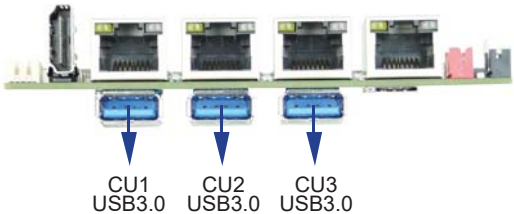
3-11 USB Interface

• **CU1~CU3: USB 3.0 Type A Connector**

PIN NO.	Description	PIN NO.	Description
1	VBUS	5	SS_RX-
2	D-	6	SS_RX+
3	D+	7	GND
4	GND	8	SS_TX-
		9	SS_TX+

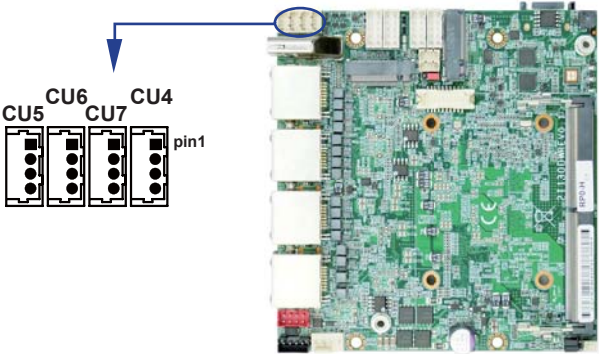
Note:

- 1. The power supply 0.9A for each USB 3.0 respect specification.
- 2. CU1, CU2, CU3 support wake up for option.



• **CU4 / CU5 / CU6 / CU7: USB 2.0 port 1x4 pin (1.25mm) Wafer**

PIN NO.	Description
1	+5V
2	DATA-
3	DATA+
4	GND



3-12 LAN Interface

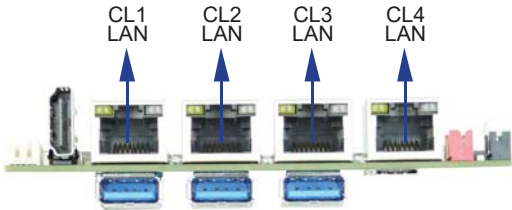
•CL1 / CL2 / CL3 / CL4: LAN RJ45 Connector

PIN NO.	Description	PIN NO.	Description
1	MDI0+	5	MDI2-
2	MDI0-	6	MDI1-
3	MDI1+	7	MDI3+
4	MDI2+	8	MDI3-

•CL1 / CL2 / CL3 / CL4: LAN RJ45 Connector for 2.5 Giga LAN LAN LED
LAN LED

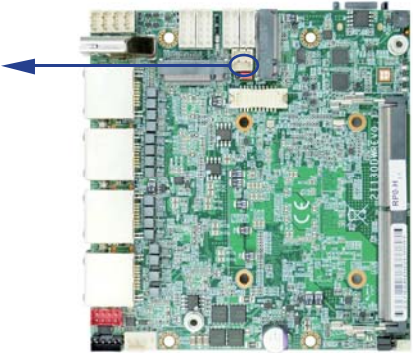
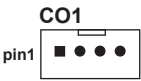
Speed	10Mbps			100Mbps		
Indicate	Back Side		Front Side	Back Side		Front Side
	Link Led	ACT Led	ACT Led	Link Led	ACT Led	ACT Led
LAN light	X	Orange	Orange	X	Orange	Orange

Speed	1000Mbps			2500Mbps		
Indicate	Back Side		Front Side	Back Side		Front Side
	Link Led	ACT Led	ACT Led	Link Led	ACT Led	ACT Led
LAN light	Green	Orange	Orange	Red	Orange	Orange



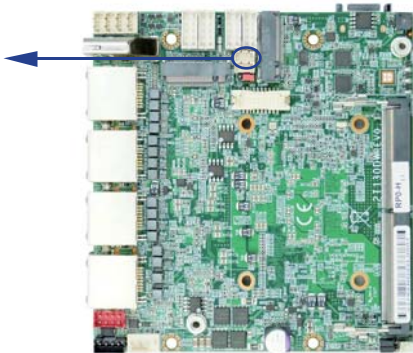
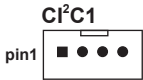
3-13 CO1: SMBus 1x4 pin (1.25mm) Wafer

PIN NO.	Description
1	+3.3V
2	GND
3	SMB Clock
4	SMB DATA



3-14 CI²C1: I²C BUS 1x4 pin (1.25mm) Wafer

PIN NO.	Description
1	+3.3V
2	GND
3	I ² C Clock
4	I ² C DATA

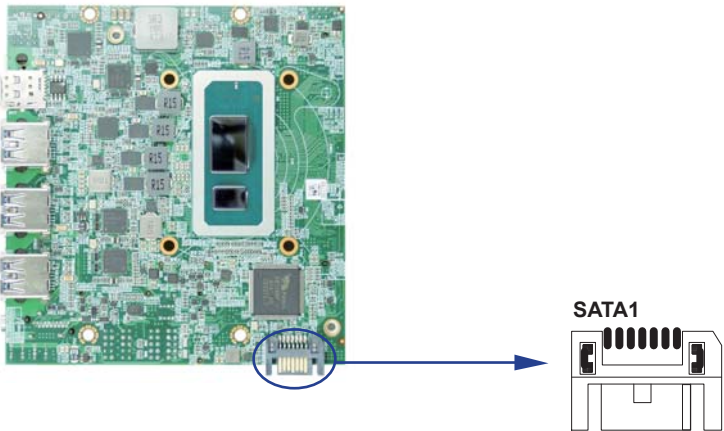


3-15 SATA Interface

• **SATA1: SATA port connectors 7pin**

PIN NO.	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Note: 1. CPO1 provides SATA-HDD power +12V, GND, +5V



3-16 NGFF1: M.2 NGFF card M key sockets 75 pin

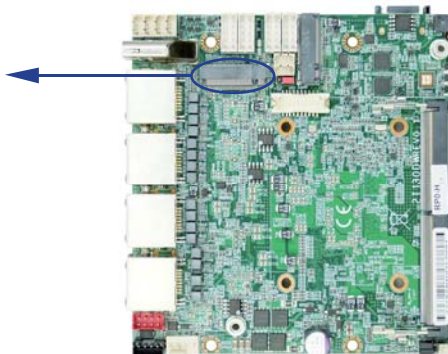
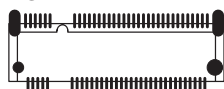
• NGFF1: size 2280 (H=8.5)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3V
3	GND	4	+3.3V
5	PCIE4_Rn3	6	NC
7	PCIE4_Rp3	8	NC
9	GND	10	M2_LED_N
11	PCIE4_Tn3	12	+3.3V
13	PCIE4_Tp3	14	+3.3V
15	GND	16	+3.3V
17	PCIE4_Rn2	18	+3.3V
19	PCIE4_Rp2	20	NC
21	GND	22	NC
23	PCIE4_Tn2	24	NC
25	PCIE4_Tp2	26	NC
27	GND	28	NC
29	PCIE4_Rn1	30	NC
31	PCIE4_Rp1	32	NC
33	GND	34	NC
35	PCIE4_Tn1	36	NC
37	PCIE4_Tp1	38	NC
39	GND	40	NC
41	PCIE4_Rn0/SATA-RX+	42	NC
43	PCIE4_Rp0/SATA-RX-	44	NC
45	GND	46	NC
47	PCIE4_Tn0/SATA-TX-	48	NC
49	PCIE4_Tp0/SATA-TX+	50	M2_PRST_N
51	GND	52	SRCCCLKREQ_N
53	CLK_SRC0_DN	54	NC

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
57	GND	58	NC
M KEY			
67	NC	68	NC
69	SATA/PCIe Detect	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

Note: 1.NGFF1 support SATA & PCIe4 GEN4 NVMe device.

NGFF1



3-17 NGFF2: M.2 NGFF card B key sockets 75 pin

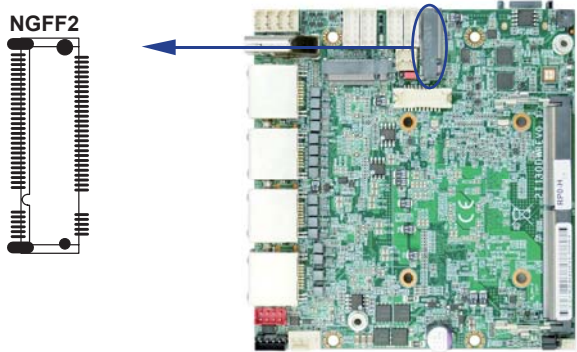
• NGFF2: size 2242 / 3042 (H=8.5)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CFG3_USB3_PCIE_N	2	+3.3V or +3.7V
3	GND	4	+3.3V or +3.7V
5	GND	6	FULL_CARD_PWR_N
7	USB2_P8_DP	8	W_DISABLE_1_N
9	USB2_P8_DN	10	M2_LED_N
11	GND		
B KEY			
21	GND	20	NC
23	NC	22	NC
25	NC	24	NC
27	GND	26	W_DISABLE_2_N
29	PERn6_U3Rn4	28	NC
31	PERp6_U3Rp4	30	SIM_RST_M2
33	GND	32	SIM_CLK_M2
35	PETn6_U3Tn4	34	SIM_DATA_M2
37	PETp6_U3Tp4	36	SIM_PWR_M2
39	GND	38	NC
41	PCIE3_P5_RX_DN	40	NC
43	PCIE3_P5_RX_DP	42	NC
45	GND	44	NC
47	PCIE3_P5_TX_DN	46	NC
49	PCIE3_P5_TX_DP	48	NC
51	GND	50	M2_PRST_N
53	NC	52	SRCCLKREQ_N
55	NC	54	NC
57	GND	56	NC
59	NC	58	NC
61	NC	60	NC

