

2I140D

Intel® Core™ Ultra Series 1 processor,

Onboard LPDDR5 / LAN / HDMI® /

USB / M.2 / COM

All-in-one wafer SBC

Intel® Core Ultra Series 1 (Meteor Lake-U/H) (Arrow Lake-U/H) CPU

Onboard LPDDR5 16 / 32GB, HDMI®, eDP,

4 x 2.5 GbE, 2 x COM,

3 x USB 3.2, 4 x USB 2.0, 2 x MIPI-CSI

2 x M.2, 1 x Nano SIM, DI/DO

CAUTION

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

DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS

NO. 2I140D

Release date: AUG. 01. 2026

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2I140D

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User Manual edition 0.1, AUG. 2026

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.

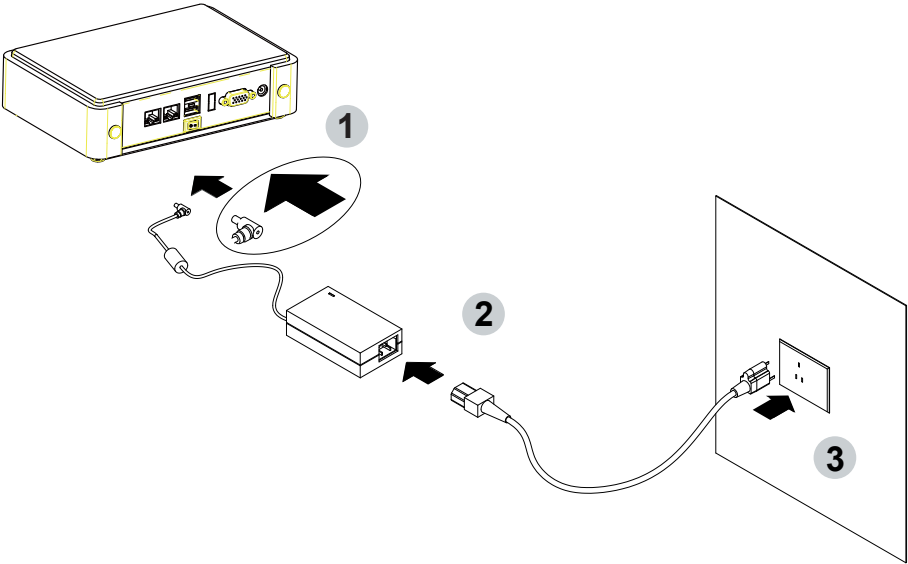
Remark 1:

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

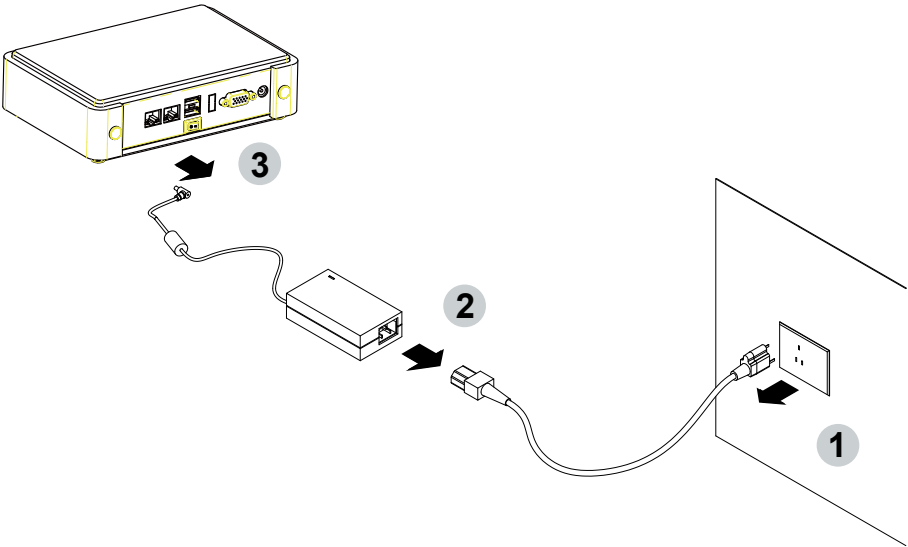
Moreover, erratic pull / push action might cause an unpredictable damage to the component & system unit.

