# 2I110D

## Intel® Tiger Lake-UP3 Core™ I / Celeron processor, DDR4 LAN / HDMI / USB / M.2 / COM

**All-In-One**

**11th gen. Intel Tiger Lake-U Core™ I / Celeron CPU**

**HDMI, eDP, 2 x M.2, USB**

**Multi-LAN, COM, 1 x Nano SIM**

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

**NO. 2I110D**
**Release date: AUG. 31. 2022**

# Contents

2I110D

User Manual edition 0.1, AUG. 2022

# 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.

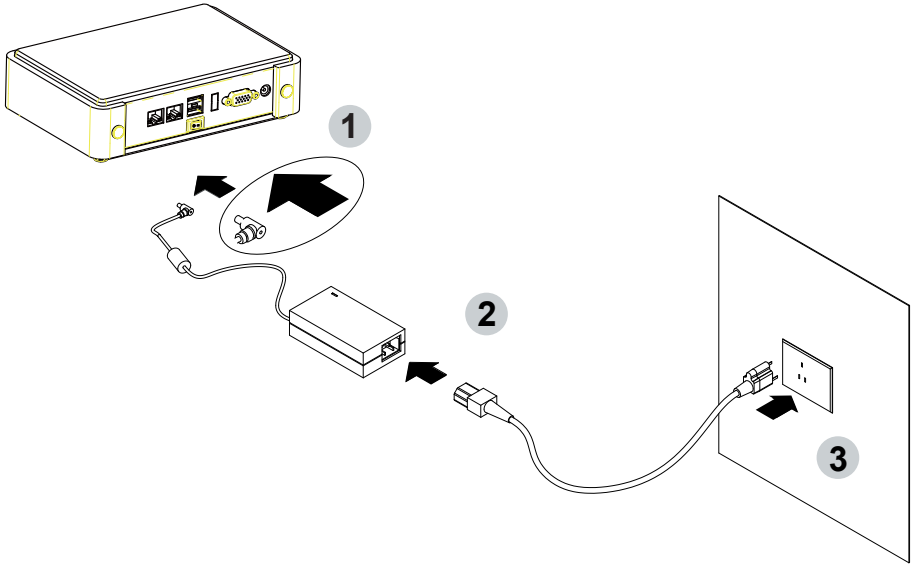
## ✱ Hardware Notice Guide

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 form 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.

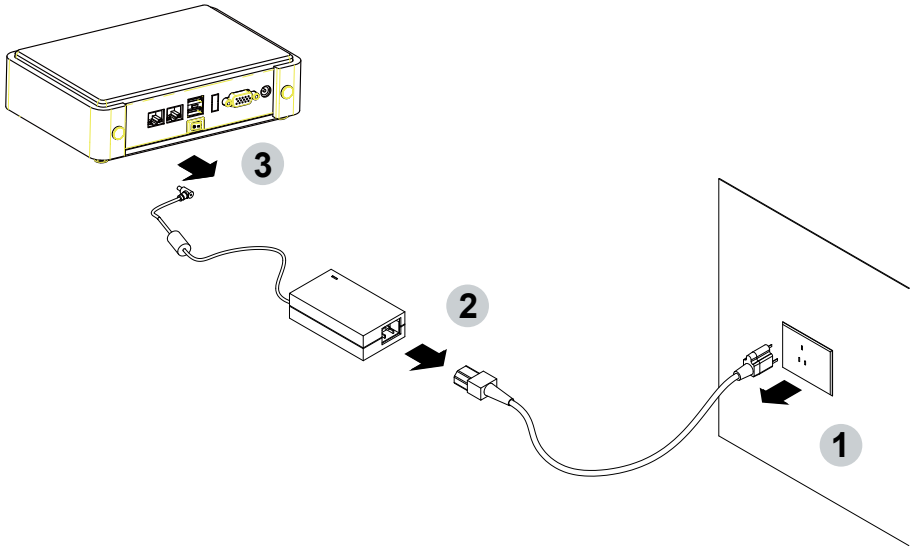
**Remark 1:**
**Always insert / unplug the DC-in horizontally & directly to / from the motherboard. DO NOT twist, it is designed to fit snugly.**
**Moreover, erratic pull / push action might cause an unpredictable damage to the component & system unit.**

## Photo 1

## Insert




## Unplug



# Chapter-1

## General Information

The 2I110D is an ultra compact (102 x 108 mm) SBC with11th Gen. Intel® Tiger Lake UP3 i7 / i5 / i3 / Celeron processor, integrated 4 x GbE LAN, 9 x USB, 2 x COM Port and HDMI, eDP display interface that offer the ideal platforms for high performance applications in Networking, Smart Automation, Machine Vision, In-vehicle, Industry 4.0 and any compact high-performance Internet of Things (IoT) applications.

The 2I110D supports high-speed data transfer interfaces such as PCIe gen3, USB 3.0, and SATA 6 Gb/s (SATA III), with one-channel DDR4 3200 MHz memory up to 32GB SODIMM slot and supports two serial ports RS232 / RS485 / RS422 jumper free auto switch by BIOS. It supports 3 ports of USB 3.0, 6 ports of USB 2.0. The expandable interfaces include 1 M.2 3042 B-key for PCI2 x 2 and USB 3.0 / 2.0 & 1 M.2 2242 M-key for PCIe x 4, mSATA (auto-detect).

## 1-1 Major Feature

1. Intel® Core i3-1115GRE Processor 2.2GHz / 3.9GHz (Quad core),
   Intel® Core i7-1185GRE Processor 1.8GHz / 4.4GHz (Quad core).
2. Intel® UHD Graphics for 11th Gen Intel® Processors, Intel® Iris® Xe Graphics.
3. DDR4 SODIMM slot x 1, up to 32GB.
4. Support 1 x 10 / 100 / 1000 Mbps & 3 x 2.5Gbps Intel LAN ports.
5. Support 2 x RS232 selectable to RS485 / RS422 by BIOS.
6. 3 x USB 3.0 and 6 x USB 2.0.
7. Support extended 1 x M.2 3042 B-Key for PCIe x 2 and USB 3.0 / 2.0 interface,
   1 x M.2 2242 M Key for PCIe x 4 / mSATA (auto-detect).
8. Support 1 SATA port
9. Hardware digital Input & Output, 4 x DI / 4 x DO, Hardware Watch Dog Timer,
   0~255 sec programmable.

## 1-2 Specification

1. **SOC:** Intel® Core i3-1115GRE Processor 2.2GHz / 3.9GHz (Quad core), Intel® Core i7-1185GRE Processor 1.8GHz / 4.4GHz (Quad core).
2. **Memory:** DDR4 SODIMM slot x 1, up to 32GB.
3. **Graphics:** Intel® UHD Graphics for 11th Gen Intel® Processors, Intel® Iris® Xe Graphics.
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:** 1 Intel I219 PHY & 3 Intel I225 LAN chipset with 2.5Gbps for PCIe x 1 V2.1.
6. **I/O Chip:** Switch chipset for 2 ports RS232 / RS422 / RS485 selected by BIOS.
7. **USB:** 3 type A USB 3.0, 6 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:** one M.2 3042 B-Key for PCIe x 2 and USB 3.0 / 2.0 interface, one M.2 2242 M-Key for PCIe x 4 / mSATA (auto-detect).
10. **BIOS:** AMI UEFI BIOS
11. **Dimension:** 102 x 108 mm
12. **Power:** On board DC +12V

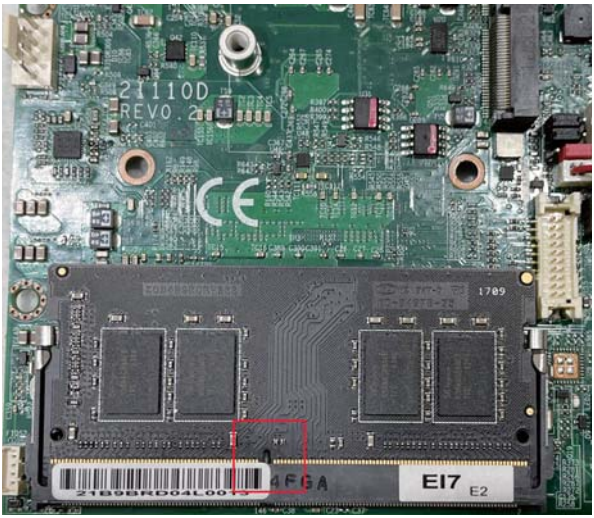
## 1-3 Installing the SO-DIMM

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

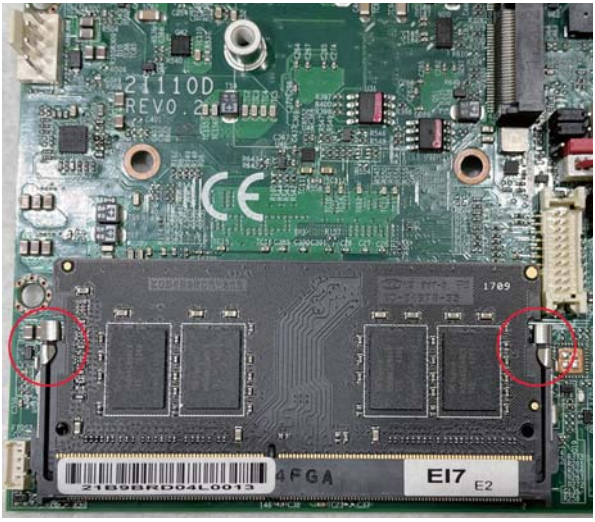

2. Press the SO-DIMM into the connector until you hear a click.

Notices:

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



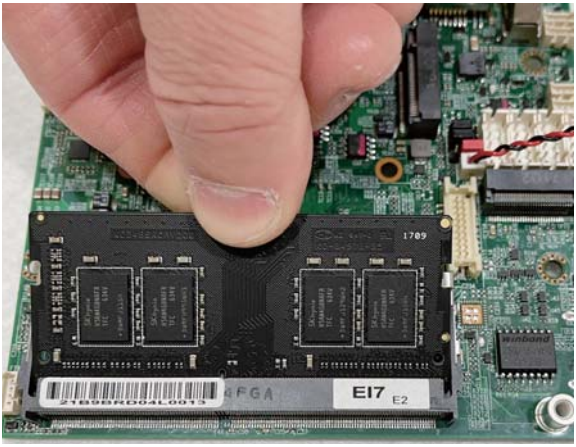

2. Make sure the retaining clips (on two sides of the slot) lock onto the notches of the card firmly.



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

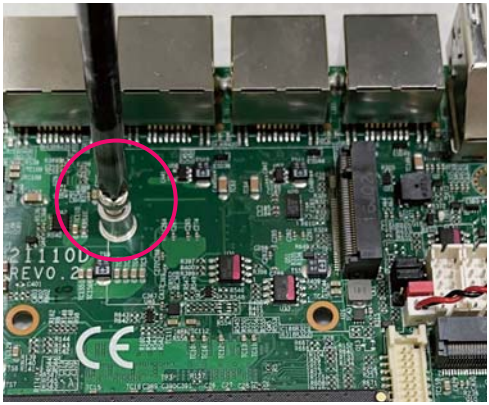
1. Release the SO-DIMM by pulling outward the two retaining clips and the SO-DIMM pops up slightly.