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
63	NC	62	NC
65	NC	64	NC
67	MD_RESET_N	66	SIM_DET
69	NC	68	NC
71	GND	70	+3.3V or +3.7V
73	GND	72	+3.3V or +3.7V
75	CFG2 power select	74	+3.3V or +3.7V

Note:

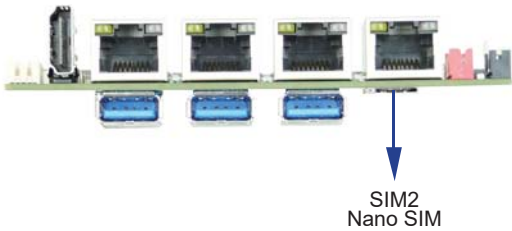
- 1. NGFF2 support PCIe / USB 3.0 Auto detect.
- 2. NGFF2 VCC voltage default is +3.3V,
when use 4G LTE device the VCC voltage is +3.7V by For OEM.



3-18 SIM2: Nano SIM card socket

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	5	GND
2	RST	6	NC
3	CLK	7	DATA
4	NC	8	DET

Note: 1. NGFF2 Pin 30, 32, 34, 36, 66 for SIM card reader use.



3-19 Connector wafer of Compatible Brand and part number list

Location	CKTS	PITCH	Brand Name	Mating connector	Cable housing
CC1~CC2	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CFP1	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CIO1	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CPI1	2x4 8Pin	2.0mm	JST	B8B-PHDSS	PHDR-08VS
CPO1	1x4 4Pin	2.0mm	JST	B4B-PH-KL	PHR-4
CO1	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CI2C1	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CU4~CU7	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CBT1	1x2 2Pin	1.25mm	MOLEX	53047-0210	51021-0200
EDP1	2x10 20Pin	1.25mm	HIROSE	DF13-20DS-1.25C	DF13-20DP-1.25V

Chapter-4

Introduction of BIOS

The BIOS is a program located in the Flash Memory on the motherboard.

This program is a bridge between motherboard and operating system.

When you start the computer, the BIOS program gains control.

The BIOS first operates an auto-diagnostic test called POST (Power on Self Test) for all the necessary hardware, it detects the entire hardware devices and configures the parameters of the hardware synchronization. After these tasks are completed, BIOS will give control of the computer back to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate with, it is the key factor of system stability and of ensuring your system performance at best.

In the BIOS Setup main menu, you can see several options. We will explain these options in the following pages. First, let us see the function keys you may use here:

Press <Esc> to quit the BIOS Setup.

Press ↑↓←→(up, down, left, right) to choose the option you want to confirm or modify.

Press <F10> to save these parameters and to exit the BIOS Setup menu after you complete the setup of BIOS parameters.

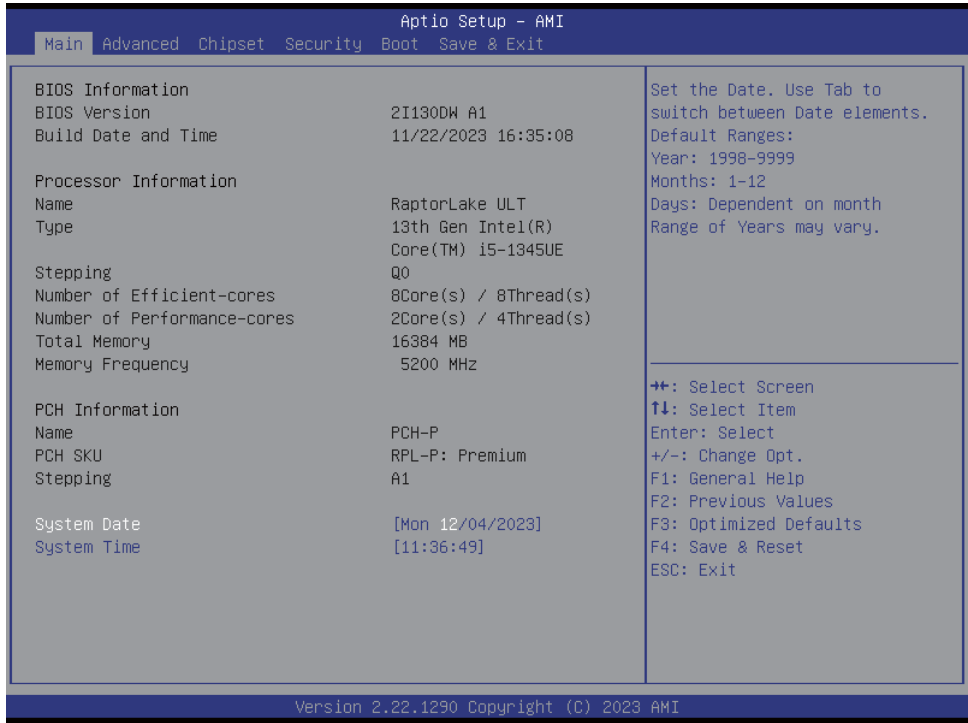
Press Page Up / Page Down or +/- keys to modify the BIOS parameters for the active option.

4-1 Enter Setup

Power on the computer and press key immediately to enter Setup.

If the message disappears before your respond but you still wish to enter Setup, restart the system by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart the system by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys.

4-2 BIOS Menu Screen & Function Keys



In the above BIOS Setup main menu of, you can see several options.

We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press >< (right, left) to select screen;
- Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
- Press <Enter> to select.
- Press <+>/<-> or <F5>/<F6> keys when you want to modify the BIOS parameters for the active option.
- [F1]: General help.
- [F2]: Previous values.
- [F3]: Optimized defaults.
- [F4]: Save & Reset.
- Press <Esc> to quit the BIOS Setup.

4-3 Getting Help



Status Page Setup Menu / Option Page Setup Menu

Press F1 to pop up a help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

4-4 Menu Bars

There are six menu bars on top of BIOS screen:

Main To change system basic configuration

Advanced To change system advanced configuration

Chipset To change PCH IO configuration

Security Password settings

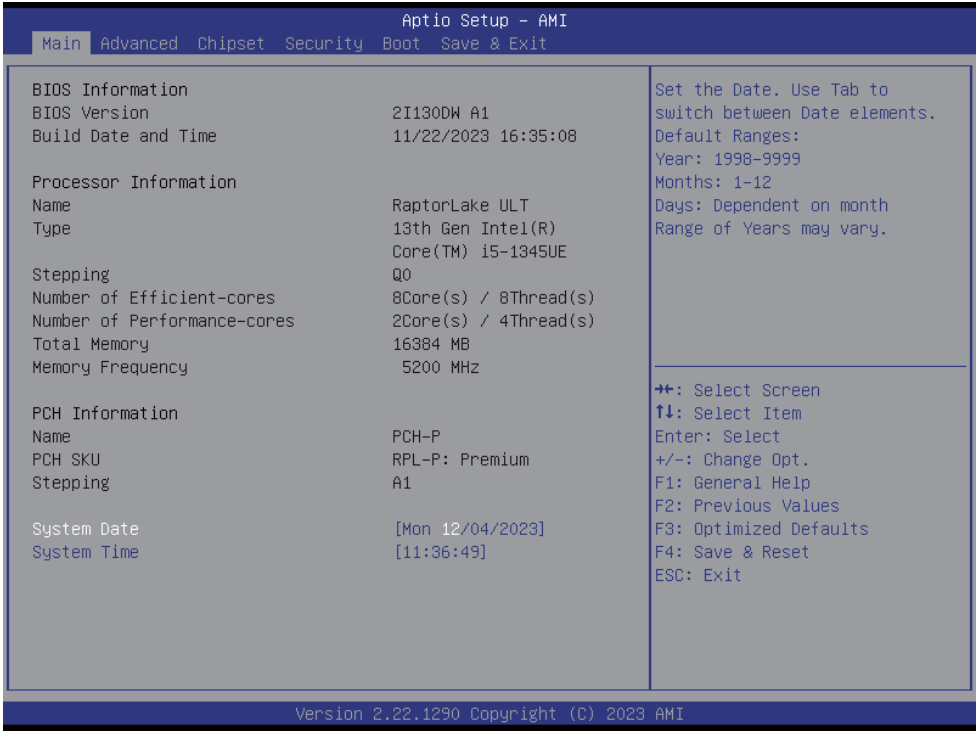
Boot Quiet boot or boot from USB selected.

Save & Exit Save setting, loading and exit options.

User can press the right or left arrow key on the keyboard to switch from menu bar.

The selected one is highlighted.

4-5 Main



Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.

System Date

Set the Date. Please use [Tab] to switch between data elements.

System Time

Set the Time. Please use [Tab] to switch between data elements.