Photo 1

Insert



Unplug



Chapter-1

General Information

The 2I140D is a high-performance 2.5-inch Plus (113 x 112 mm) ultra-compact SBC powered by Intel® Core™ Ultra Series 2 processors with an integrated NPU for advanced Edge AI acceleration. Its primary competitive edge lies in its remarkable size-to-performance ratio, featuring onboard 16GB / 32GB LPDDR5 memory that not only maximizes space efficiency but also enhances shock and vibration resistance for harsh environments. Despite its miniature footprint, the 2I140D delivers robust industrial connectivity, including 4 x Intel® 2.5G LAN ports, 2 x MIPI-CSI connectors, HDMI / eDP, SATA III, and M.2 slots for 5G / wireless expansion. With a 12V DC input, it is the premier choice for industrial automation, healthcare, and transportation applications where space is at a premium but high-speed AI processing is essential.

1-1 Major Feature

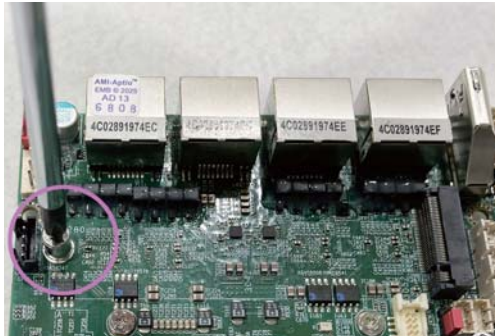
1. Intel® Core™ Ultra 5 125U/H, 135U/H, Ultra 7 155U/H, 165U/H Meteor Lake-U/H series processor. Intel® Core™ Ultra 5 225U/H, 235U/H, Ultra 7 255U/H, 265U/H Arrow Lake-U/H series processor. includes Integrated Display Engine, GPU and Integrated Memory Controller.
2. Intel® Graphics for Core™ Ultra U series CPU, Intel® Arc™ graphics for Core™ Ultra H series CPU.
3. On board LPDDR5, 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 3.2 and 4 x USB 2.0
7. Support extended 1 x M.2 2280 M-key PCIe x 4 support NVMe and SATA interface, 1 x M.2 2242 / 3042 B-Key for PCIe x 2 & USB 3.0 / 2.0 interface with Nano SIM socket.
8. Support 1 SATA port
9. 2 x MIPI-CSI-2 D-PHY
10. Hardware digital Input & Output, 4 x DI / 4 x DO, Hardware Watch Dog Timer, 0~255 sec programmable
11. Support TPM 2.0
12. Power input DC +12V

1-2 Specification

1. **SOC:** Intel® Core™ Ultra 5 125U (1.3 / 4.3 GHz), 135U (1.1 / 4.4 GHz), Ultra 7 155U (1.2 / 4.3 GHz), 165U (1.2 / 4.9 GHz), Ultra 5 125H (1.2 / 4.5 GHz), 135H (1.2 / 4.6 GHz), Ultra 7 155H (1.4 / 4.8GHz), 165H (1.4 / 5.0 GHz), Meteor Lake series processor. Intel® Core™ Ultra 5 225U (1.3 / 4.8 GHz), 235U (1.6 / 4.9 GHz), Ultra 7 255U (1.7 / 5.2 GHz), 265U (1.7 / 5.3 GHz), Ultra 5 225H (1.3 / 4.9 GHz), 235H (1.8 / 5.0 GHz), Ultra 7 255H (1.5 / 5.1GHz), 265H (1.7 / 5.3 GHz), Arrow Lake series processor.
2. **Memory:** On board LPDDR5 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 ports RS232 / RS422 / RS485 selected by BIOS
7. **USB:** 3 type A USB 3.2 and 4 USB 2.0, 2 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 PCIe x 4 support NVMe and SATA interface, 1 x M.2 2242 / 3042 B-Key for PCIe x 2 and USB 3.0 / 2.0 interface with Nano SIM socket.
10. **MIPI:** 2 x MIPI-CSI-2 D-PHY
11. **BIOS:** AMI UEFI BIOS
12. **Dimension:** 113 x 112 mm
13. **Power:** On board DC +12V

1-3 Directions for installing the M.2M Key for SATA / PCIe x4

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.