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

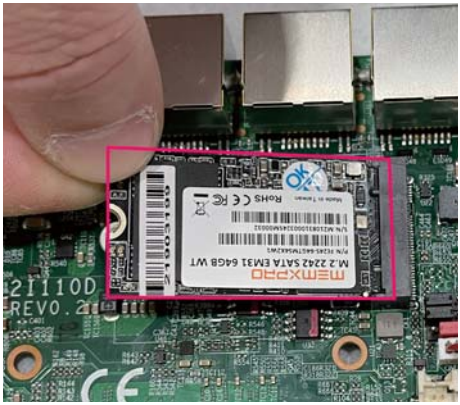


## 1-4 Directions for installing the M.2B Key Mini Card

1. Unscrew the screw on the board



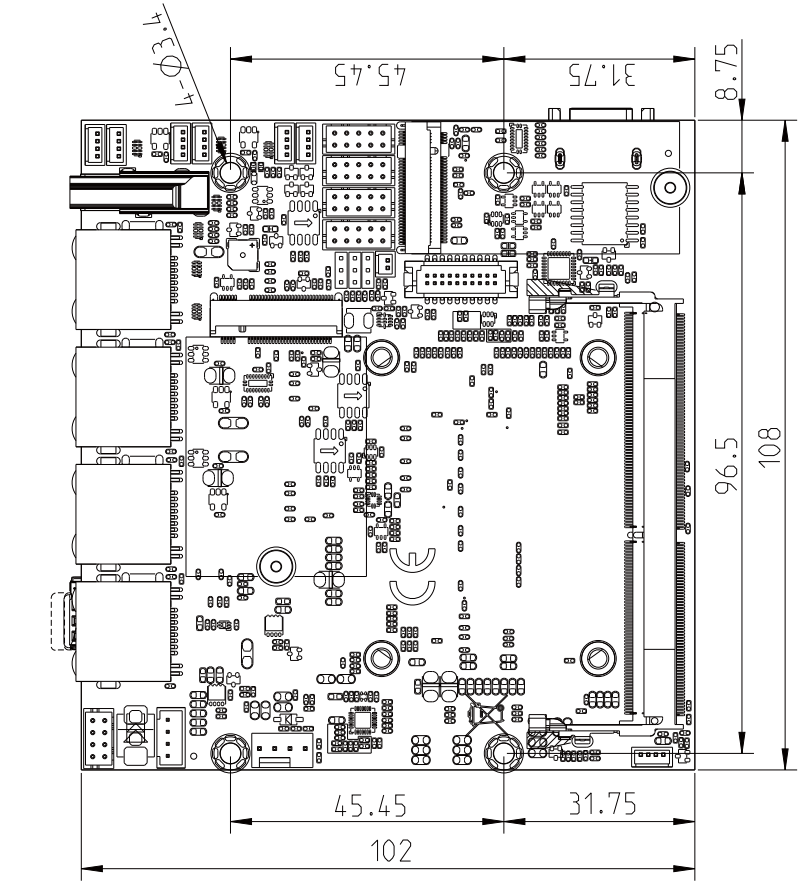
2. Plug in the Mini Card in a 45 angle

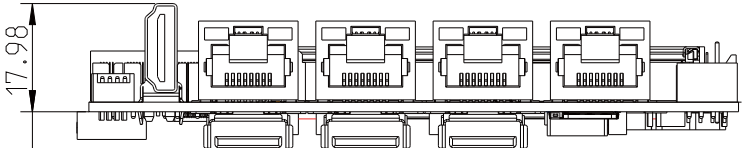


3. Gently push down the Mini Card and screw the screw back.

# Chapter-2

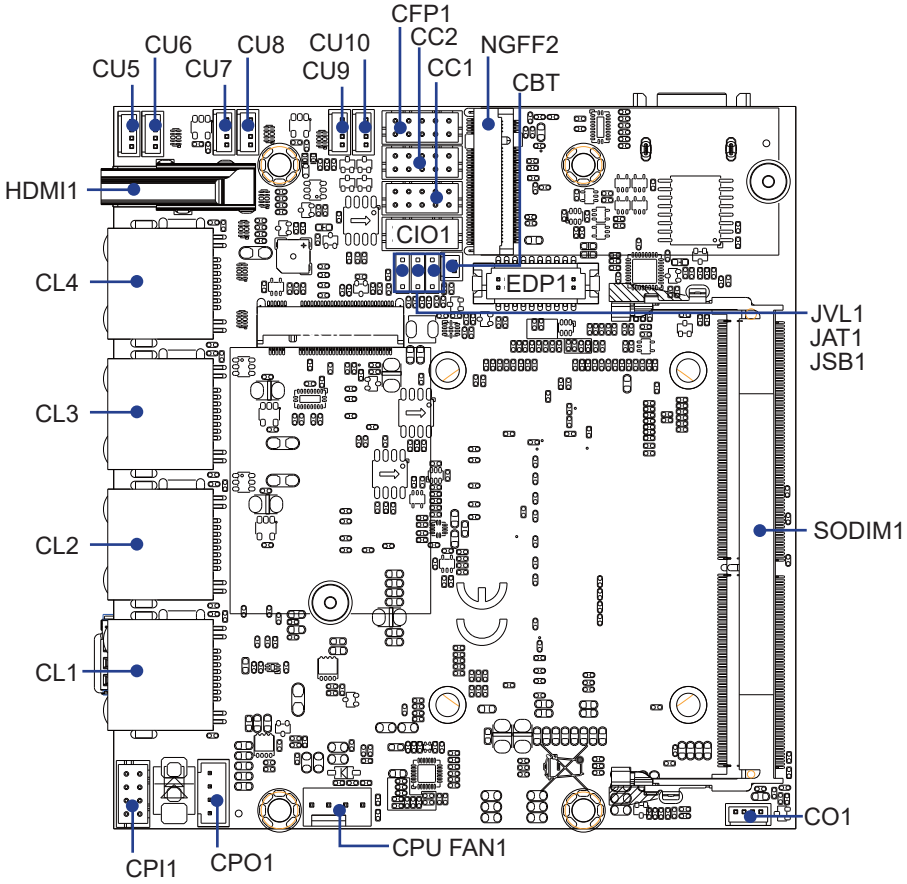
## 2-1 Dimension-2I110D



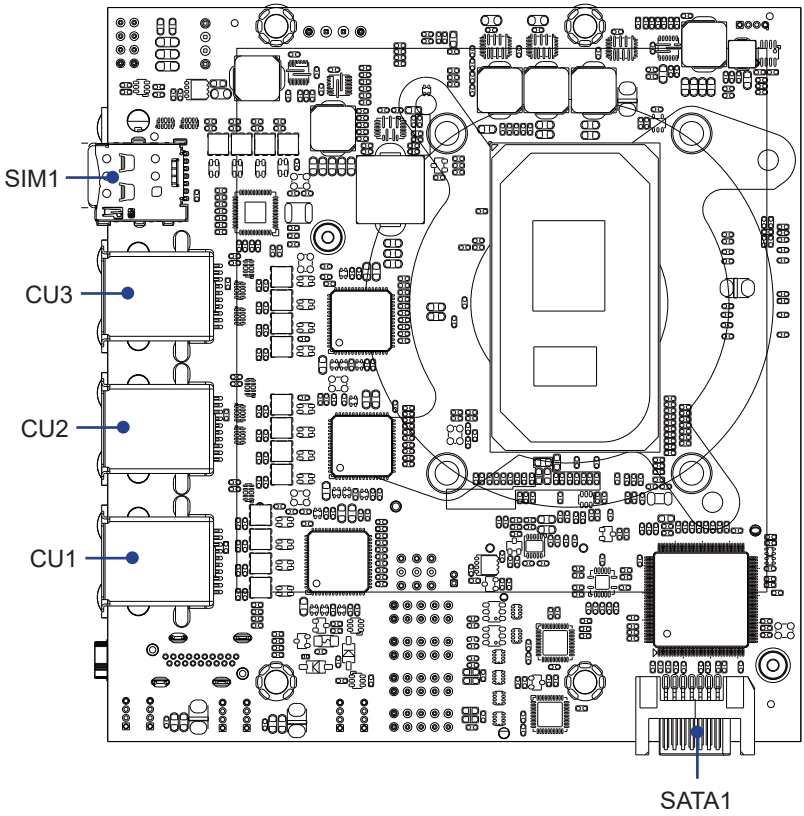
## 2-2 Layout-2I110D-Connector and Jumper

TOP



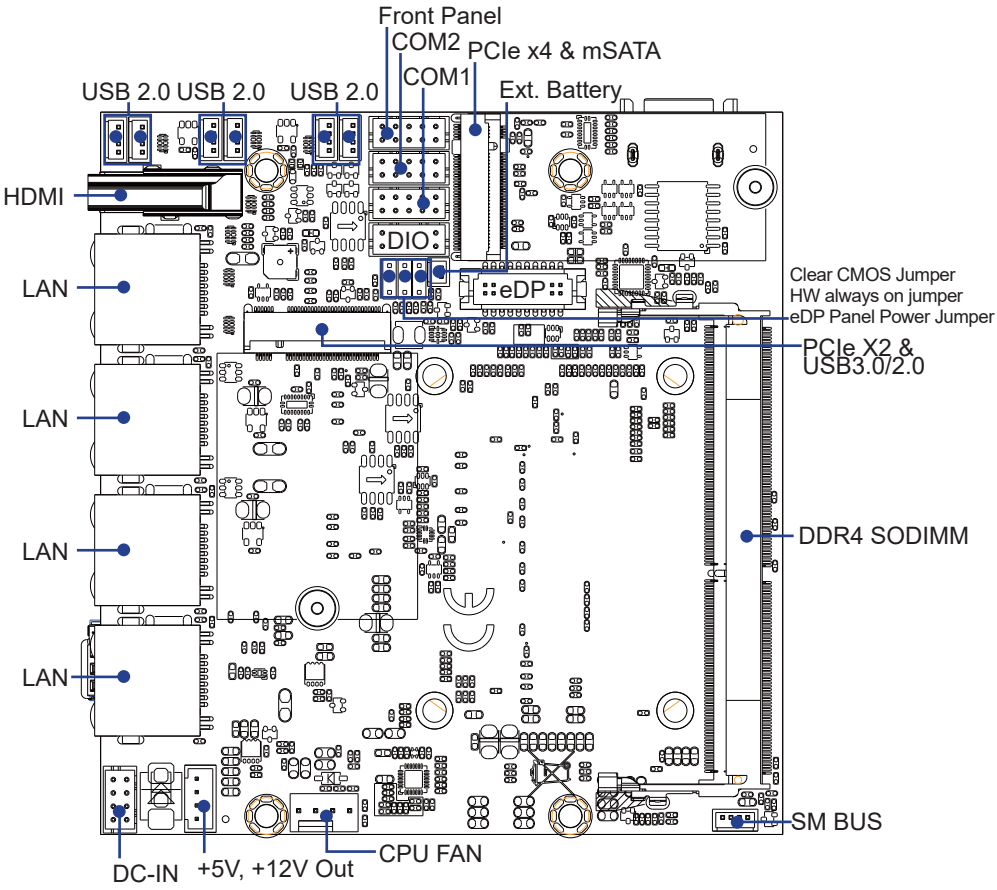
## 2-2-1 Layout-2I110D-Connector and Jumper Bottom