4-6 Advanced



CPU Power Management Control

Please refer section 4-6-1

PCH-FW Configuration

Please refer section 4-6-2

AMT Configuration

Please refer section 4-6-2

Trusted Computing

Please refer section 4-6-3

ACPI Settings

Please refer section 4-6-4

F81966 Super IO Configuration

Please refer section 4-6-5

Hardware Monitor

Please refer section 4-6-6

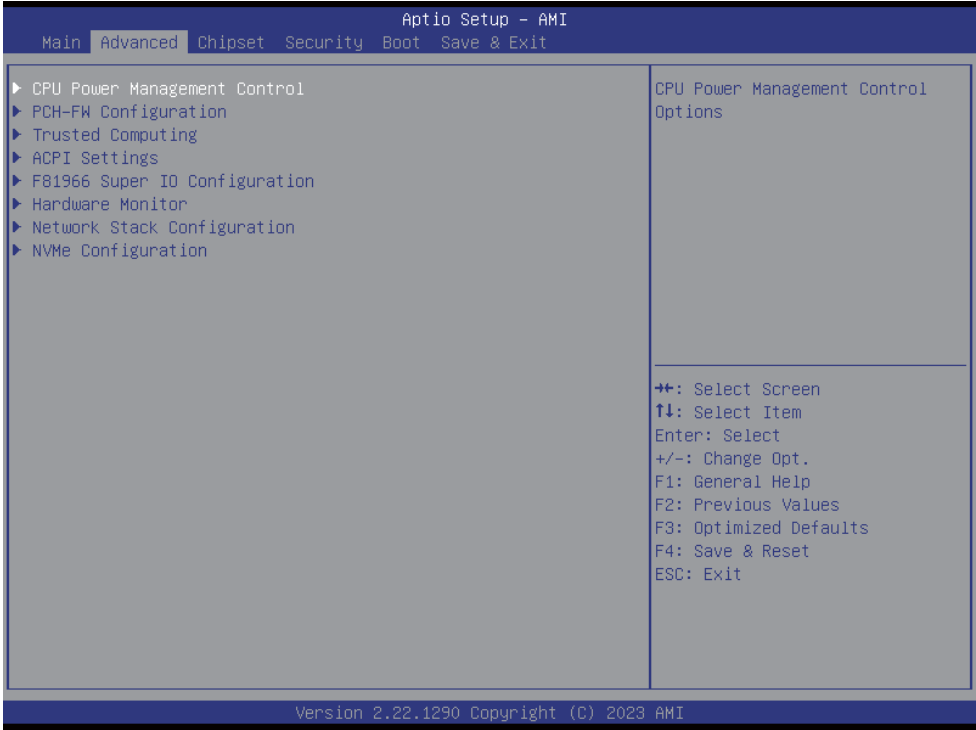
Network Stack Configuration

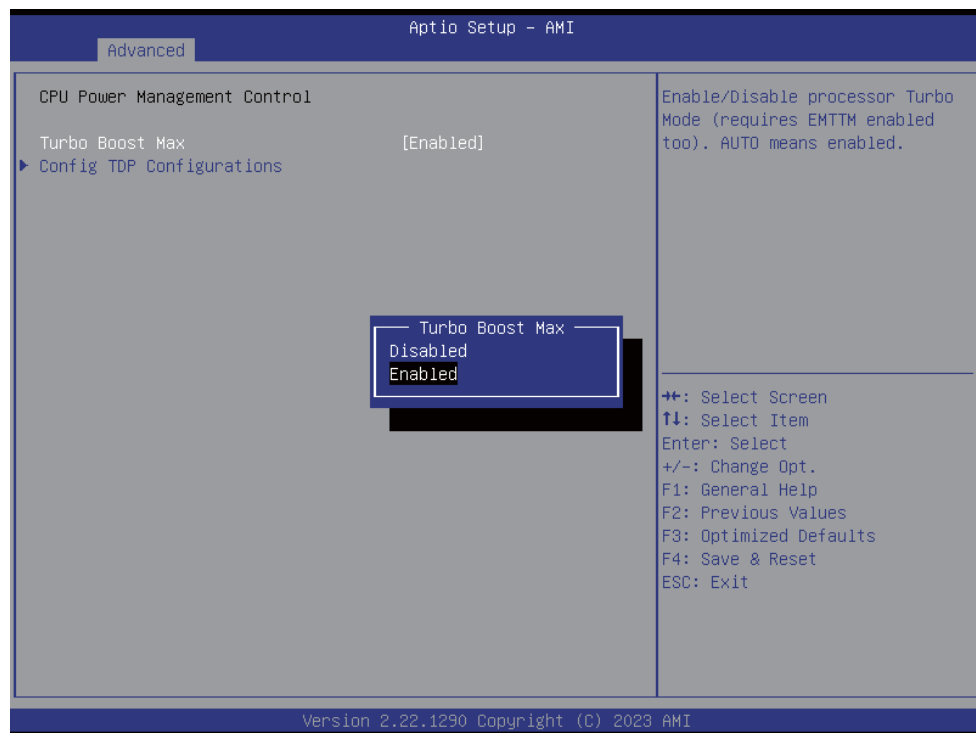
Please refer section 4-6-7

NVMe Configuration

Please refer section 4-6-8

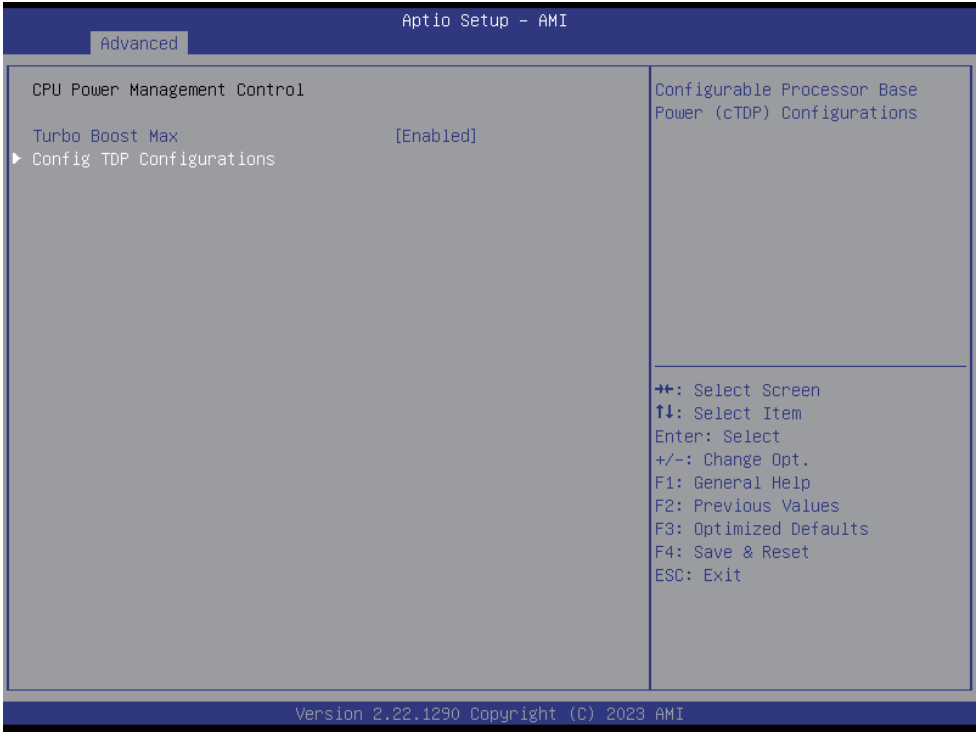
4-6-1 CPU Power Management Control

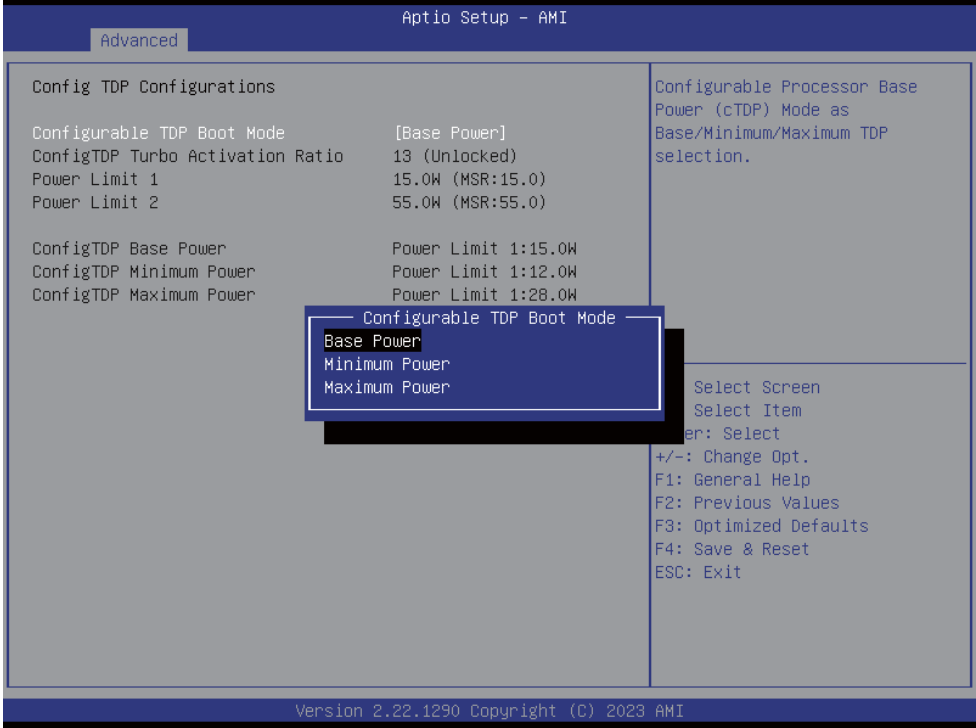




Turbo Boost Max

To turn on turbo boost or not, default is disabled.