1-4 Directions for installing the M.2B Key for USB 3.2 Gen1 & USB 2.0 / PCIe x2

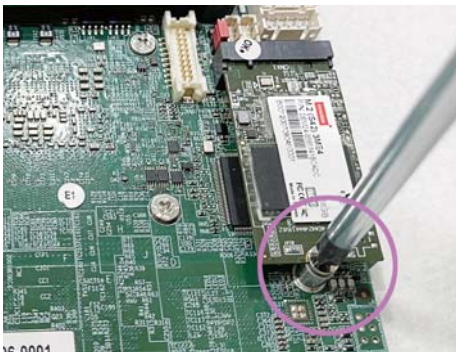
1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle

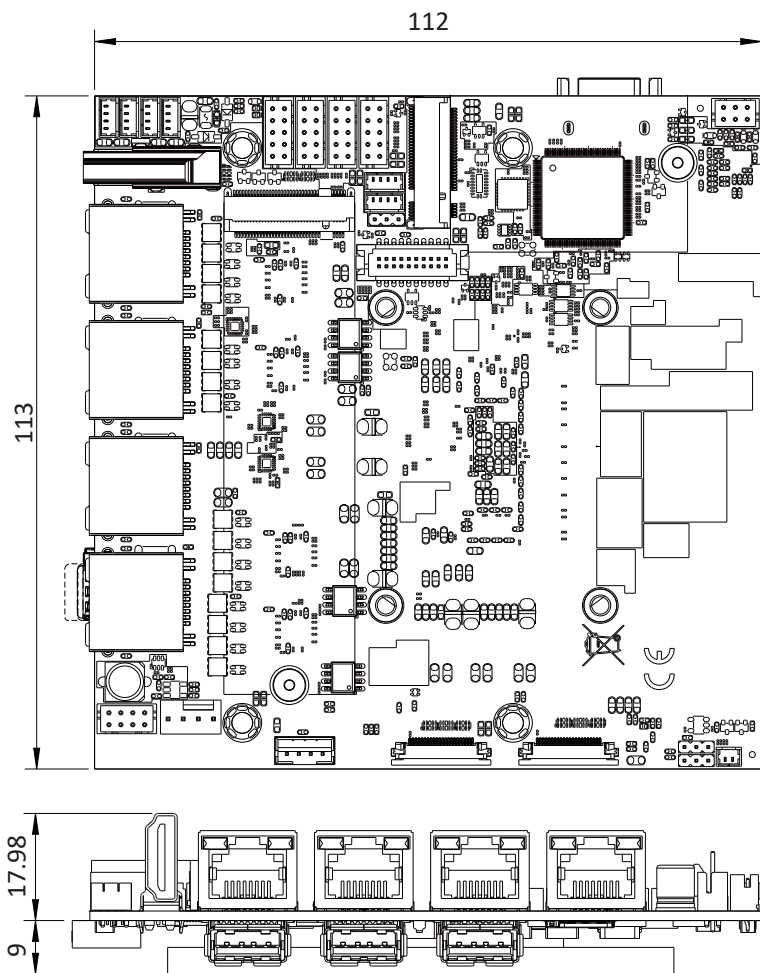


3. Gently push down the Mini Card and screw the screw back.



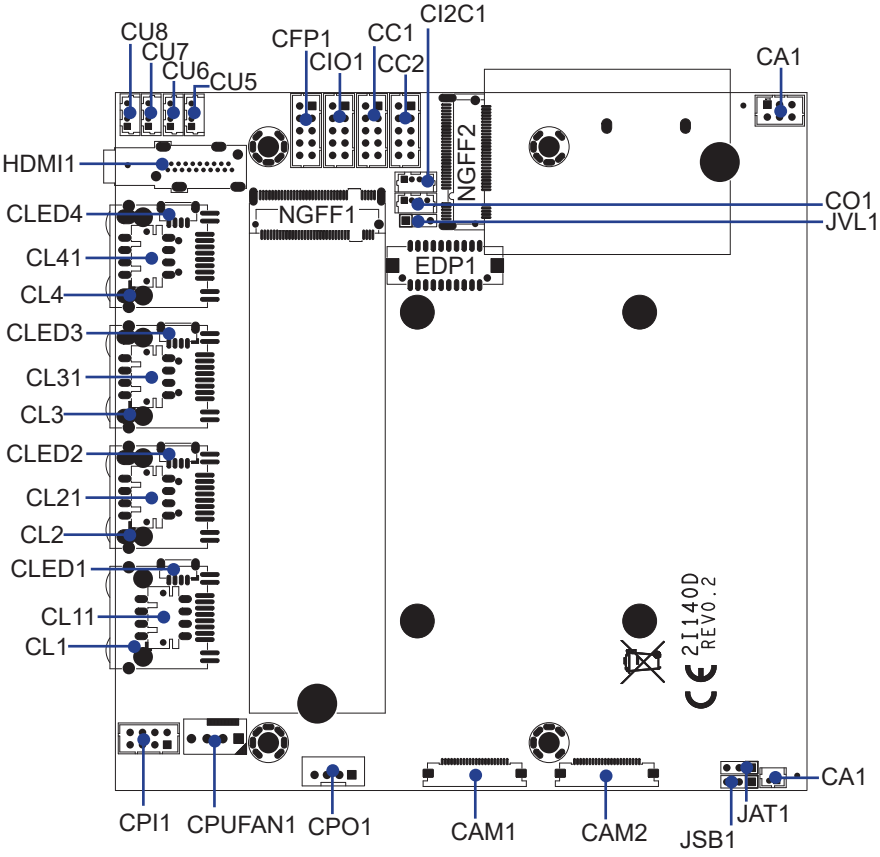
Chapter-2

2-1 Dimension-2I140D