BOT



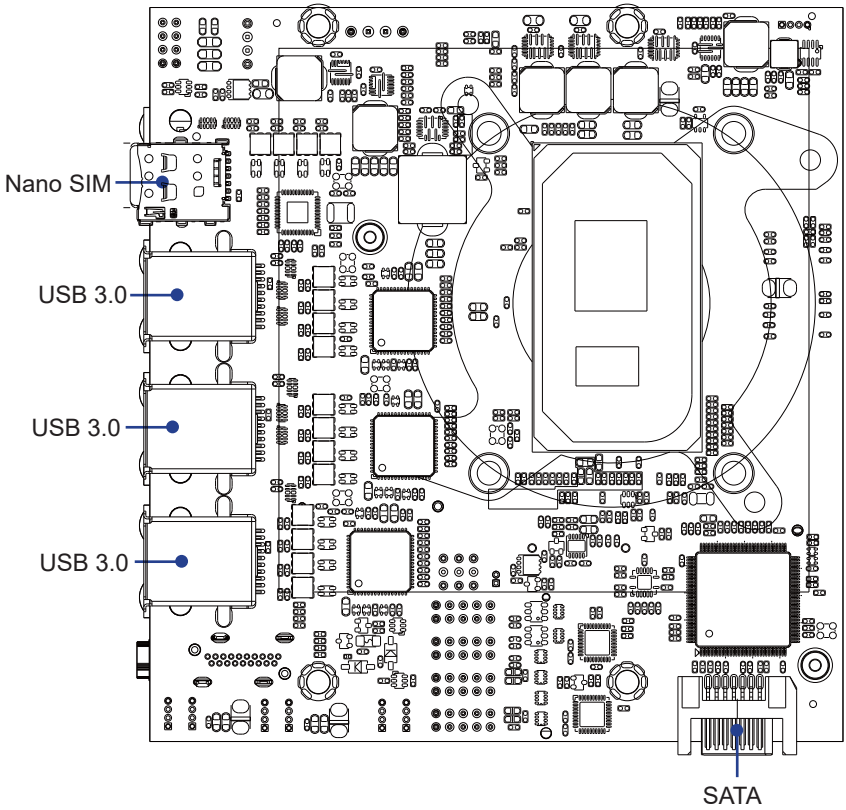
## 2-3 Layout-2I110D-Function MAP

TOP



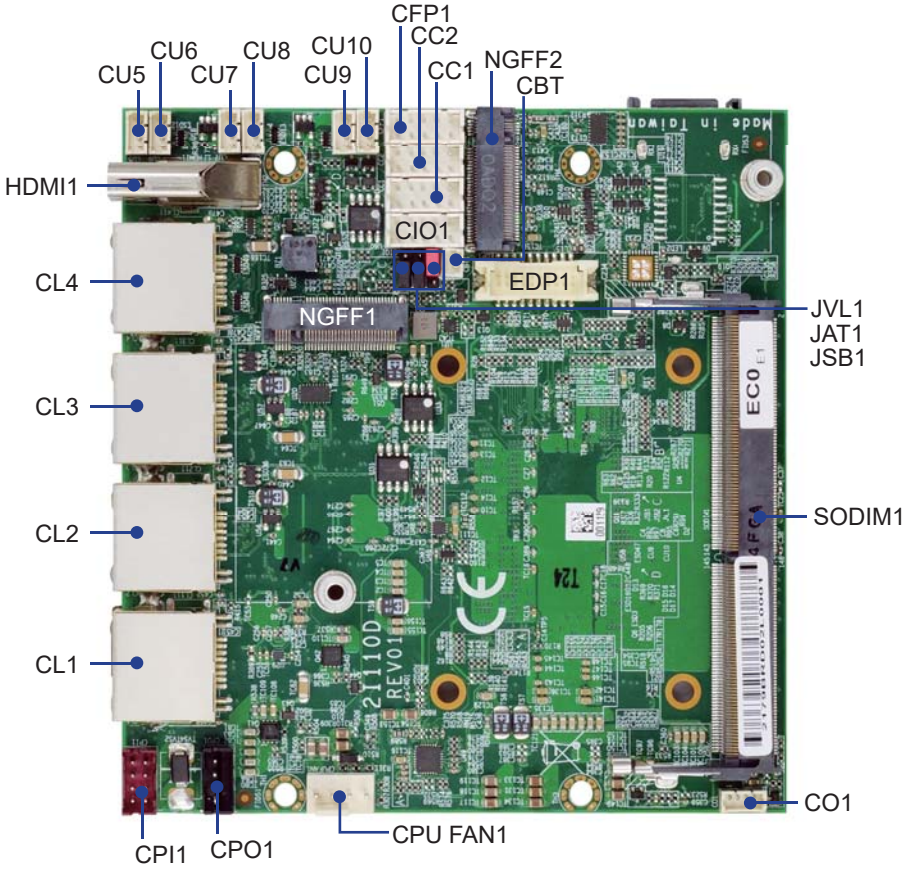
## 2-3-1 Layout-2I110D-Function MAP

BOT



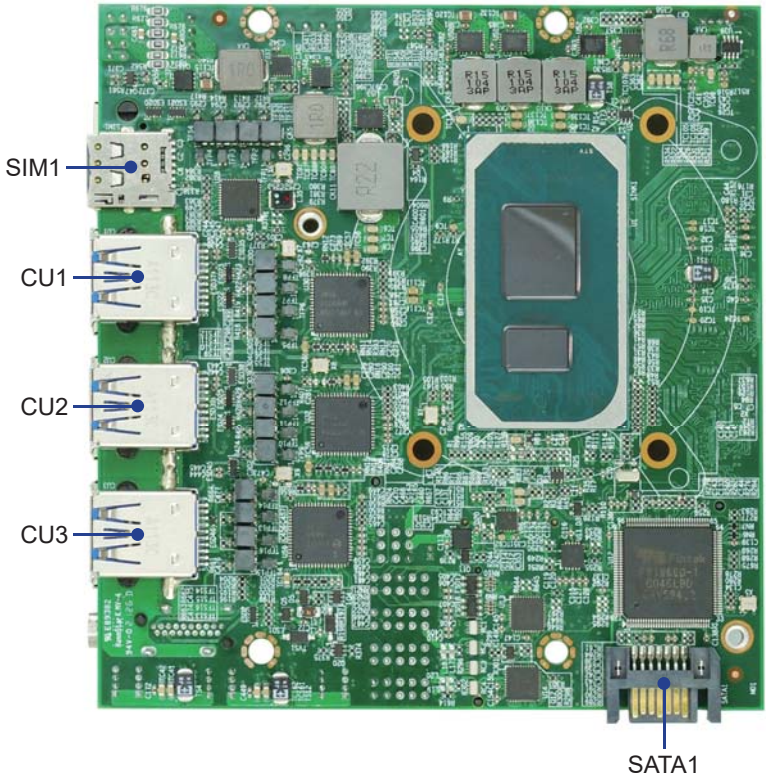
## 2-4 Diagram- 2I110D

TOP

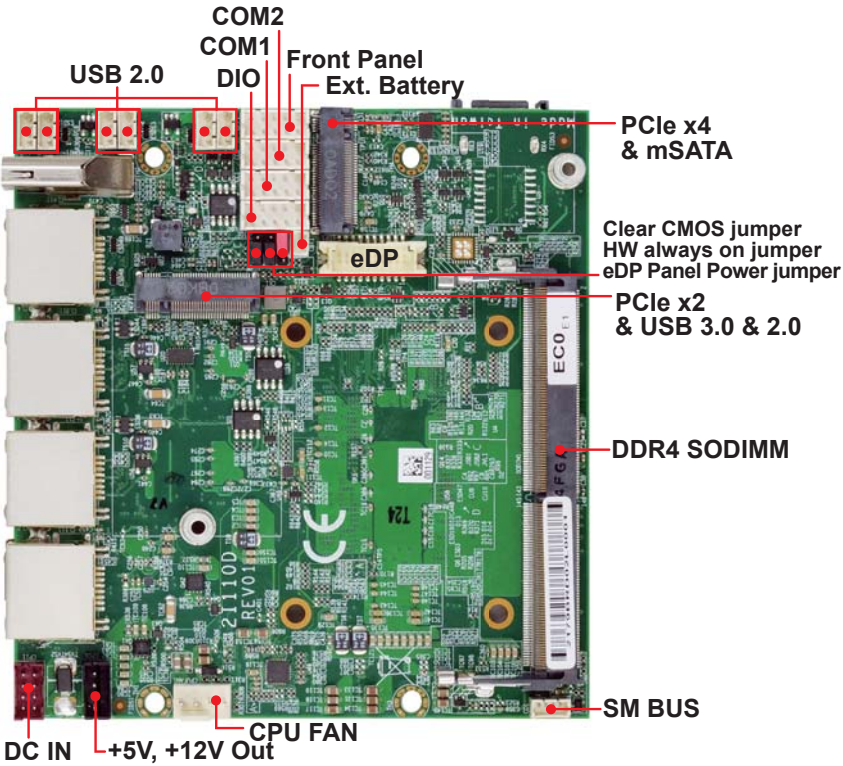


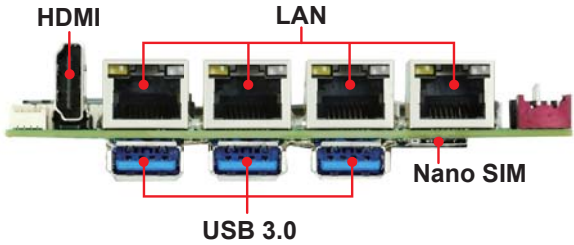
## 2-4-1 Diagram- 2I110D

BOT



## 2-5 Function MAP- 2I110D



## 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.

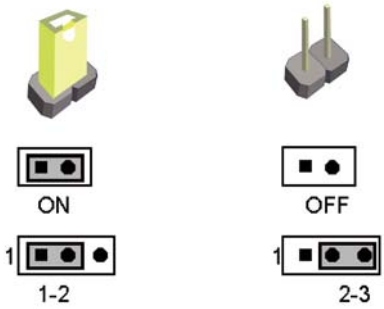



**Figure 2.2**

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

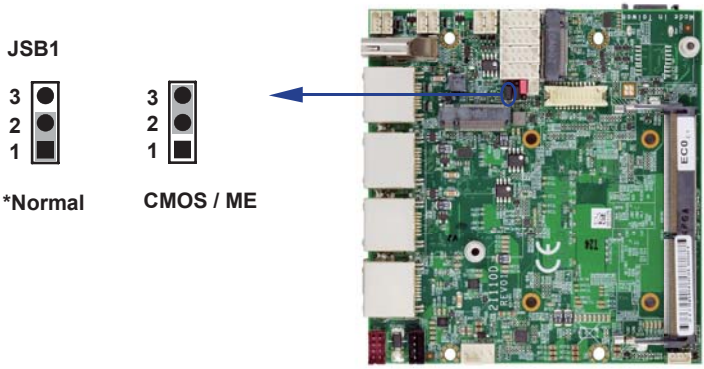
| JSB1 | DESCRIPTION |
|---|---|
| *1-2 | Normal set |
| 2-3 | CMOS / ME data clear |

Note: Do not clear CMOS unless

***1. Troubleshooting***

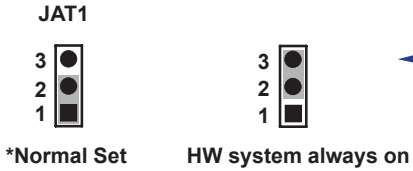
***2. Forget password***

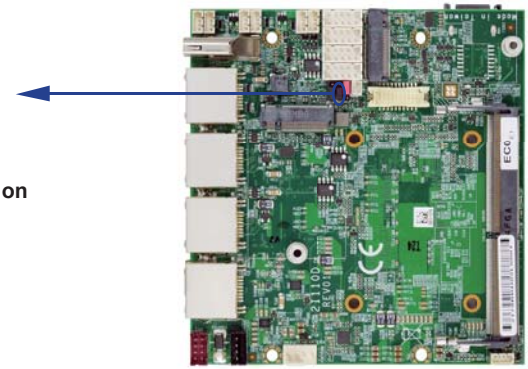
***3. You fail over-clocking system***



## 2-9 JAT1: HW system always on

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

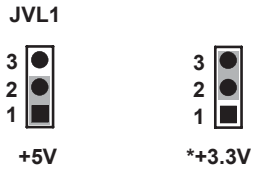


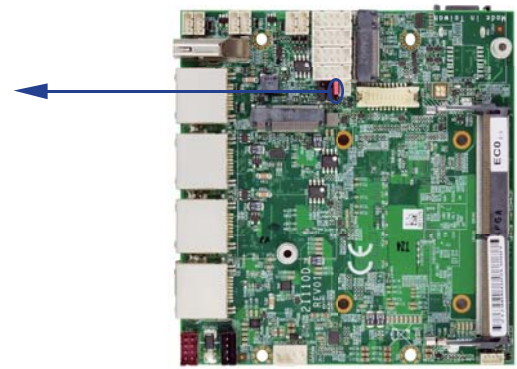



## 2-10 JVL1: eDP panel power select

| 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

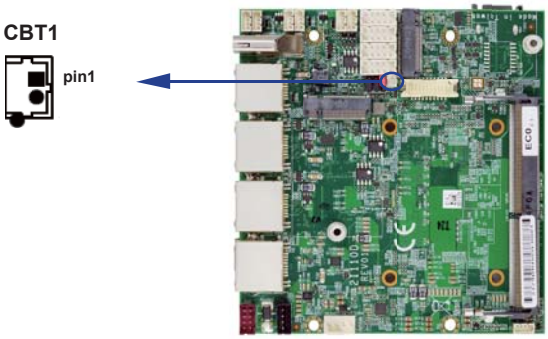
| | |
|---|---|
| CPI1: | DC 12V-IN 2x4 pin (2.0mm) Red wafer |
| CBT1: | COMS battery 1x2 pin (1.25mm) wafer |
| CC1~CC2: | COM 2x5 pin (2.0mm) wafer |
| CFP1: | Front Panel connector 2x5 pin (2.0mm) wafer |
| CIO1: | 4DI / 4DO 2x5 pin (2.0mm) wafer |
| CPU FAN1: | CPU Fan 1x4 pin (2.54mm) wafer |
| EDP1: | HDMI 2x10 pin (1.25mm) wafer |
| CU1~CU3: | USB 3.0 Type A connector |
| CU5~CU10: | USB 2.0 port 1x4 pin (1.25mm) wafer |
| CL1~CL3: | LAN RJ45 Connector |
| CO1: | SMBus 1x4 pin (1.25mm) wafer |
| CPO1: | +12V / +5V power output 4 pin (2.0mm) Black wafer |
| SATA1: | SATA connector 7 pin |
| SODIMM1: | DDR4 Channel A SODIMM H: 9.2mm |
| NGFF1: | M.2 NGFF B key sockets 75 pin H: 8.5mm |
| NGFF2: | M.2 NGFF M key sockets 75 pin H: 8.5mm |
| SIM1: | Nano SIM card socket |

## 3-2 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



## 3-3 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 |

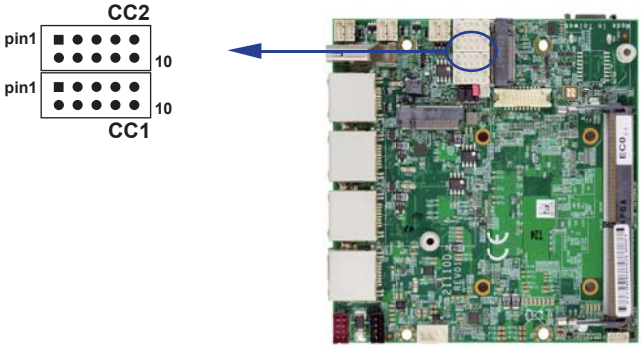
- **(RS485 Mode)**

| 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 |

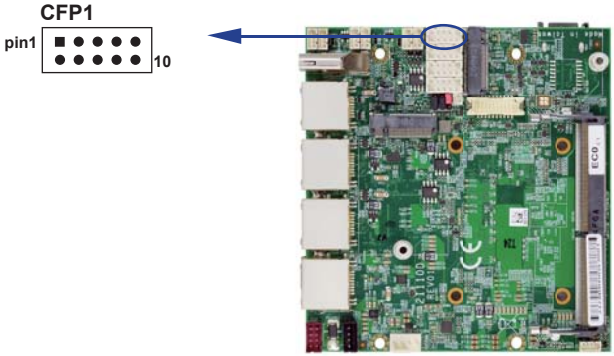
Note:
1. Pin 9 RI and Voltage setting only for COM 1/2 ports, is used BOM control.
2. Default support RS232 / RS422 / RS485 by BIOS selected, default set RS232.



## 3-4 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+ |

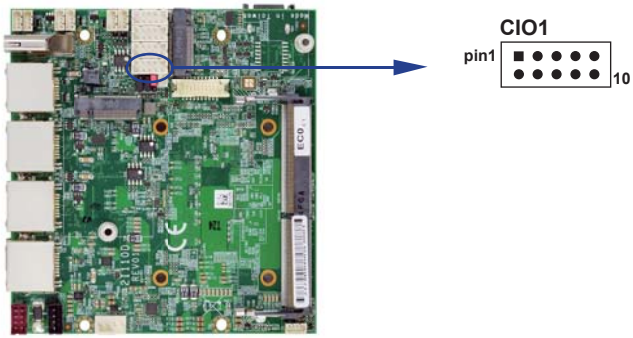


## 3-5 DIO Interface

- **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.

# 3-5-1 IO Device: F81966 DIO under Windows

## The Sample code source you can download from

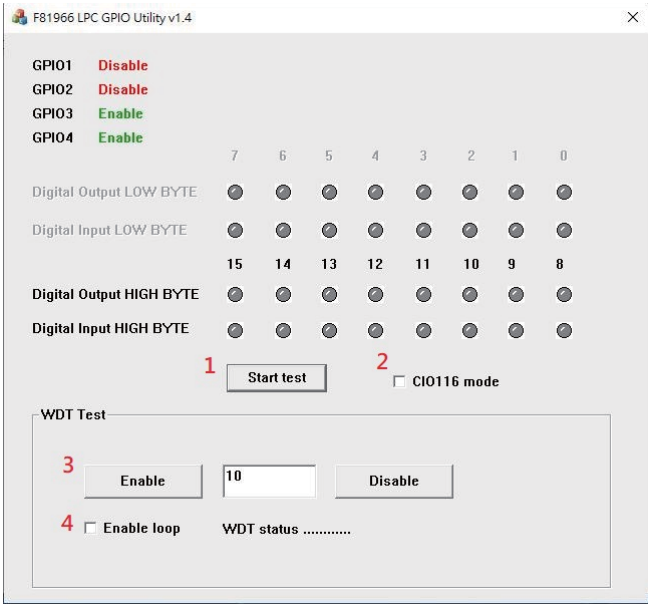
http://tprd.info/lexwiki/index.php/IO_Device:F81966_LPC_DIO_under_Windows

**Source file: F81966_LPC_GPIO_Utility_Src_v1.5.zip**

**Binary file: F81966_LPC_GPIO_Utility_Bin_x86_v1.5.zip F81966_LPC_GPIO_Utility_Bin_x64_v1.5.zip**

**F81966 DLL: F81966_DLL_x32_v1.0.zip F81966_DLL_x64_v1.0.zip**

## Introduction 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

```
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: 2I110D
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();
```