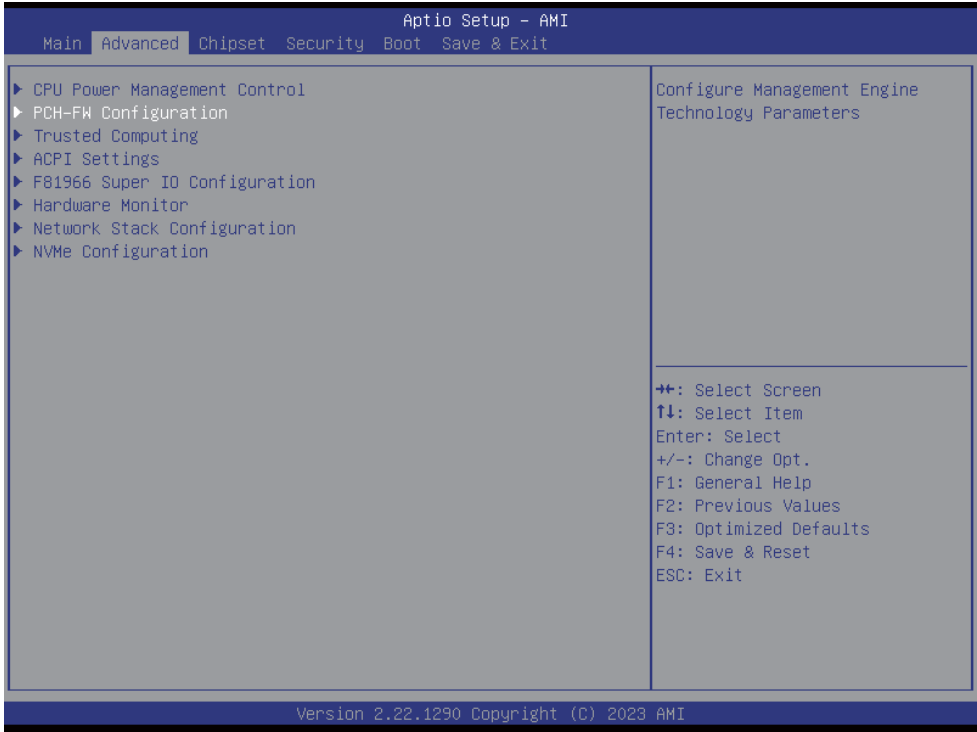


Config TDP Configurations

Configurable TDP Boot Mode

Enabled to change the TDP up or TDP down, default is Base Power

4-6-2 PCH-FW Configuration



Aptio Setup - AMI

Advanced

ME Firmware Version	16.1.27.2225
ME Firmware Mode	Normal Mode
ME Firmware SKU	Corporate SKU
ME Firmware Status 1	0x90000255
ME Firmware Status 2	0x39858106
ME Firmware Status 3	0x00000030
ME Firmware Status 4	0x00004000
ME Firmware Status 5	0x00000000
ME Firmware Status 6	0x00400002

⇄: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Reset
 ESC: Exit

Version 2.22.1290 Copyright (C) 2023 AMI

4-6-3 Trusted Computing

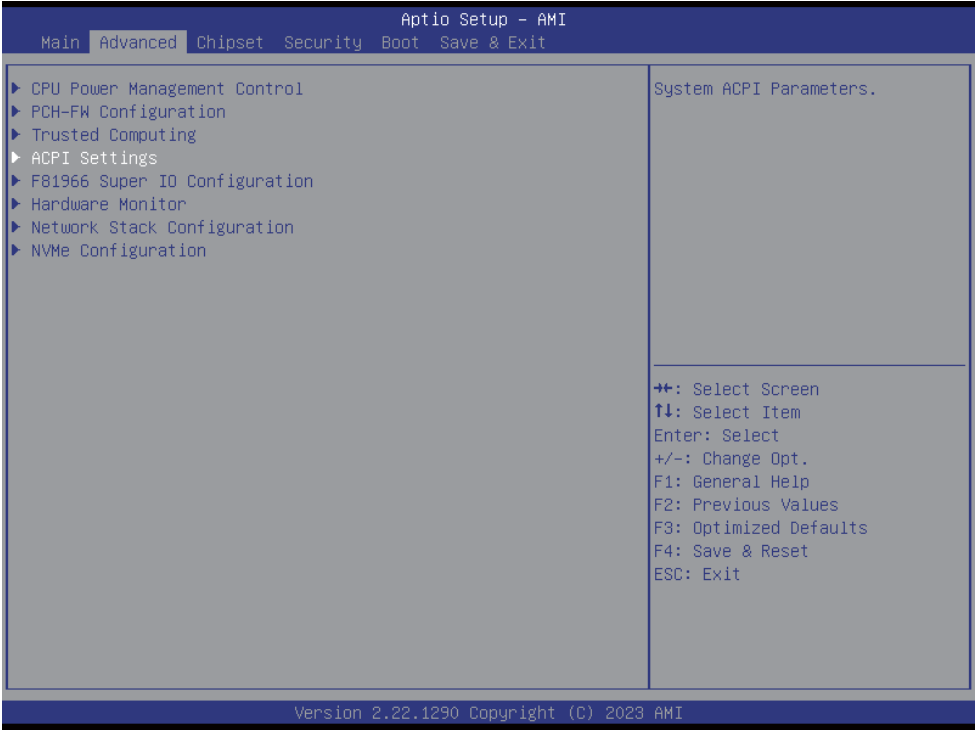


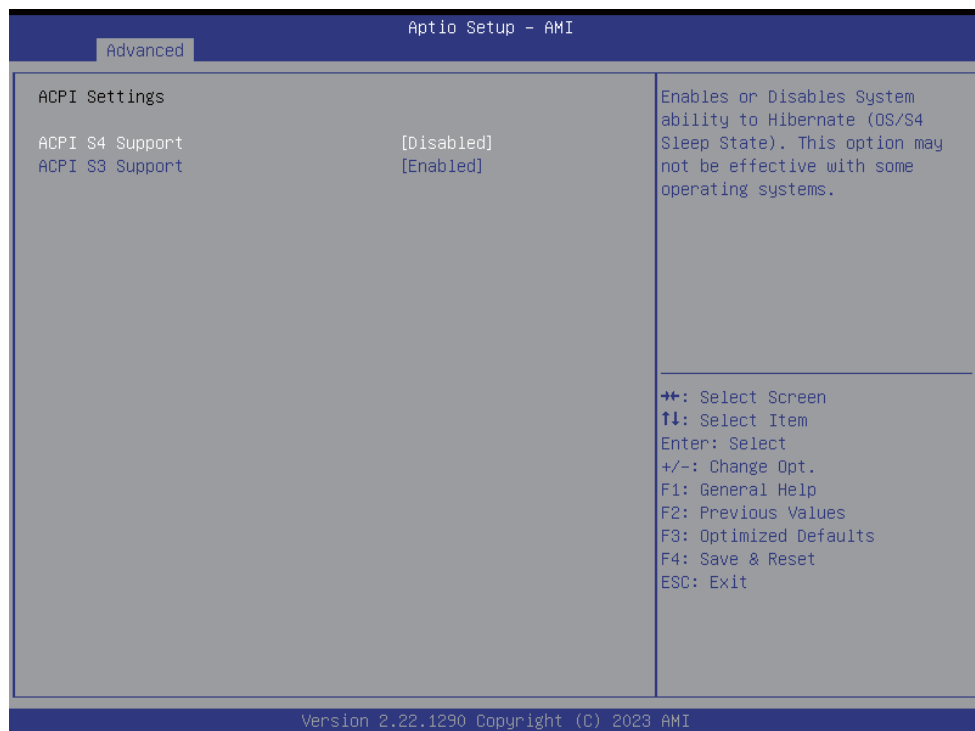


Security Device Support

To enable BIOS support security device or not, default is Enabled.