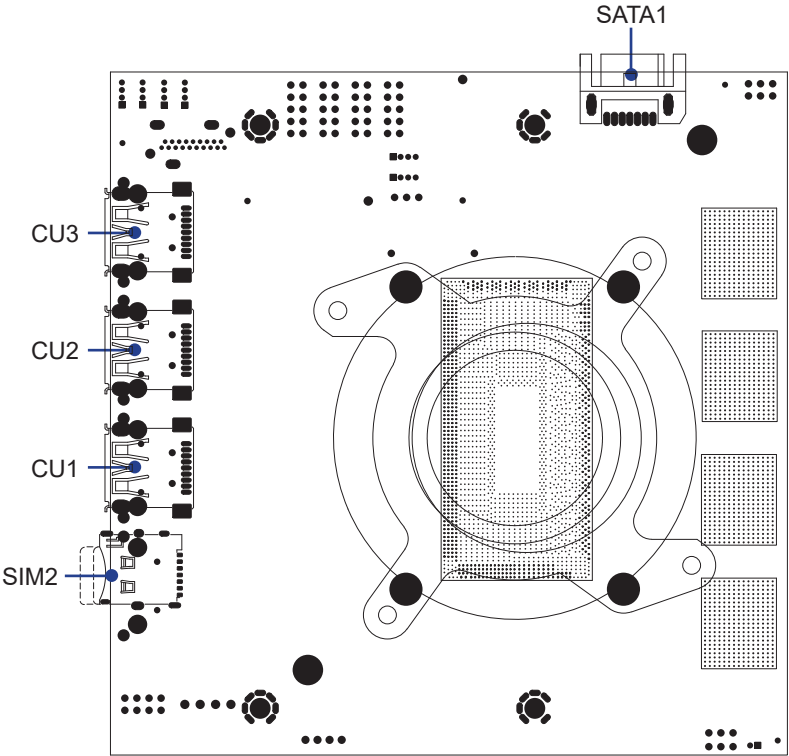
2-2 Layout-2I140D-Connector and Jumper

TOP



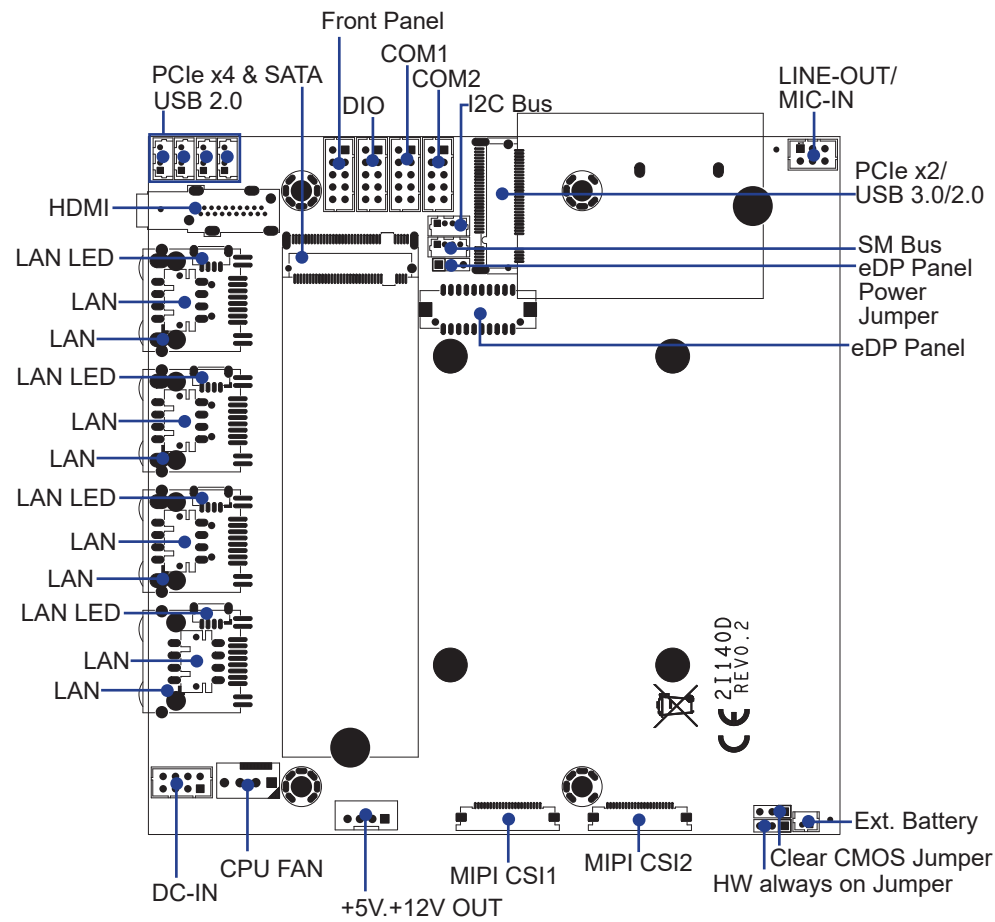
2-2-1 Layout-2I140D-Connector and Jumper Bottom