## 3-5-2 IO Device: F81966 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

**Source file: F81966_DIO_v1.1_Src_L.tar.gz**

**Binary file: F81966_DIO_v1.1_Bin_x64_L.tar.gz F81966_DIO_v1.1_Bin_x32_L.tar.gz**

**F81966 Libary: F81966_LIB_v1.1_x64_L.tar.gz F81966_LIB_v1.1_x32_L.tar.gz**

## 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: 2I110D
CIO1 needs to be controlled by CIO3

| | Digital output<br>Low Byte | | Digital iutput<br>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<br>High Byte | | Digital iutput<br>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);
```

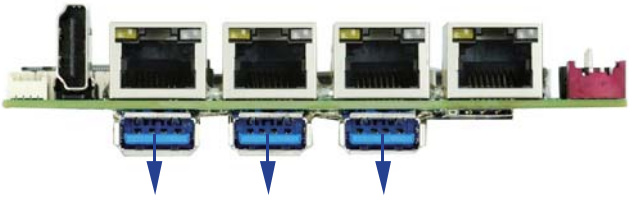
```
Disable WDT
F81966_LPC_Set_WDT_Disable();
```

## 3-6 USB Interface

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

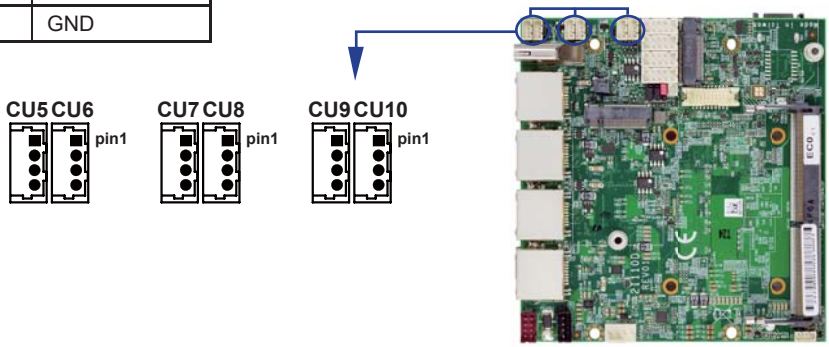
| PIN NO. | Description | PIN NO. | Description |
|---|---|---|---|
| 1 | VBUS | 5 | SS_RX- |
| 2 | D- | 6 | SS_RX+ |
| 3 | D+ | 7 | GND |
| 4 | GND | 8 | SS_TX- |
| | | 9 | SS_TX+ |

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




● **CU5~CU10: USB 2.0 port 1x4 pin (1.25mm) Wafer**

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



## 3-7 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- |

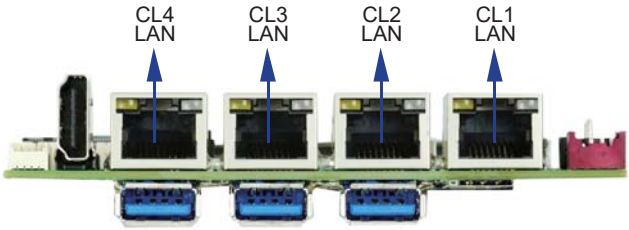
● **CL1: LAN RJ45 Connector for 1Giga LAN**
**LAN LED**

| Speed | 10Mbps | | | 100Mbps | | | 1000Mbps | | |
|---|---|---|---|---|---|---|---|---|---|
| Indicate | Back Side | | Front Side | Back Side | | Front Side | Back Side | | Front Side |
| | Link Led | ACT Led | ACT Led | Link Led | ACT Led | ACT Led | Link Led | ACT Led | ACT Led |
| LAN light | X | Orange | Orange | Green | Orange | Orange | Red | Orange | Orange |

● **CL2 / CL3 / CL4: LAN RJ45 Connector for 2.5Giga LAN**
**LAN LED**

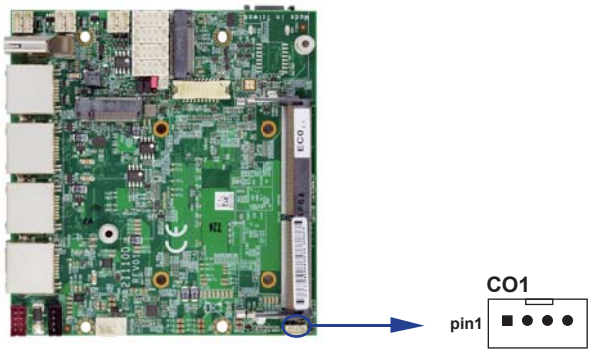
| Speed | 10Mbps | | | 100Mbps | | |
|---|---|---|---|---|---|---|
| Indicate | Back Side | | Front Side | Back Side | | Front Side |
| | Link Led | ACT Led | ACT Led | Link Led | ACT Led | ACT Led |
| LAN light | X | Orange | Orange | Green | Orange | Orange |

| 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 | X | Orange | Orange | Green | Orange | Orange |



## 3-8 CO1: SMBus 1x4 pin (1.25mm) Wafer

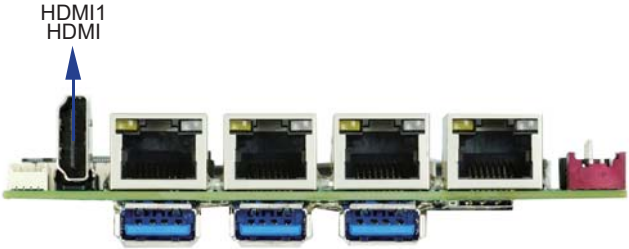
| PIN NO. | Description |
|---|---|
| 1 | +3.3V |
| 2 | GND |
| 3 | SMBus Clock |
| 4 | SMBus DATA |




## 3-9 Display Interface

**● HDMI1: HDMI Type A Connector**

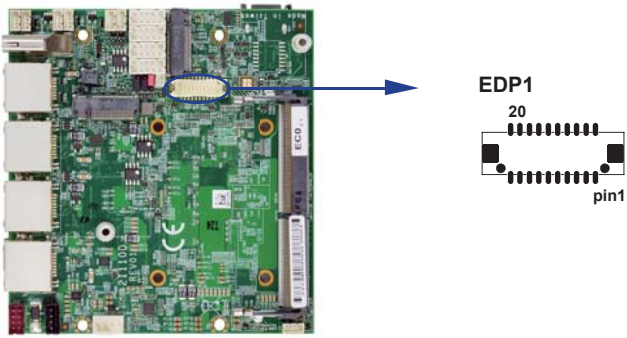
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---|---|---|---|
| 1 | TMDS DATA2+ | 2 | GND |
| 3 | TMDS DATA2- | 4 | TMDS DATA1+ |
| 5 | GND | 6 | TMDS DATA1- |
| 7 | TMDS DATA0+ | 8 | GND |
| 9 | TMDS DATA0- | 10 | TMDS CLK+ |
| 11 | GND | 12 | TMDS CLK- |
| 13 | NC | 14 | NC |
| 15 | DDC CLOCK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



● **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 | I2C Clock | 14 | +LCD (5V or 3.3V) |
| 15 | I2C Data | 16 | +LCD (5V or 3.3V) |
| 17 | eDP Aux+ | 18 | +LCD (5V or 3.3V) |
| 19 | eDP Aux- | 20 | EDP_HPD |

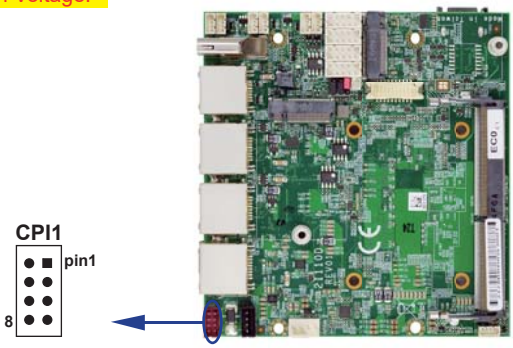
Note:
1. eDP interface support 2 lanes.
2. JVL1: eDP panel +5V / +3.3V (default) Voltage select.
3. eDP1 pin9 for panel backlight enable. +3.3V Level
4. eDP1 pin11 for panel backlight SOC dimming control
5. eDP1 pin2, 4 backlight power default set +12V



## 3-10 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 |

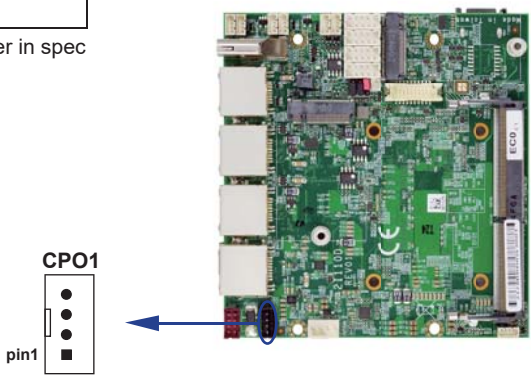
Note: 1. Very important check DC-in Voltage.




## 3-11 CPO1: DC +5 / +12V output 1x4 pin (2.0mm) Black Wafer

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

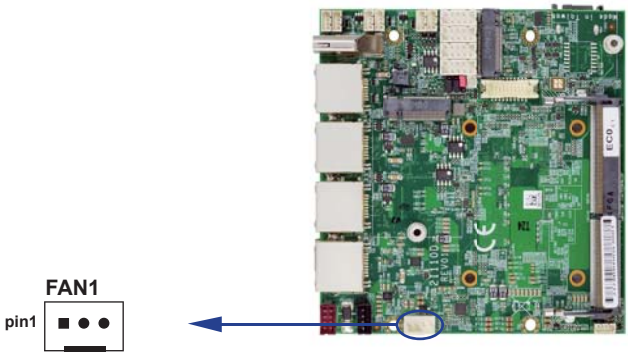
Note: Attention! Check Device Power in spec



## 3-12 CPU FAN1: CPU Fan 1x4 pin (2.54mm) Wafer (option)

| 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

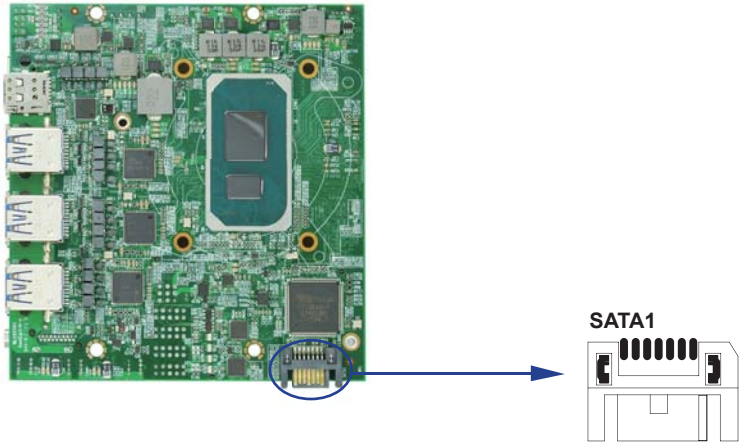


## 3-13 SATA Interface

- **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



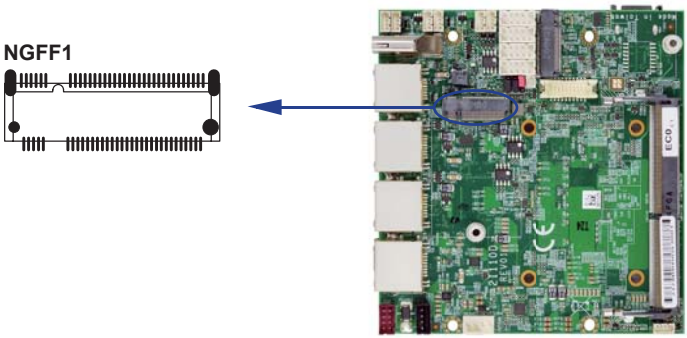
## 3-14 NGFF1 M.2 NGFF card B key sockets 75 pin

- **NGFF1: size 3042 (H=8.5)**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---|---|---|---|