4-6-4 ACPI Settings





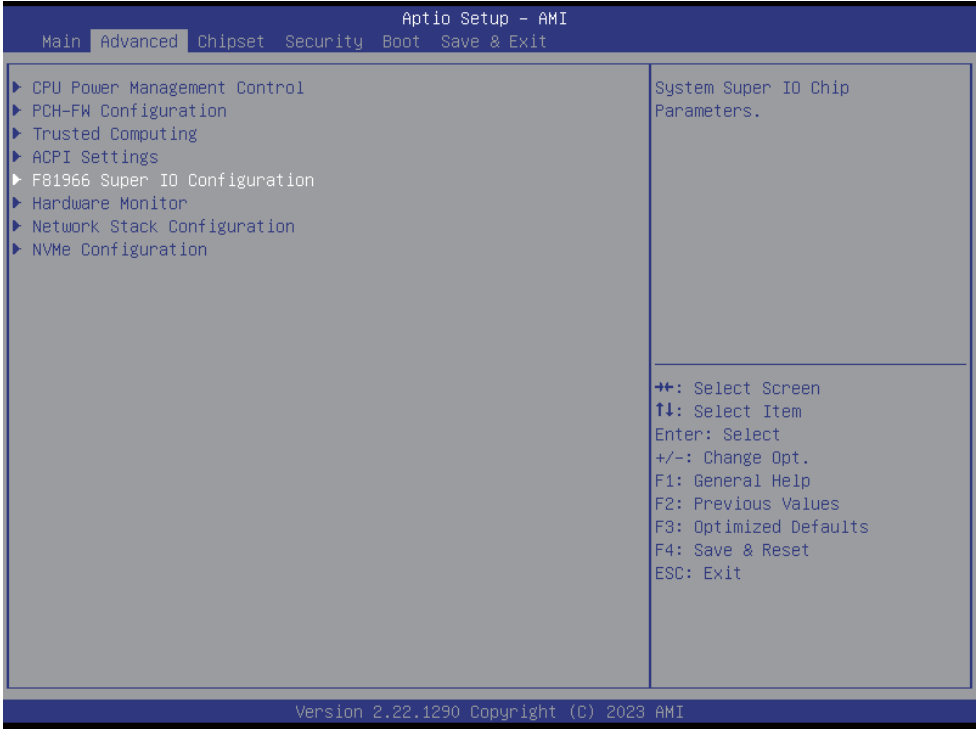
ACPI S4 Support

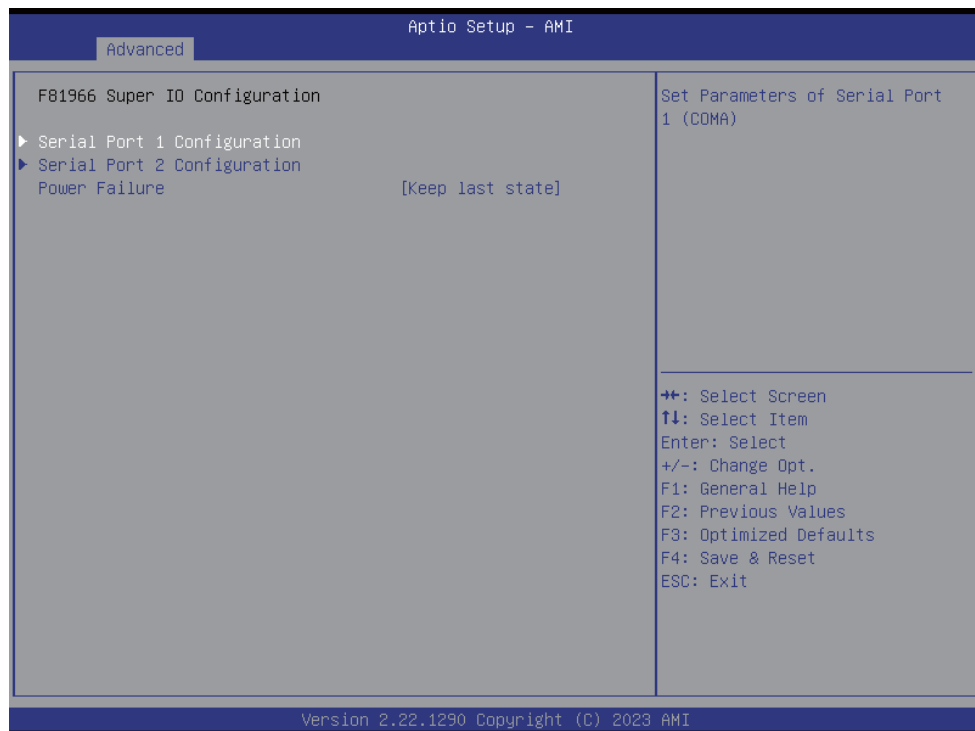
To enable support S4 mode, default is Disabled.

ACPI S3 Support

To enable support S3 mode, default is Enabled.

4-6-5 F81966 Super IO Configuration





Serial Port 1 Configuration

Please refer section 4-6-5-1

Serial Port 2 Configuration

Please refer section 4-6-5-2

Power Failure

Please refer section 4-6-5-3

4-6-5-1 ► Serial Port 1 Configuration

Aptio Setup - AMI

Advanced

Serial Port 1 Configuration

Serial Port

Device Settings

Change Settings

Serial Mode

[Enabled]

IO=3F8h; IRQ=4;

[Auto]

[RS232]

Enable or Disable Serial Port (COM)

⬅➡: Select Screen

⬆⬆: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F2: Previous Values

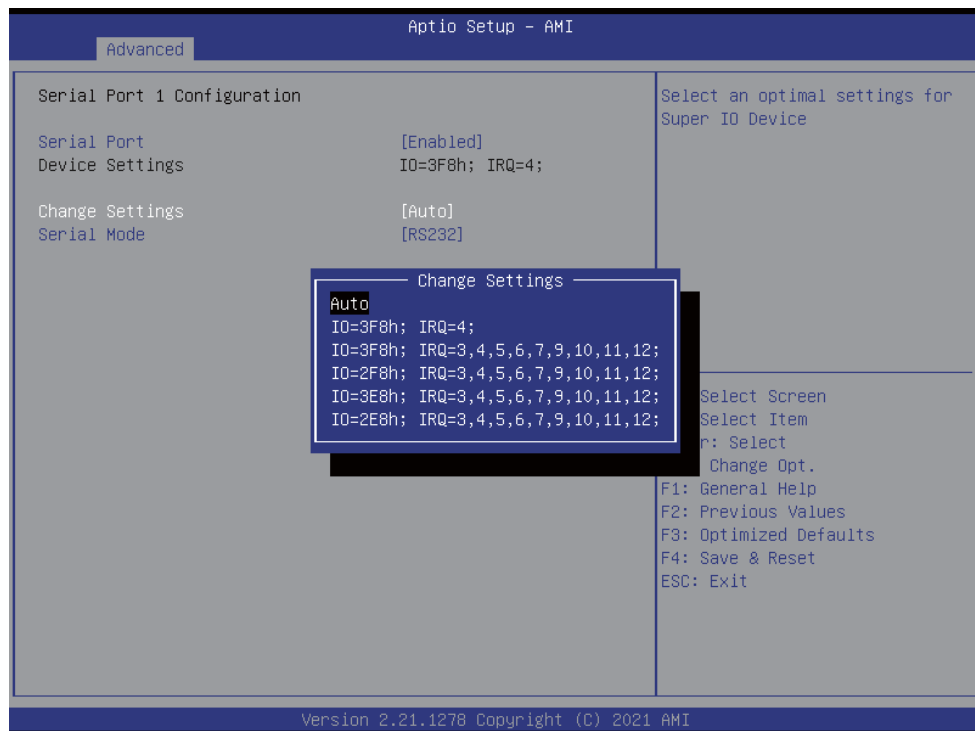
F3: Optimized Defaults

F4: Save & Reset

ESC: Exit

Version 2.21.1278 Copyright (C) 2021 AMI

To Enable Serial port or not, default is Enabled.



Change Settings, default is Auto.

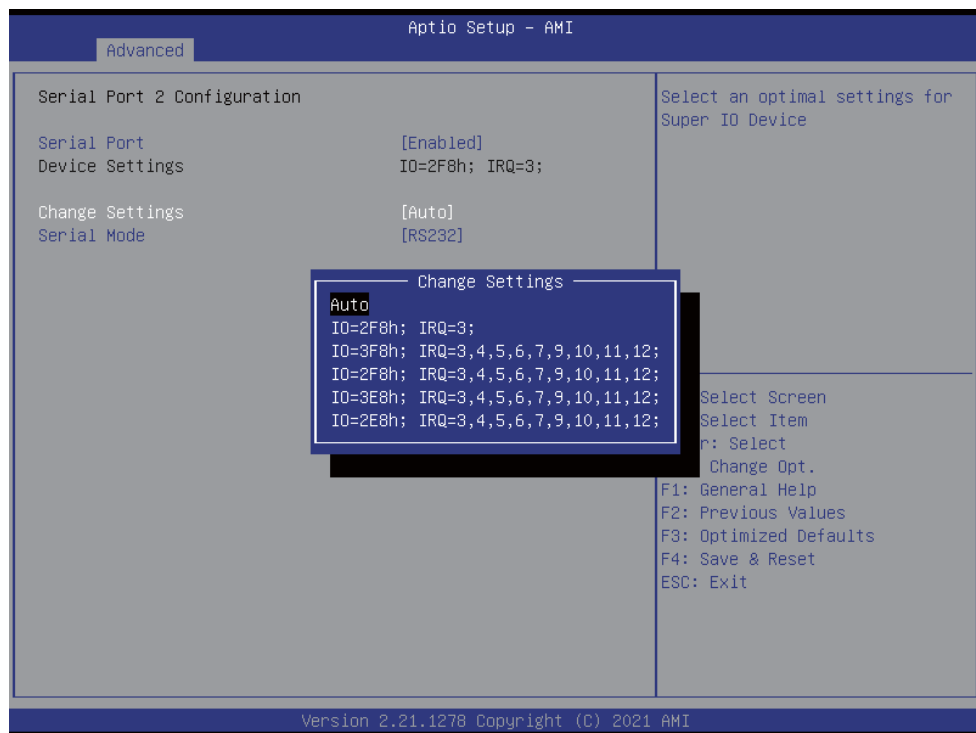


To select the Serial port to RS232 / RS422 / RS485, default is RS232.