BOT



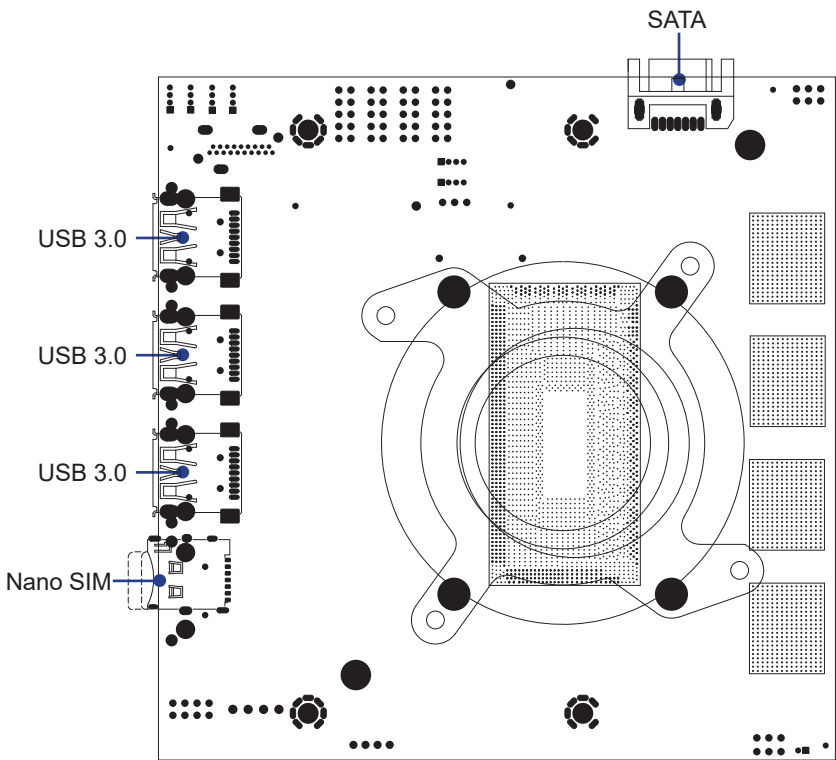
2-3 Layout-2I140D-Function MAP

TOP



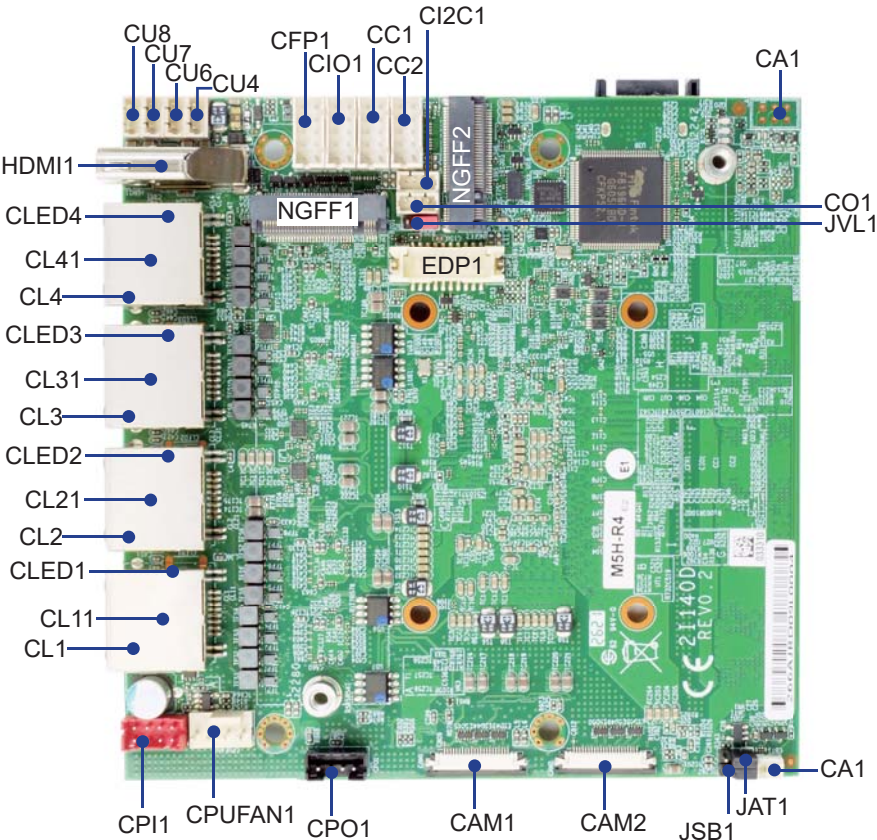
2-3-1 Layout-2I140D-Function MAP

BOT



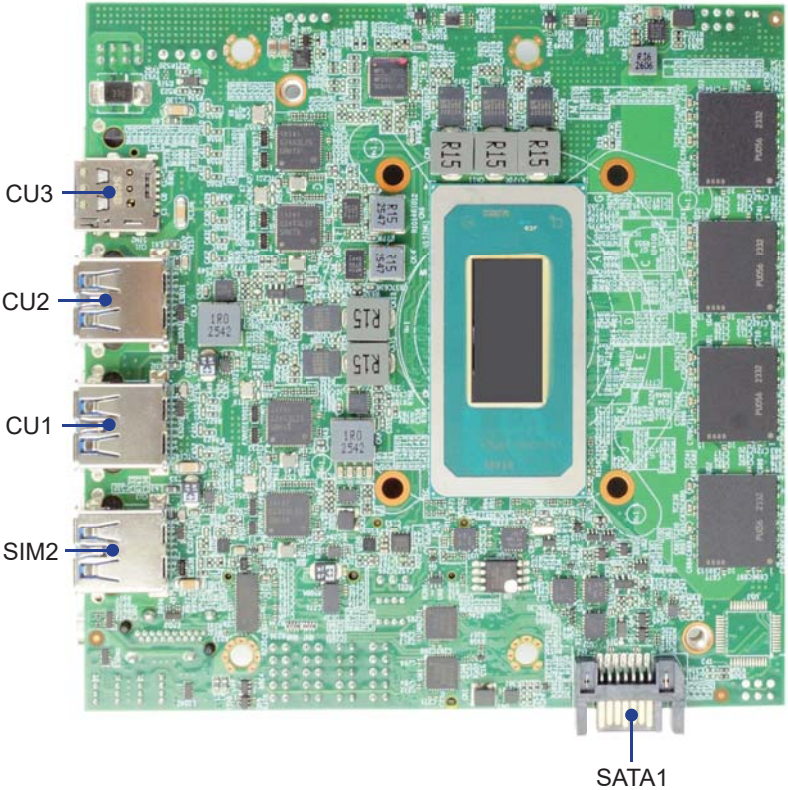