| 1 | CFG3_USB3_PCIE_N | 2 | +3.3V |
| 3 | GND | 4 | +3.3V |
| 5 | GND | 6 | FULL_CARD_PWR_N |
| 7 | USB2_P4_DP | 8 | W_DISABLE_1_N |
| 9 | USB2_P4_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 | M2_PERn1_U3Rn | 28 | NC |
| 31 | M2_PERp1_U3Rp | 30 | SIM_RST_M2 |
| 33 | GND | 32 | SIM_CLK_M2 |
| 35 | M2_PETn1_U3Tn | 34 | SIM_DATA_M2 |
| 37 | M2_PETp1_U3Tp | 36 | SIM_PWR_M2 |
| 39 | GND | 38 | NC |
| 41 | M2_PERn0 | 40 | NC |
| 43 | M2_PERp0 | 42 | NC |
| 45 | GND | 44 | NC |
| 47 | M2_PETn0 | 46 | NC |
| 49 | M2_PETp0 | 48 | NC |
| 51 | GND | 50 | M2_PRST_N |
| 53 | REFCLK_N | 52 | SRCCLKREQ_N |
| 55 | REFCLK_P | 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 |
| 73 | GND | 72 | +3.3V |
| 75 | CFG2 power select | 74 | +3.3V |

Note: 1. WWAN Module For 3.7V by OEM



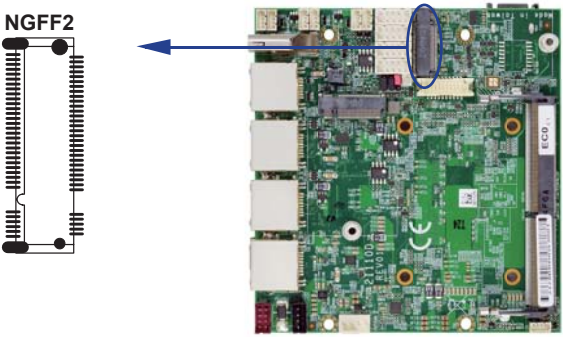
## 3-15 NGFF2 M.2 NGFF card M key sockets 75 pin

- **NGFF2: size 2242 (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_ MSRp | 42 | NC |
| 43 | PCIE4_Rp0_ MSRn | 44 | NC |
| 45 | GND | 46 | NC |
| 47 | PCIE4_Tn0_ MSTn | 48 | NC |
| 49 | PCIE4_Tp0_ MSTp | 50 | M2_PRST_N |
| 51 | GND | 52 | SRCCLKREQ_N |
| 53 | CLK_SRC0_DN | 54 | NC |

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---|---|---|---|
| 55 | CLK_SRC0_DP | 56 | NC |
| 57 | GND | 58 | NC |
| M KEY | | | |
| 67 | NC | 68 | NC |
| 69 | PCIe_SATA#_DET | 70 | +3.3V |
| 71 | GND | 72 | +3.3V |
| 73 | GND | 74 | +3.3V |
| 75 | GND | | |

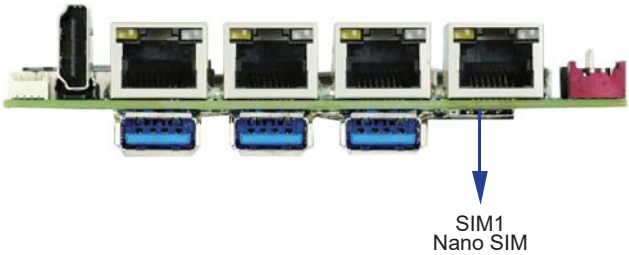
Note:
1. NGFF2 support mSATA / PCIe Auto detect.
2. NGFF2 support PCIe x4 GEN4 NVMe device.



## 3-16 SIM1: 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. NGFF1 Pin 30, 32, 34, 36, 66 for SIM card reader use.



## 3-17 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 |
| CU5~CU10 | 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

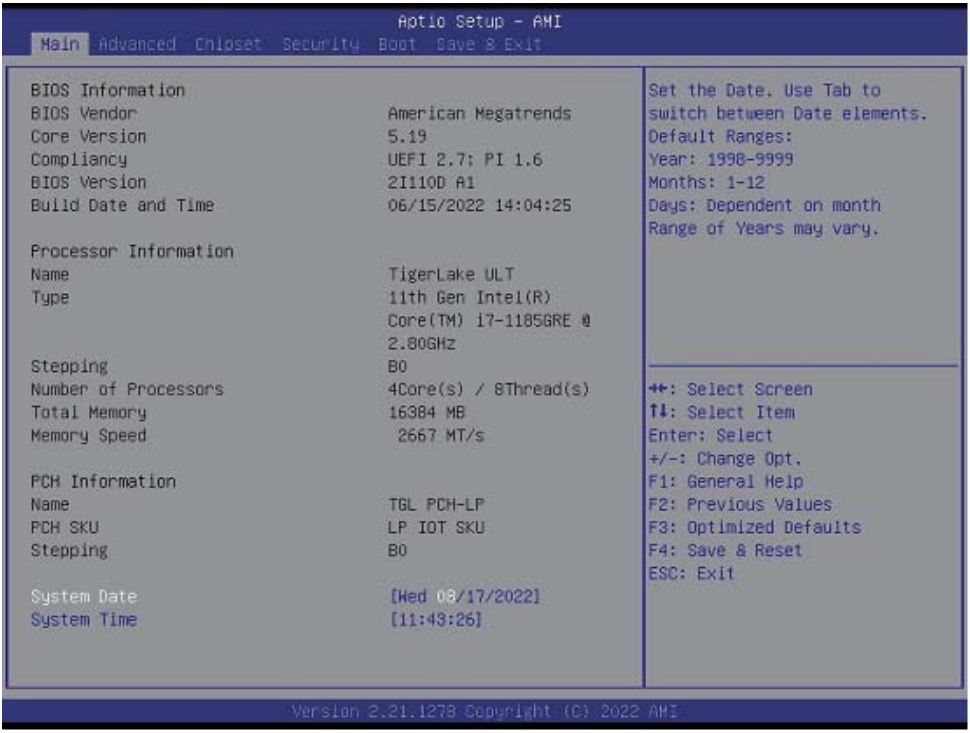
The BIOS is a program located in the Flash Memory on the motherboard.
This program is a bridge between motherboard and operating system.
When you start the computer, the BIOS program gains control.
The BIOS first operates an auto-diagnostic test called POST (Power on Self Test) for all the necessary 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 <Del> 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

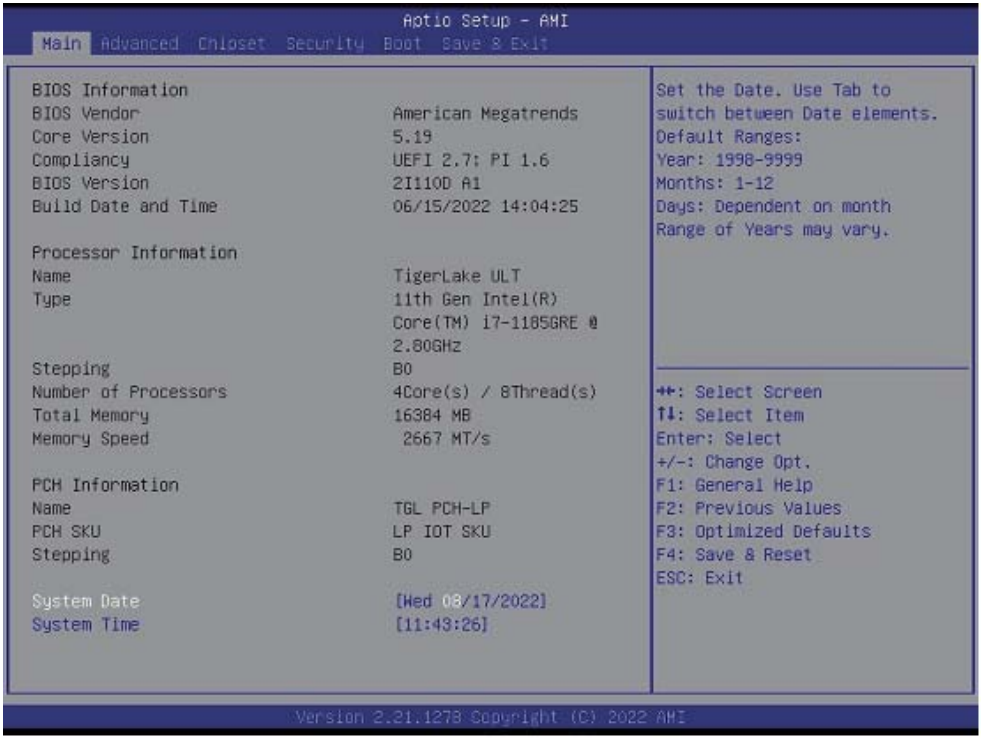
Boot Quiet boot or boot from USB selected.

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.

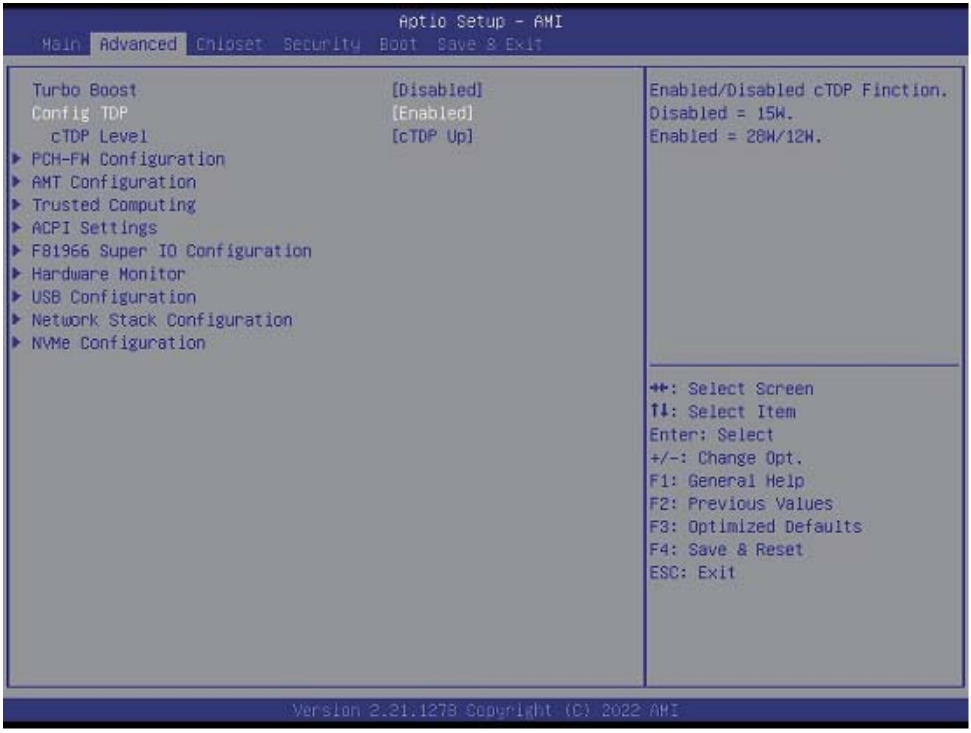
**System Date**
Set the Date. Please use [Tab] to switch between data elements.

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

## 4-6 Advanced


**Turbo Boost**

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




**Config TDP**

Enabled to change the TDP up or TDP down, default is disabled.


**cTDP Level**

To change the TDP up(28W) or TDP down(12W), default is TDP(15W)

**PCH-FW Configuration**

Please refer section 4-6-1

**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

**USB Configuration**

Please refer section 4-6-7

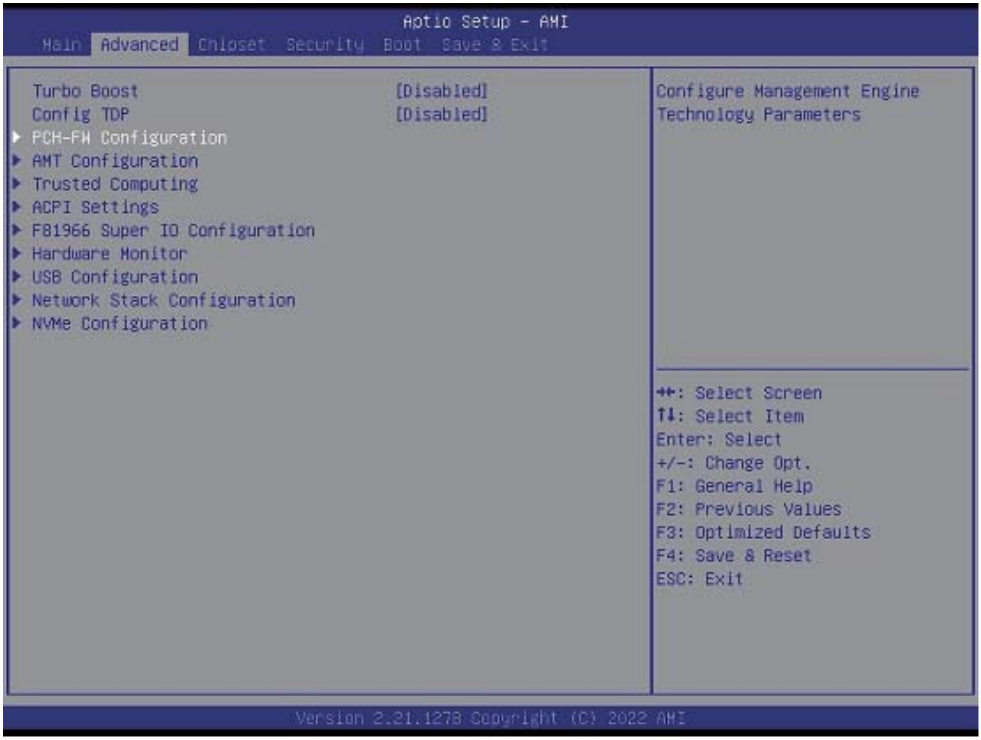
**Network Stack Configuration**

Please refer section 4-6-8

**NVMe Configuration**

Please refer section 4-6-9

## 4-6-1 PCH-FW Configuration



Aptio Setup - AMI

Advanced

| | |
|---|---|
| ME Firmware Version | 15.0.35.1951 |
| ME Firmware Mode | Normal Mode |
| ME Firmware SKU | Corporate SKU |
| ME Firmware Status 1 | 0x90000255 |
| ME Firmware Status 2 | 0x30858106 |
| ME State | [Enabled] |

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

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## 4-6-2 AMT Configuration

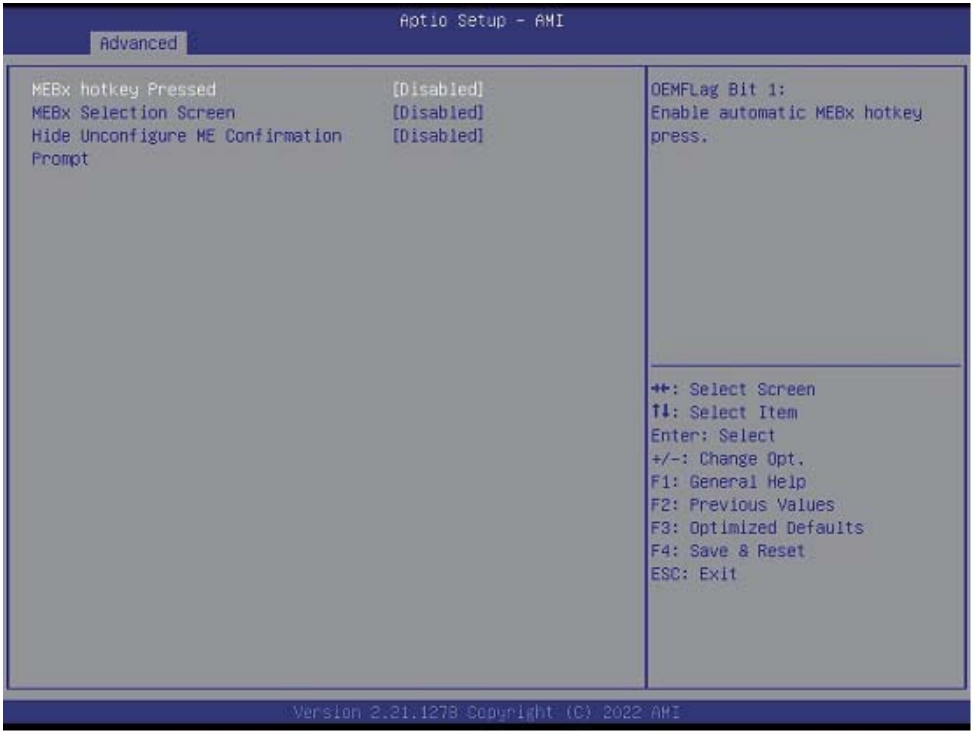

**OEM Flags Settings**

Please refer section 4-6-2-1

**MEBx Resolution Settings**

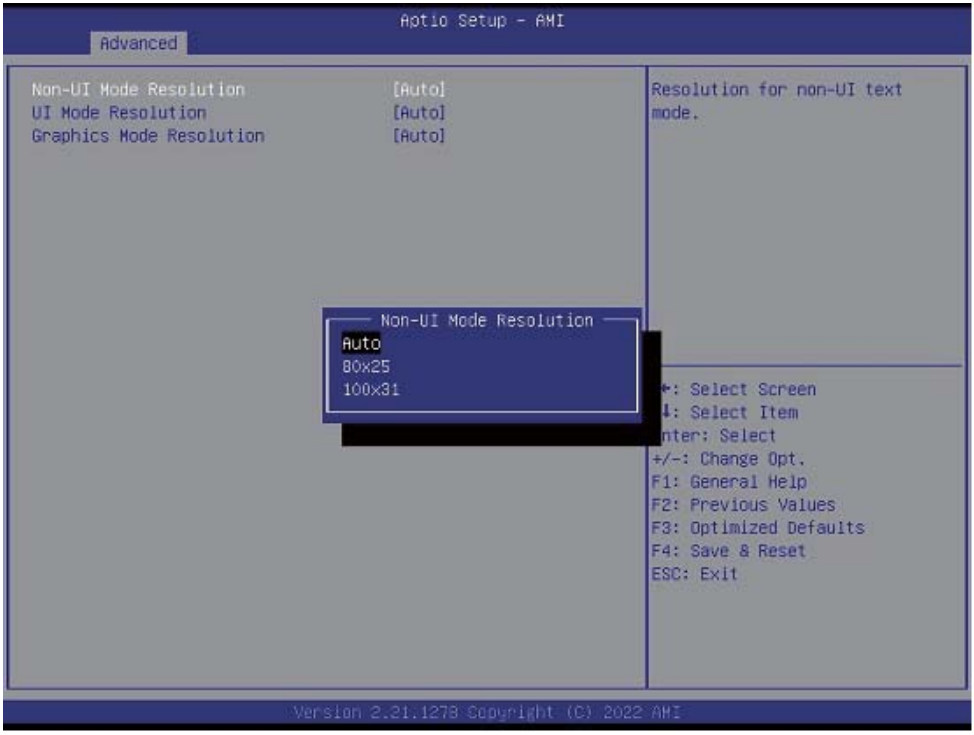
Please refer section 4-6-2-2

## 4-6-2-1 ► OEM Flags Settings




To enable Intel® Management Engine BIOS Extension settings, default is Disabled.

## 4-6-2-2 ► MEBx Resolution Settings



## 4-6-3 Trusted Computing