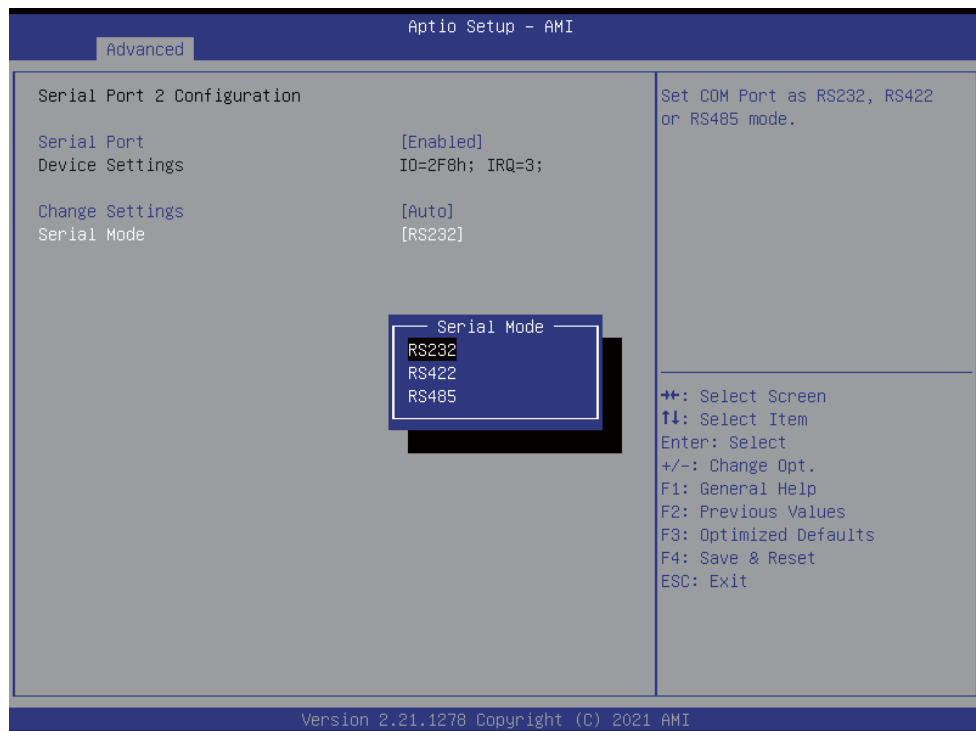
4-6-5-2 ► Serial Port 2 Configuration



To Enable Serial port or not, default is Enabled.

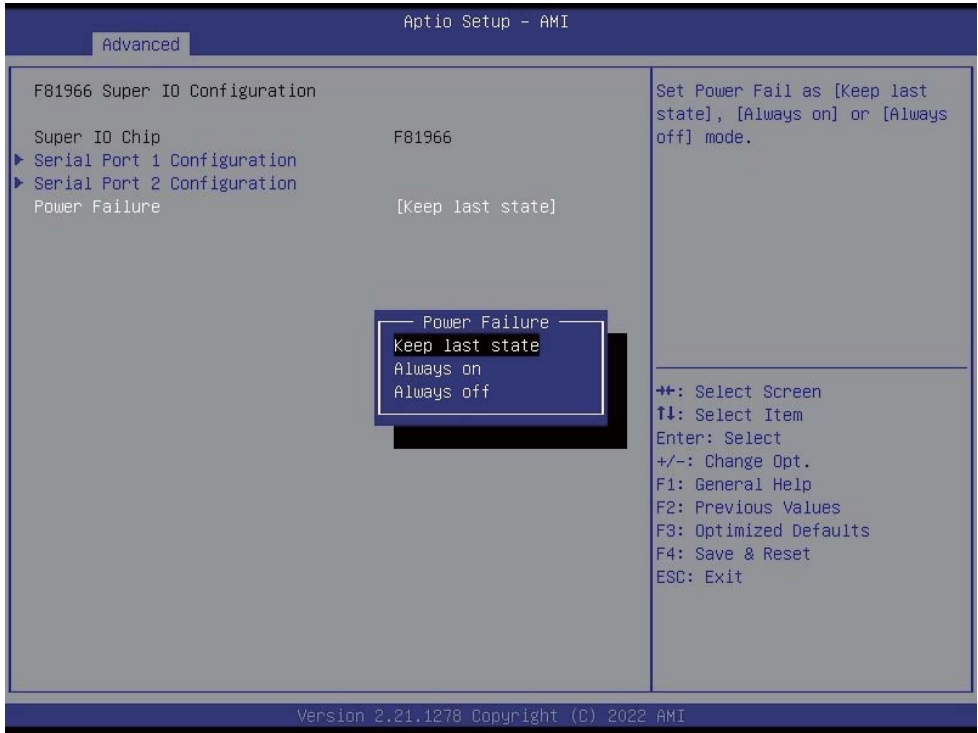


Change Settings, default is Auto.



To select the Serial port to RS232 / RS422 / RS485, default is RS232.

4-6-5-3 ► Power Failure



To select the power behavior after power fail, default is Keep last state.

4-6-6 Hardware Monitor

Advanced

Aptio Setup - AMI

Pc Health Status

CPU Temperature

: +27 °C

SYSTEM Temperature

: +27 °C

CPU Fan

: 8287 RPM

VCCORE

: +0.728 V

VCCIN_AUX

: +1.800 V

VDD2

: +1.096 V

VBAT

: +3.152 V

+/: Select Screen

↑↓: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F2: Previous Values

F3: Optimized Defaults

F4: Save & Reset

ESC: Exit

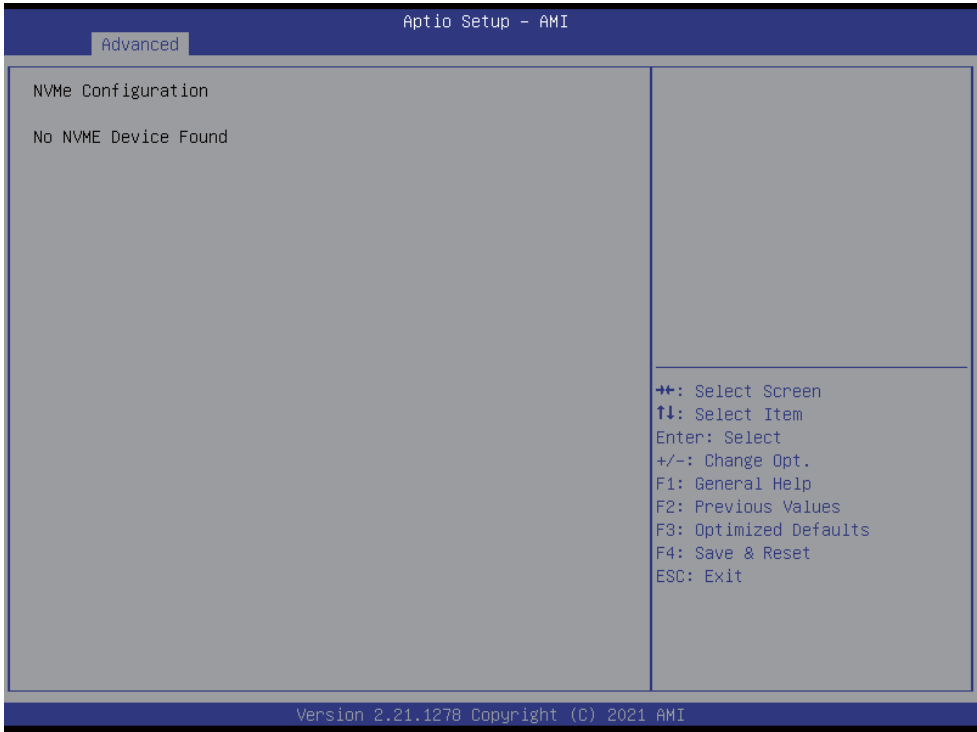
Version 2.22.1290 Copyright (C) 2023 AMI

4-6-7 Network Stack Configuration



To enable the Network stack or not, default is Disabled.

4-6-8 NVMe Configuration



To detect NVMe storage automatically

4-7 Chipset



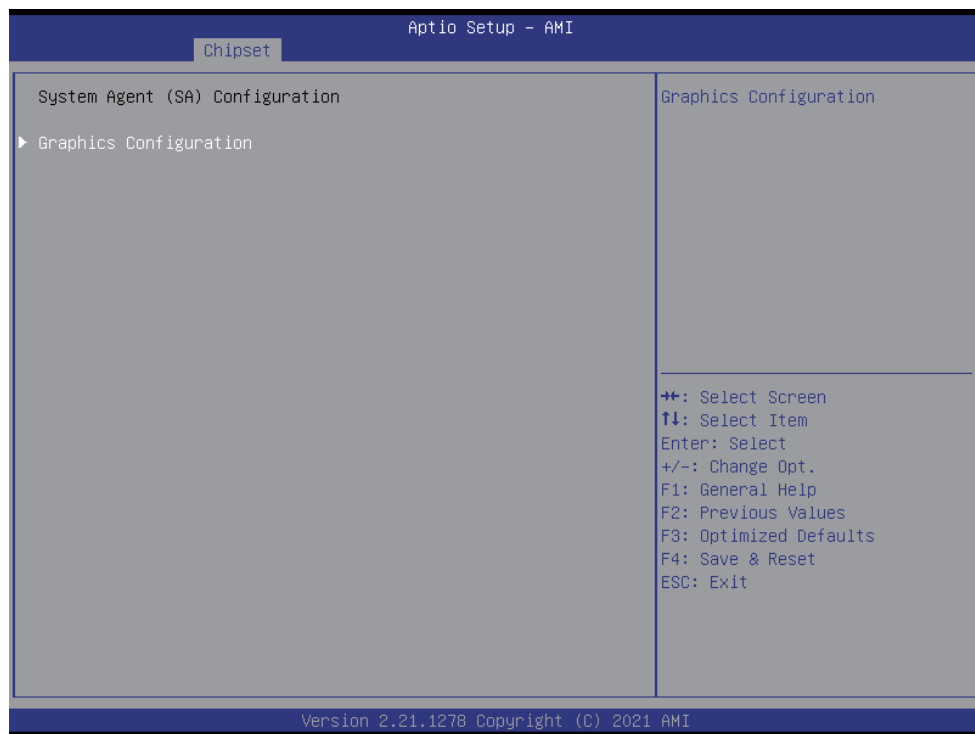
System Agent (SA) Configuration.