2-4 Diagram- 21140D

TOP



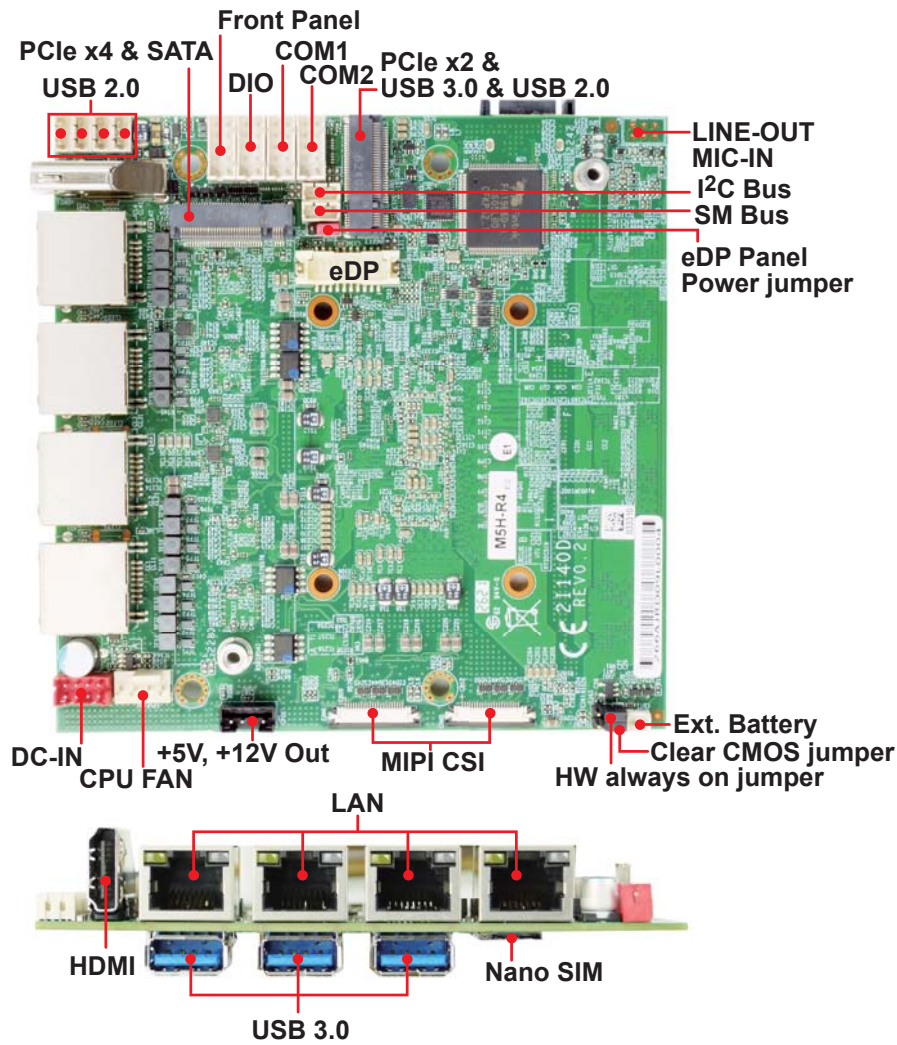
2-4-1 Diagram- 2I140D

BOT



2-5 Function MAP- 2I140D

TOP



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.