```
Aptio Setup - AMI
Advanced

TPM 2.0 Device Found
Firmware Version:                 600.7
Vendor:                           INTC

Security Device Support           [Enable]
Active PCR banks                  SHA256
Available PCR banks               SHA-1,SHA256,SHA384,SM3

SHA-1 PCR Bank                    [Disabled]
SHA256 PCR Bank                   [Enabled]
SHA384 PCR Bank                   [Disabled]
SM3_256 PCR Bank                  [Disabled]

Pending operation                 [None]
Platform Hierarchy                [Enabled]
Storage Hierarchy                 [Enabled]
Endorsement Hierarchy             [Enabled]
TPM 2.0 UEFI Spec Version         [TCG_2]
Physical Presence Spec Version    [1.3]
TPM 2.0 InterfaceType             [CRB]
Device Select                     [Auto]

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

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

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```
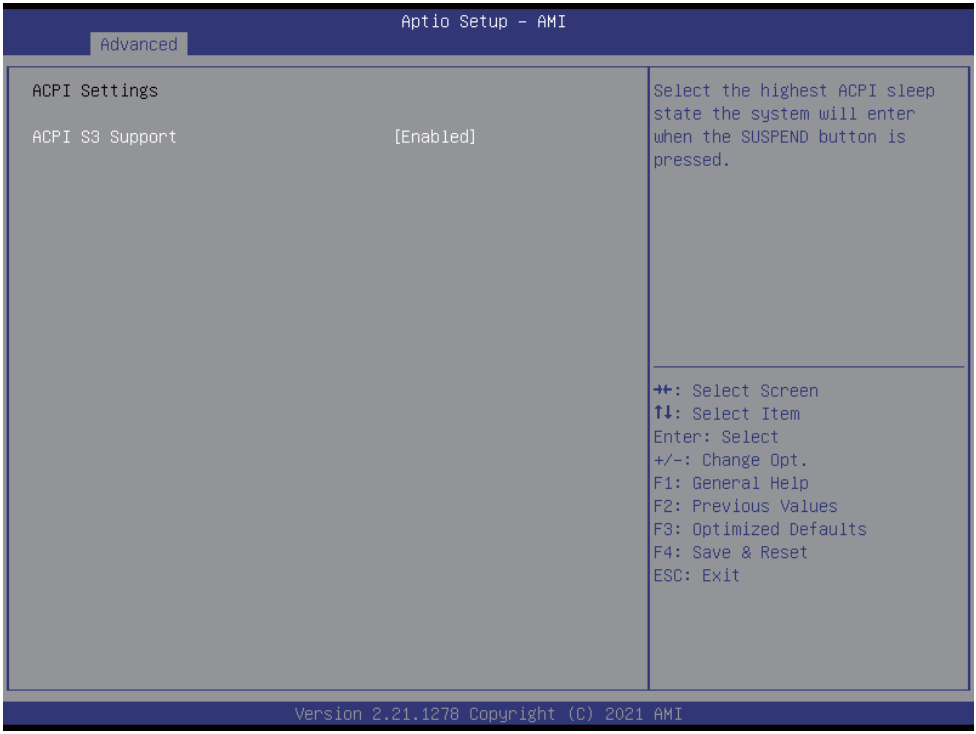

**Security Device Support**

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

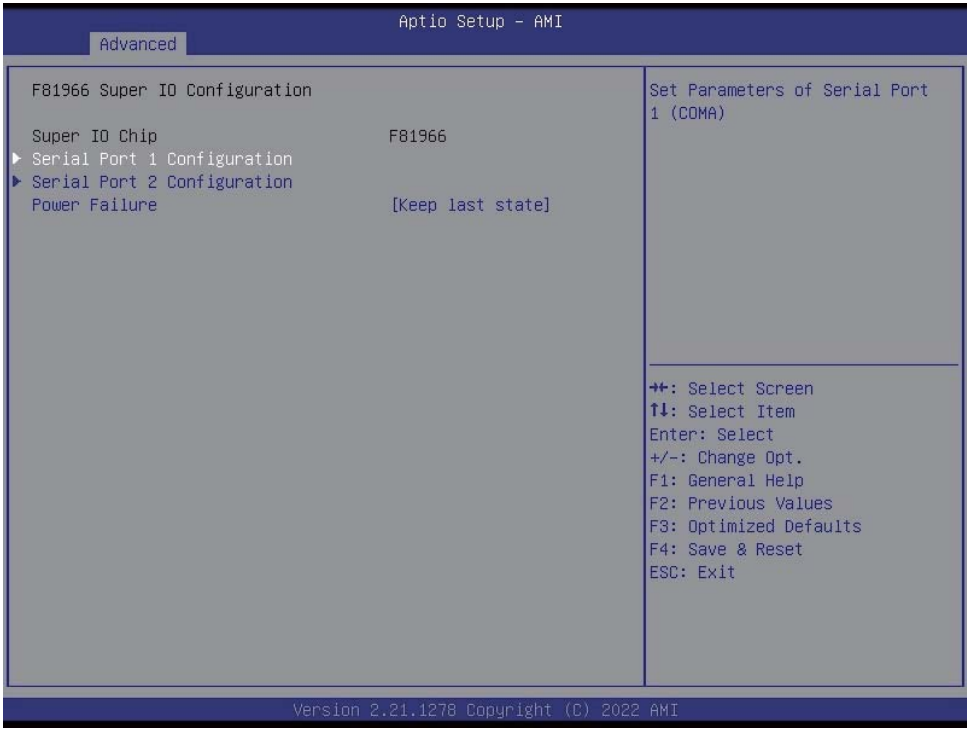
## 4-6-4 ACPI Settings




**ACPI S3 Support**

To enable BIOS support security device or not, 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