Please refer section 4-7-1

PCH-IO Configuration.

Please refer section 4-7-2

4-7-1 System Agent (SA) Configuration



Graphics Configuration.

Please refer section 4-7-1-1

4-7-1-1 ► Graphics Configuration



Primary Display

Primary display. The optional settings are: Auto, IGFX, PEG Slot, PCH PCI

Internal Graphics

Graphics Translation Table Size. The optional settings are: Auto, Disabled, Enabled,

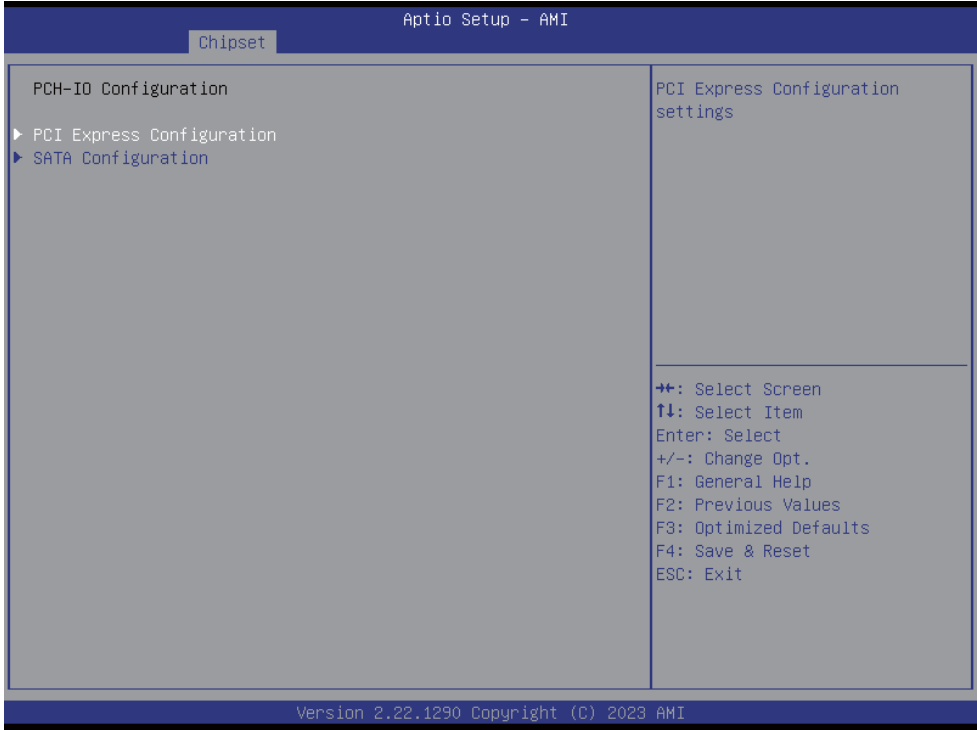
GTT Size

The optional settings are: 2MB, 4MB, 8MB(default)

Aperture Size

The optional settings are: 256MB(default), 512MB, 1024MB

4-7-2 PCH-IO Configuration



PCI Express Configuration.

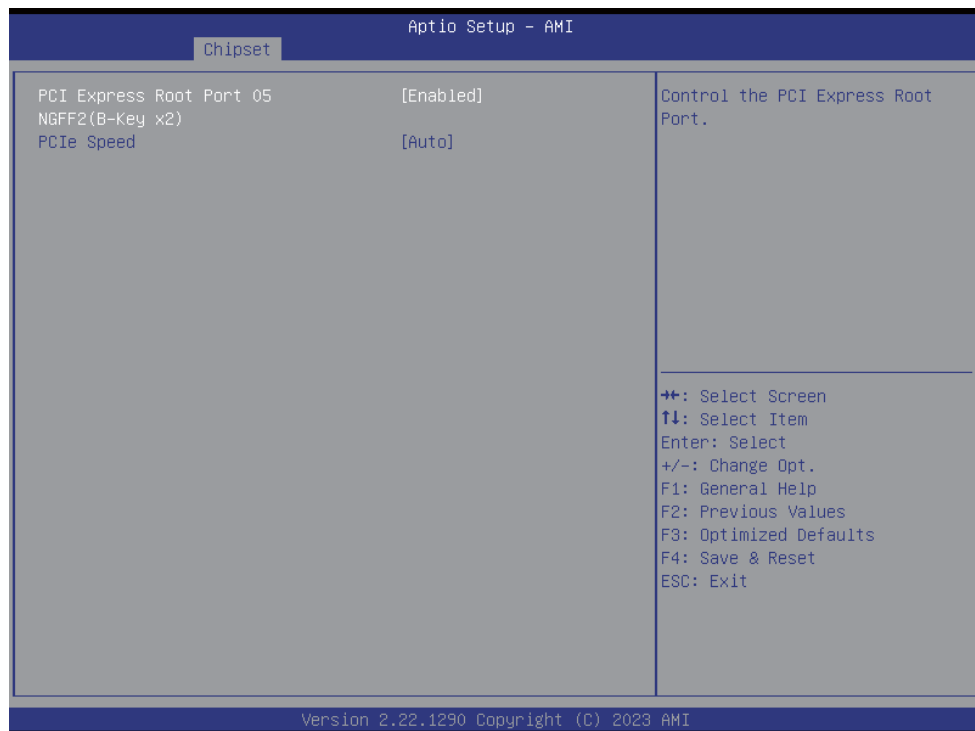
Please refer section 4-7-2-1

SATA Configuration.

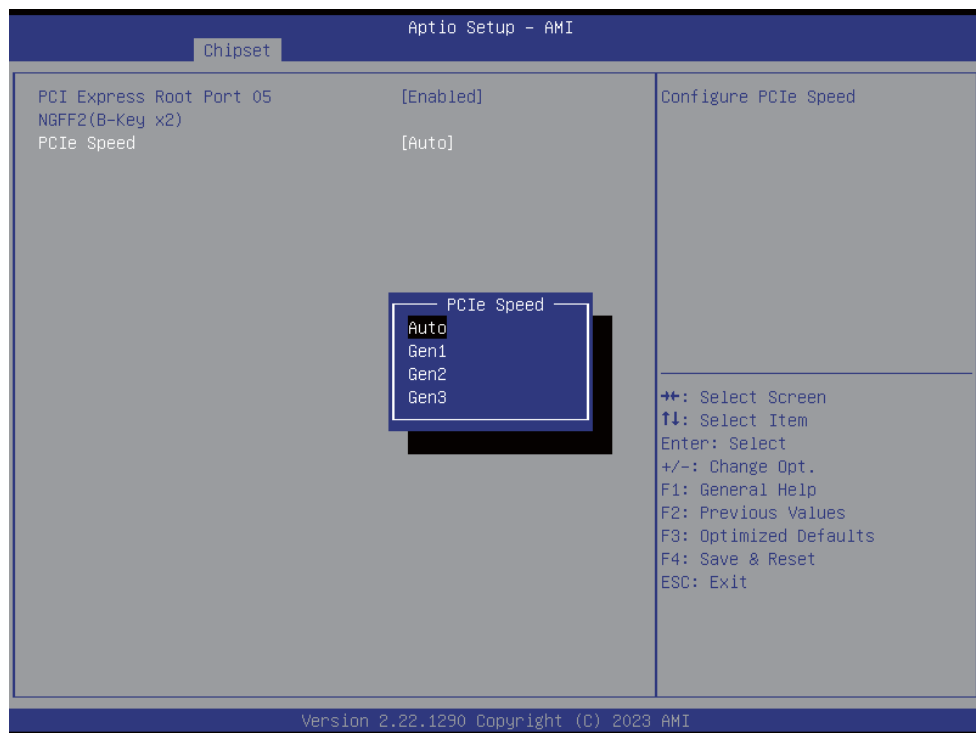
Please refer section 4-7-2-2

4-7-2-1 ► PCI Express Configuration





The optional settings are: Enabled(default), Disabled.