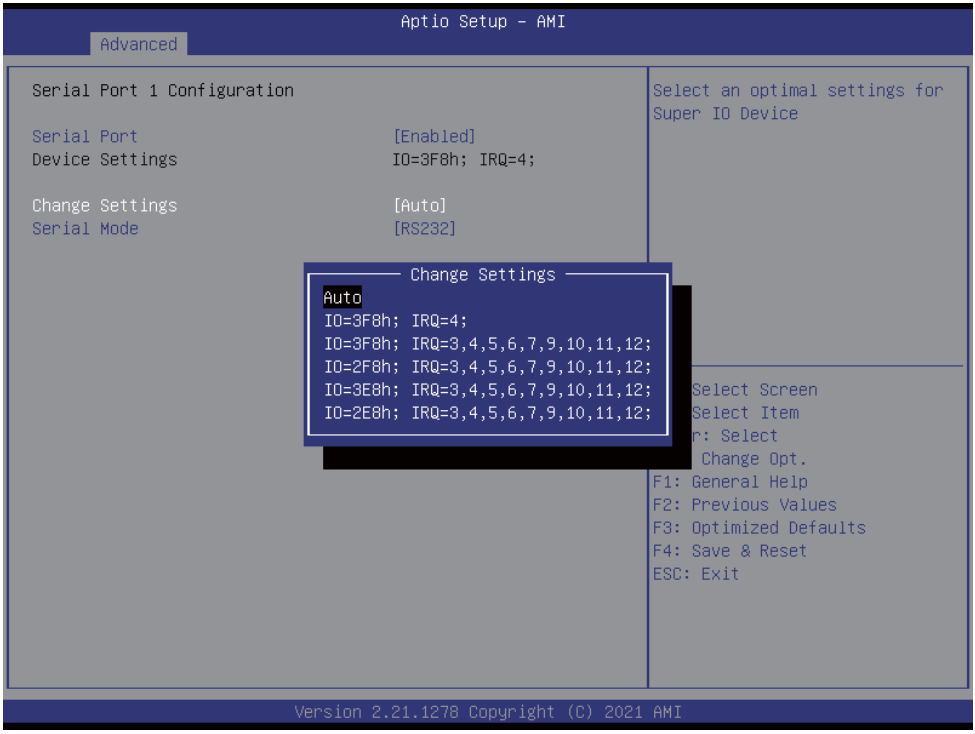
**Power Failure**

Please refer section 4-6-5-3

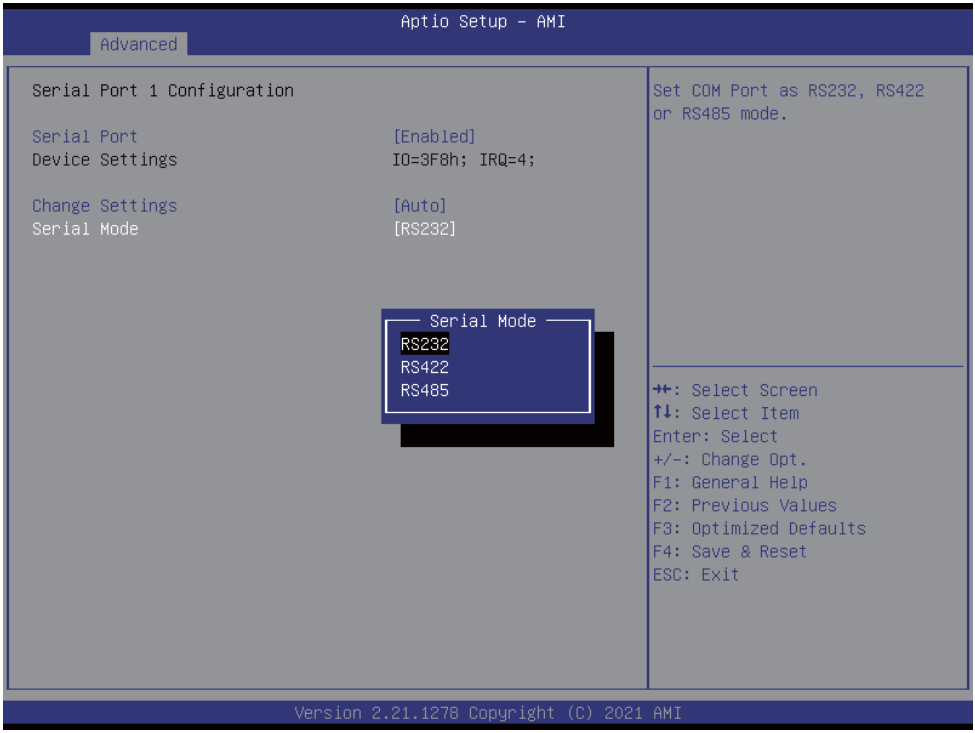
## 4-6-5-1 ► Serial Port 1 Configuration

```
Aptio Setup - AMI
Advanced

Serial Port 1 Configuration                    Enable or Disable Serial Port
                                               (COM)
Serial Port                    [Enabled]
Device Settings                IO=3F8h; IRQ=4;

Change Settings                [Auto]
Serial Mode                    [RS232]

                                               →←: 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.

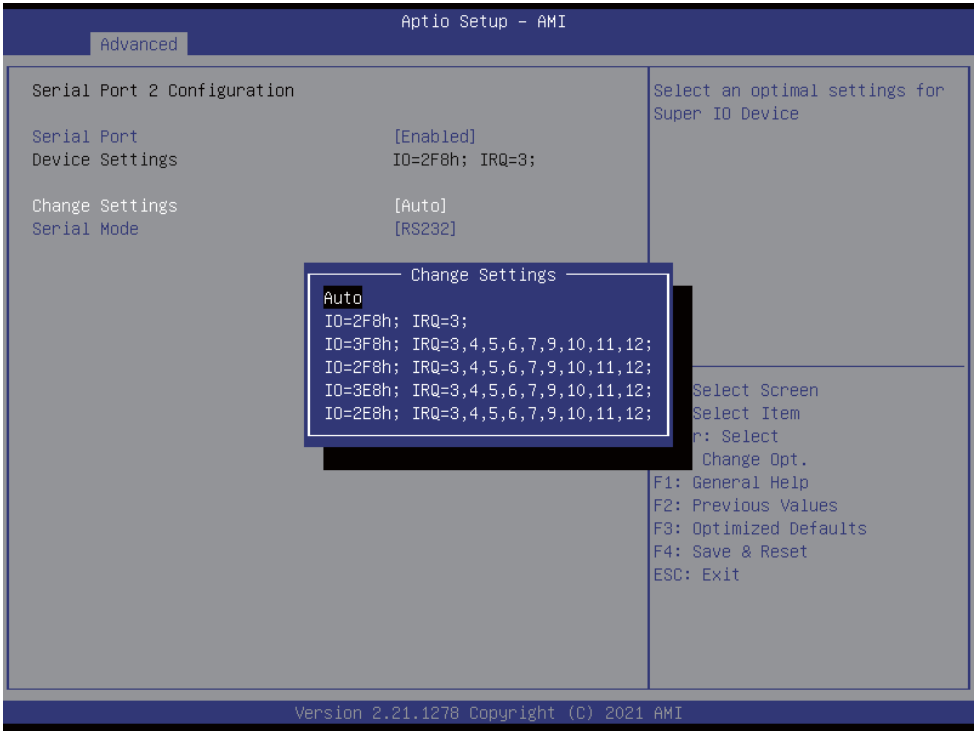



To select the Serial port to RS232 / RS422 / RS485, default is RS232.

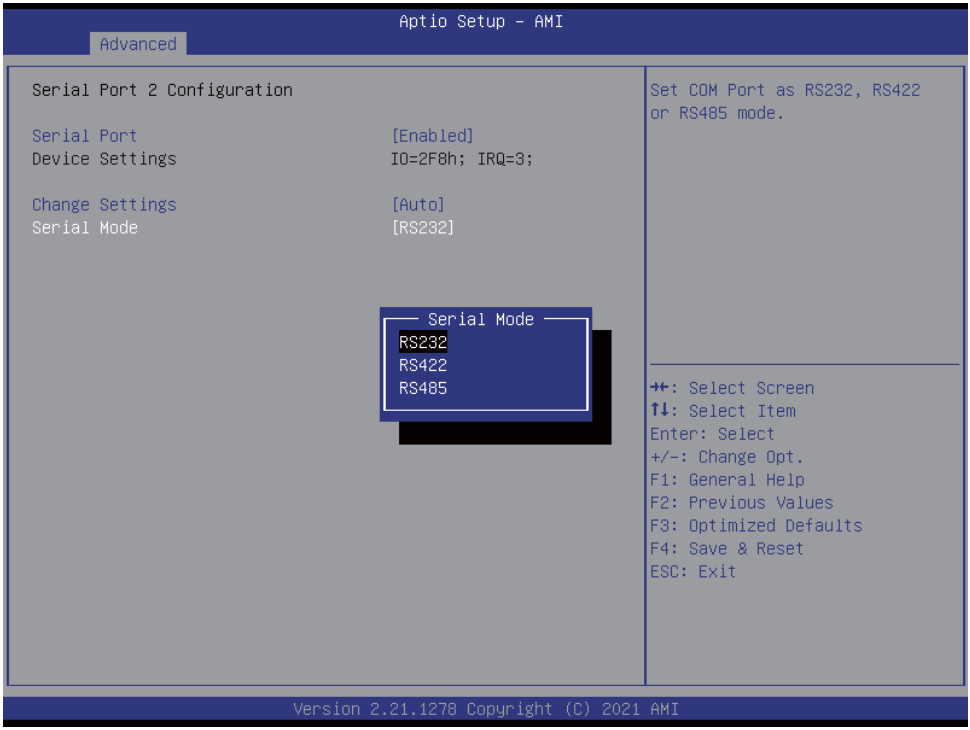
## 4-6-5-2 ► Serial Port 2 Configuration

```
Aptio Setup - AMI
Advanced

Serial Port 2 Configuration                    Enable or Disable Serial Port
                                               (COM)
Serial Port                    [Enabled]
Device Settings                IO=2F8h; IRQ=3;

Change Settings                [Auto]
Serial Mode                    [RS232]

                                               →←: 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.

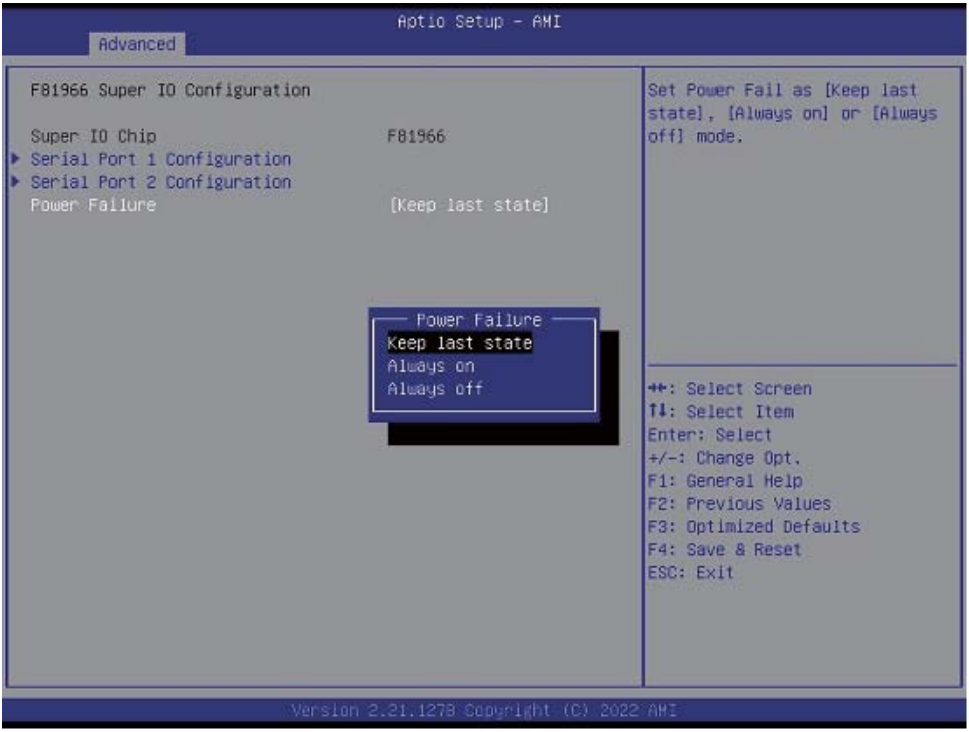



Change Settings, default is Auto.




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

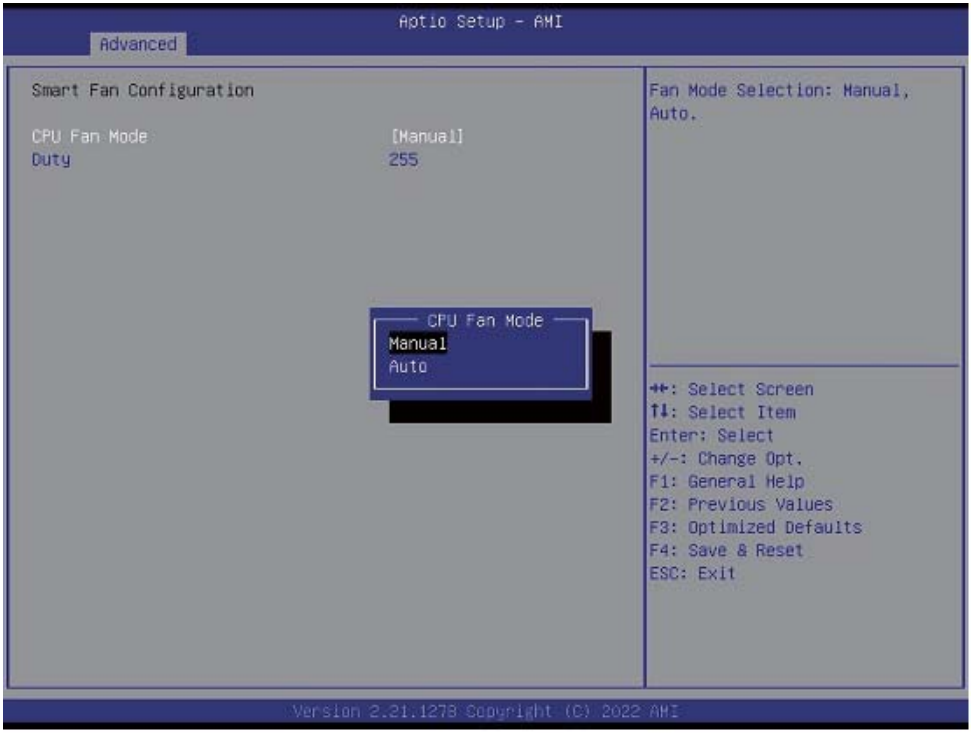
## 4-6-5-3 ► Power Failure




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

## 4-6-6 Hardware Monitor

```
Aptio Setup - AMI
Advanced

Pc Health Status                                  Smart Fan Configuration.

▶ Smart Fan Configuration
  CPU Temperature                  : +44 C
  SYSTEM Temperature               : +37 C
  CPU Fan                          : N/A
  VCCIN                            : +1.288 V
  VCCIN AUX                        : +1.808 V
  VDDQ                             : +1.200 V
  VCC3V                            : +3.248 V
  VSB3V                            : +3.312 V
  VSB5V                            : +5.064 V
  VBAT                             : +3.168 V
                                    ---------------------------
                                    →←: Select Screen
                                    ↑↓: Select Item
                                    Enter: Select
                                    +/-: Change Opt.
                                    F1: General Help
                                    F2: Previous Values
                                    F3: Optimized Defaults
                                    F4: Save & Reset
                                    ESC: Exit

Version 2.21.1278 Copyright (C) 2021 AMI
```

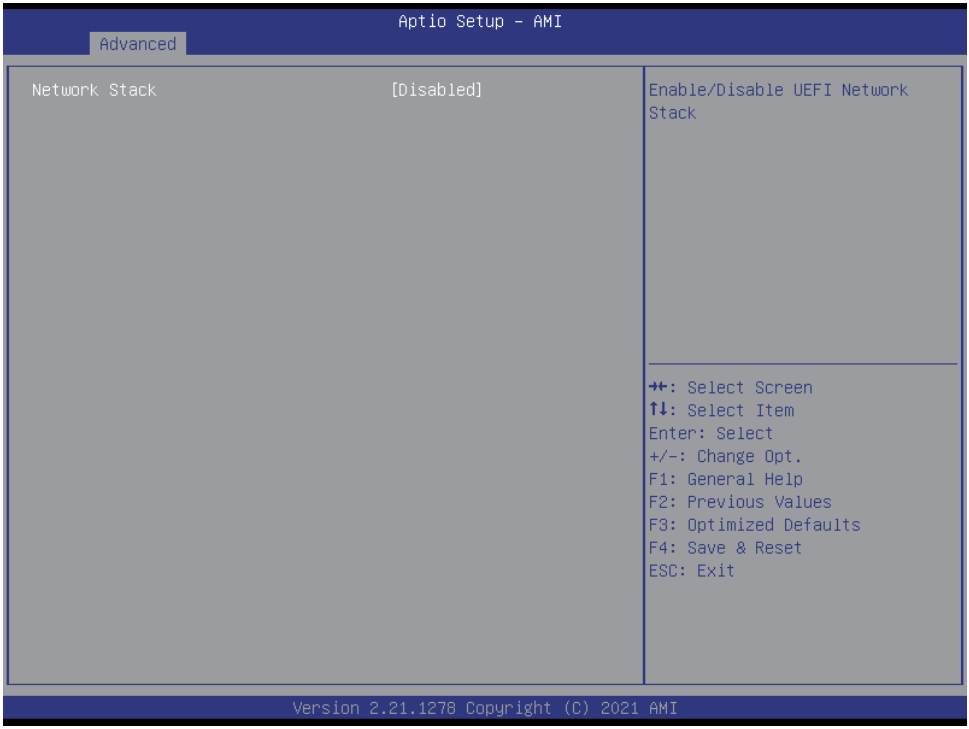



Press [Enter] to view PC health status.
This section shows the status of your CPU, Fan, and overall system.
This is only available when there is Hardware Monitor function onboard.

## 4-6-7 USB Configuration

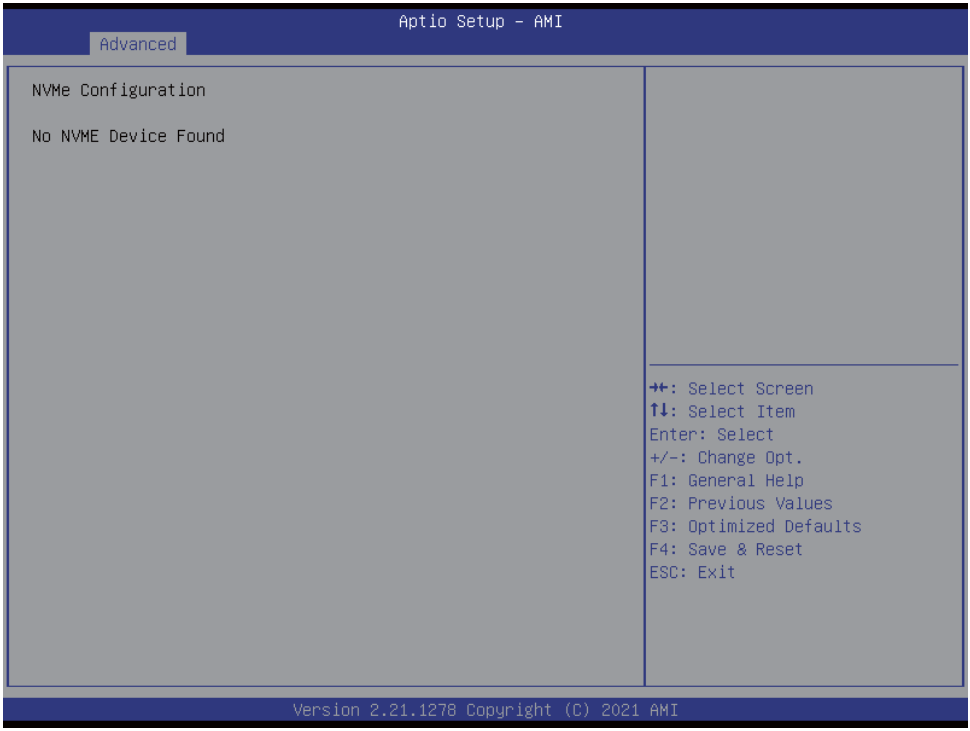
```
Aptio Setup - AMI
Advanced

USB Configuration

USB Controllers:
      2 XHCIs
USB Devices:
      1 Drive, 1 Keyboard, 1 Mouse


Mass Storage Devices:
KingstonDT 101 II PMAP              [Auto]

Mass storage device emulation
type. 'AUTO' enumerates
devices according to their
media format. Optical drives
are emulated as 'CDROM',
drives with no media will be
emulated according to a drive
type.

→←: 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
```

## 4-6-8 Network Stack Configuration




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

## 4-6-9 NVMe Configuration



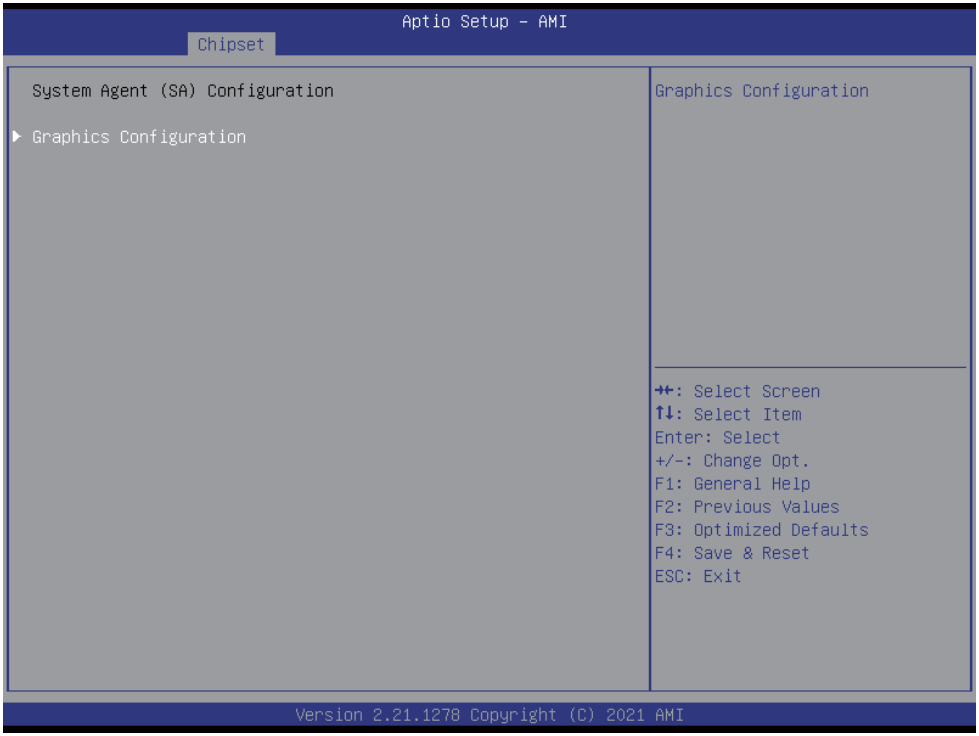

To detect NVMe storage automatically.

## 4-7 Chipset


**System Agent (SA) Configuration.**
Please refer section 4-7-1

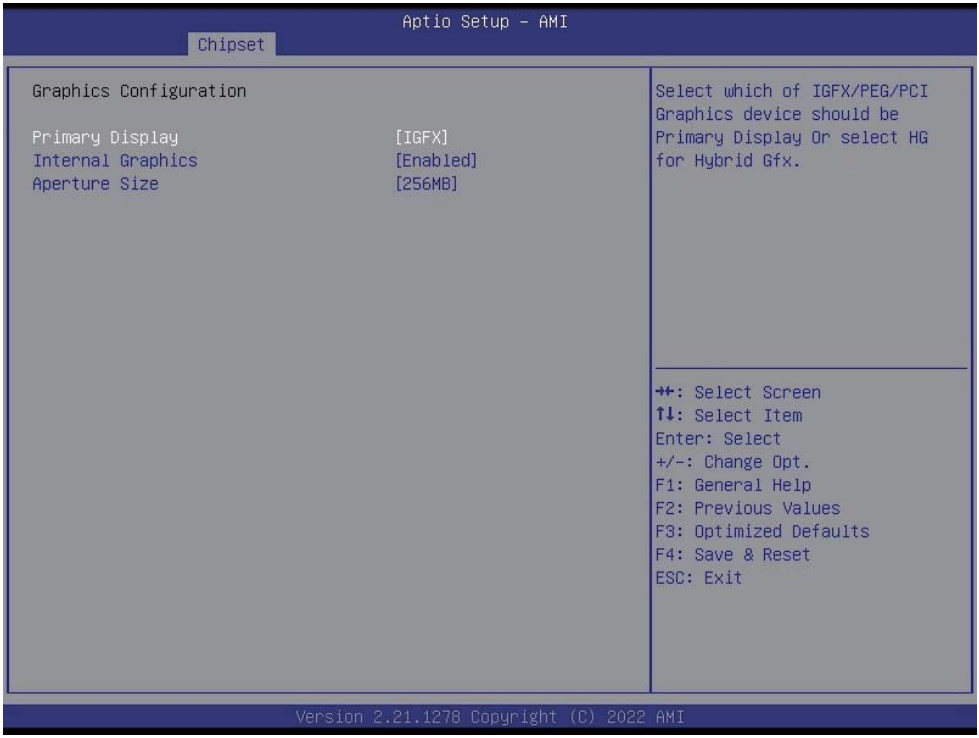
**PCH-IO Configuration.**
Please refer section 4-7-2

## 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, PCH PCI

**Internal Graphics**

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

**Aperture Size**

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

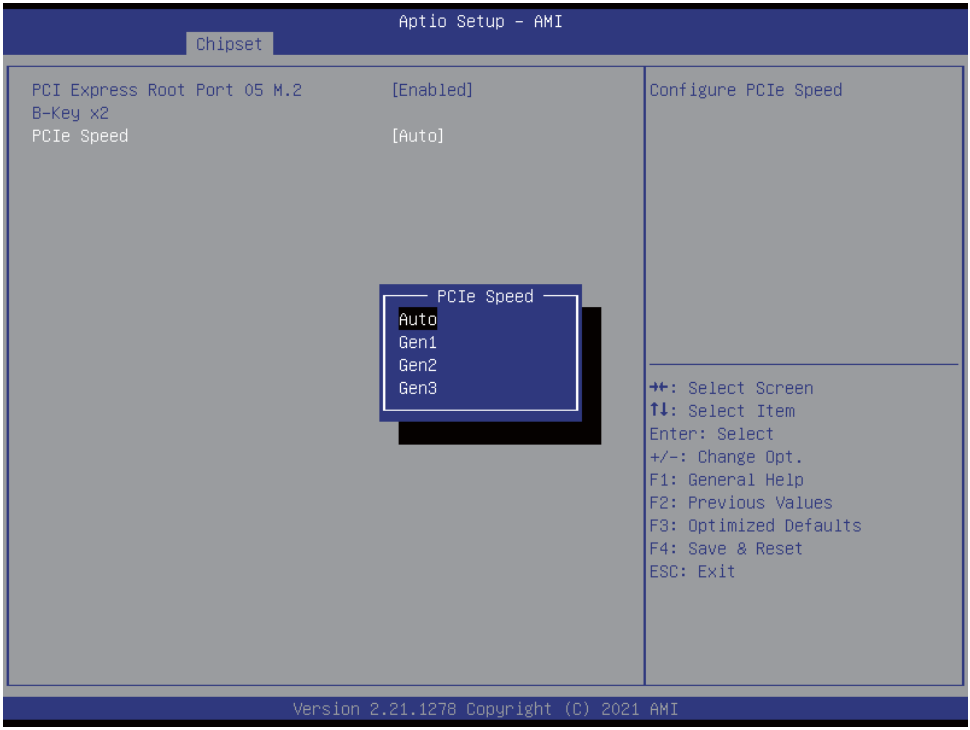
## 4-7-2 PCH-IO Configuration


**PCI Express Configuration.**
Please refer section 4-7-2-1

**SATA And RST 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

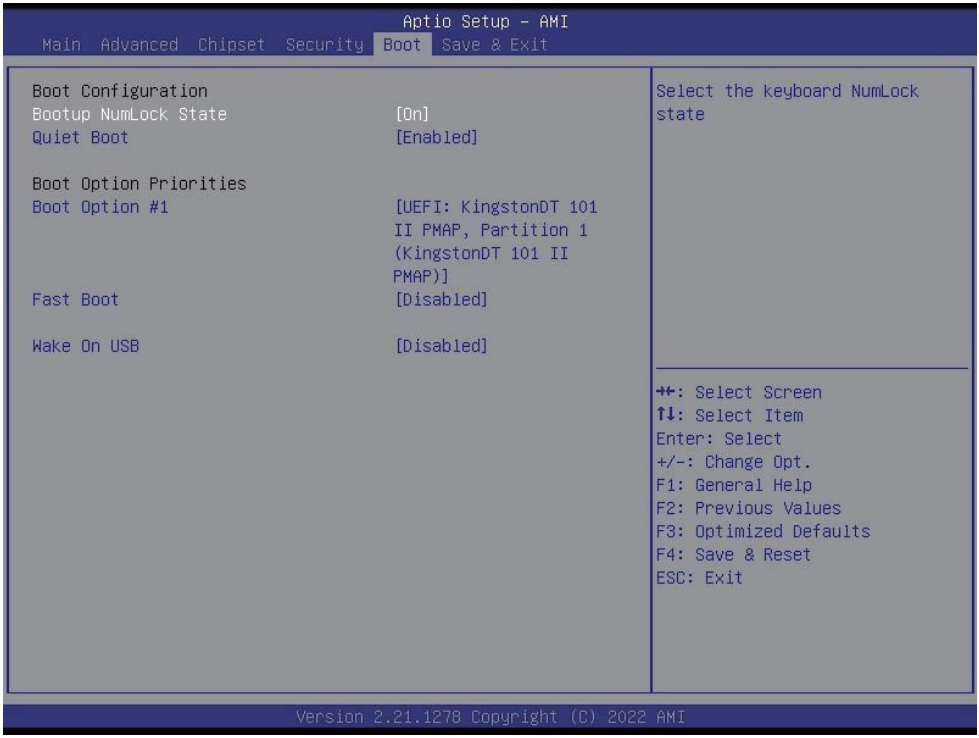
## 4-7-2-2 ► SATA And RST Configuration


**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>

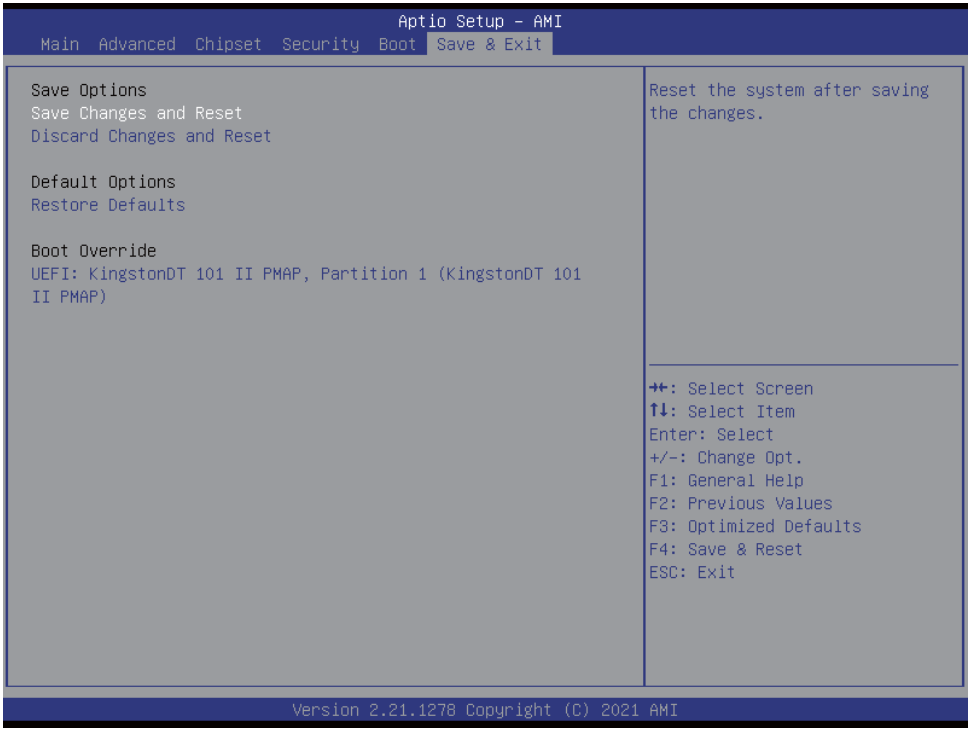
**Quiet Boot**

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

**Wake-Up From USB 3.0**

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 2I110D 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 2I110DA2.ROM –BIOS -ALL

2I110DA2.ROM is the file name of the latest BIOS.

It may be 2I110DWA1.ROM or 2I110DWA2.ROM, etc.

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

By Bay Trail series mainboard, please type

X:\: H2OFFT-D.EXE 2I110DWA2.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 ) |