To select PCI Express port speed. The optional settings are: Auto(default), Gen1, Gen2, Gen3

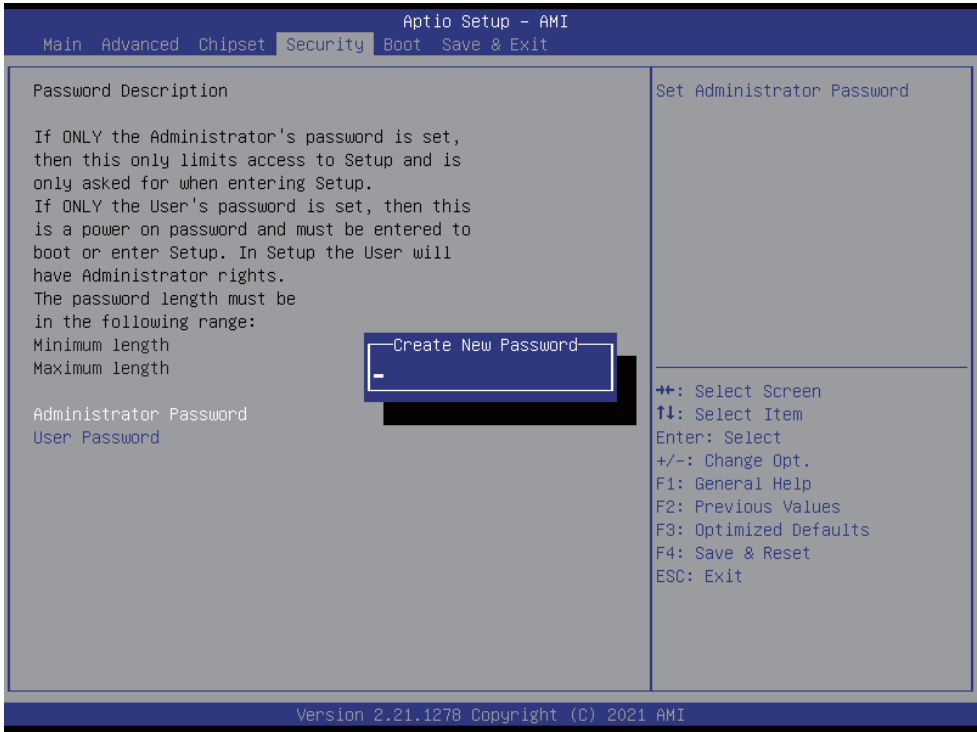
4-7-2-2 ► SATA Configuration



SATA Controller

Use this item to Enable or Disable SATA Device.

4-8 Security

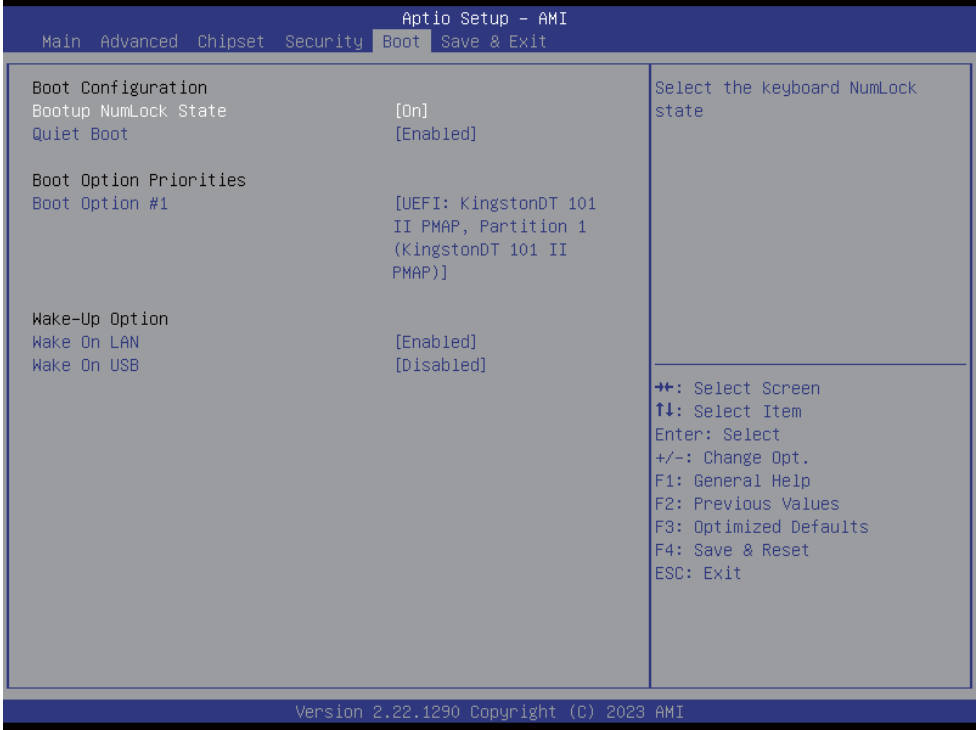


Administrator Password

User Password

To set up an Administrator or an User password

4-9 Boot



Bootup NumLock State

To select Power-on state for NumLock, default is <On>

Quiet Boot

The optional settings are: Enabled(default), Disabled.

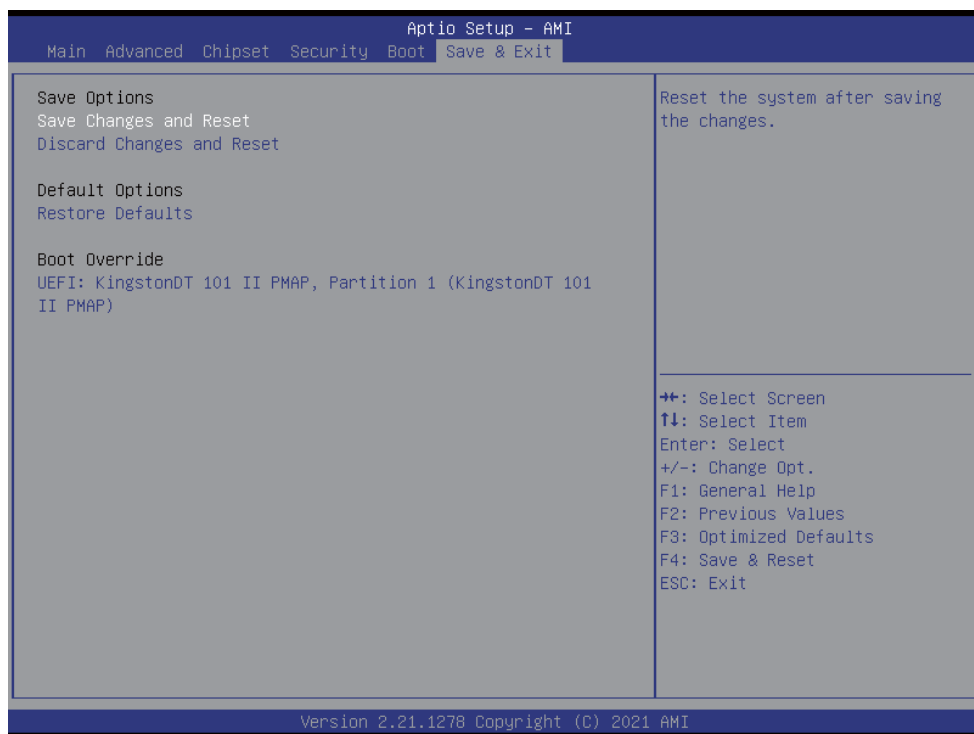
Wake-Up On LAN

The optional settings are: Enabled(default)., Disabled

Wake-Up On USB

The optional settings are: Enabled, Disabled(default).

4-10 Save & Exit



Save Change and Reset

Save configuration and reset

Discard Changes and Reset

Reset without saving the changes

Restore Defaults

To restore the optimal default for all the setup options

4-11 How to update Insyde BIOS

Under DOS Mode

STEP 1. Prepare a bootable disc.

(Storage device could be USB FDD or USB pen drive.)

STEP 2. Copy utility program to your bootable disc. You may download it from our website.

STEP 3. Copy the latest BIOS for your LEX motherboard from our website to your bootable disc.

STEP 4. (Here take 2I130DW as an example, please enter your motherboard's name)

Insert your bootable disc into X: (X could be C:, A: or others.

It depends on which type of storage device you use.)

Start the computer and type

X:\: H2OFFT-D.EXE 2I130DWA2.ROM -BIOS -ALL

2I130DWA2.ROM is the file name of the latest BIOS.

It may be 2I130DWA1.ROM or 2I130DWA2.ROM, etc.

Please leave one space between .ROM & -BIOS -ALL

By Bay Trail series mainboard, please type

X:\: H2OFFT-D.EXE 2I130DWA2.ROM -BIOS -ALL

-BIOS : Flash BIOS region

-ALL : Flash all

STEP 5. Press ENTER and the BIOS will be updated,
Computer will restart automatically.

Appendix B: Resolution list

640 x 480 x (256 / 16bit / 32bit)
800 x 600 x (256 / 16bit / 32bit)
1024 x 768 x (256 / 16bit / 32bit)
1152 x 864 x (256 / 16bit / 32bit)
1280 x 600 x (256 / 16bit / 32bit)
1280 x 720 x (256 / 16bit / 32bit)
1280 x 768 x (256 / 16bit / 32bit)
1280 x 800 x (256 / 16bit / 32bit)
1280 x 960 x (256 / 16bit / 32bit)
1280 x 1024 x (256 / 16bit / 32bit)
1400 x 1050 x (256 / 16bit / 32bit)
1440 x 900 x (256 / 16bit / 32bit)
1600 x 900 x (256 / 16bit / 32bit)
1600 x 1200 x (256 / 16bit / 32bit)
1680 x 1050 x (256 / 16bit / 32bit)
1920 x 1080 x (256 / 16bit / 32bit)
1920 x 1200 x (256 / 16bit / 32bit)