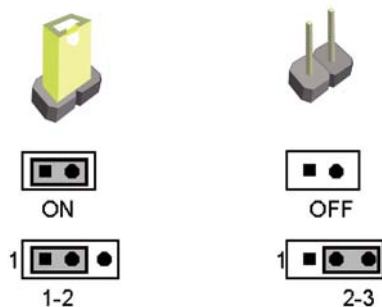


Figure 2.2

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.

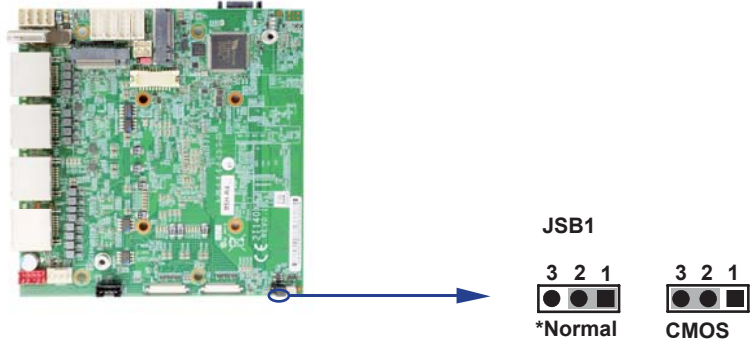
To clear the CMOS, follow the procedures below:

- 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 data clear

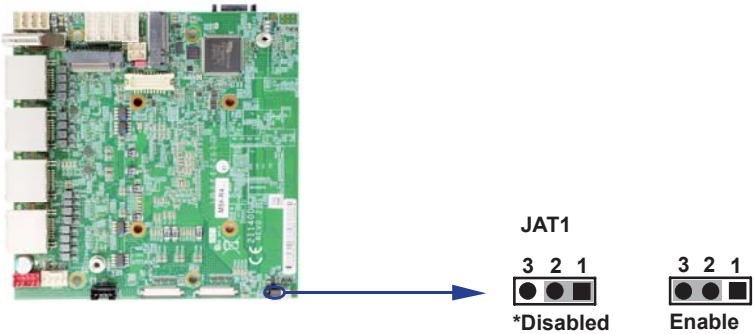
Note: Do not clear CMOS unless

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



2-9 JAT1: HW system always on

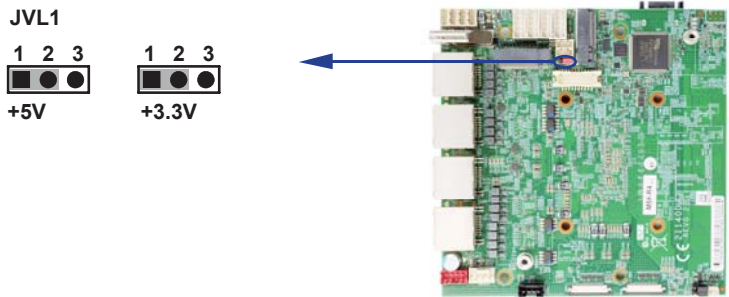
JAT1	DESCRIPTION
*1-2	Normal Set
2-3	HW system always on



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.

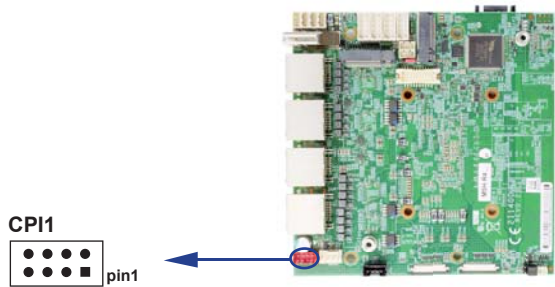
3-1 List of Connectors

CPI1	DC-IN 2x4 pin (2.00mm) Rad wafer
CPO1	+12V/+5V power output 4 pin (2.00mm) Black wafer
CBT1	COMS battery 1x2 pin (1.25mm) wafer
CC1/2	COM 2x5 pin (2.00mm) wafer
CFP1	Front Panel connector 2x5 pin (2.00mm) wafer
CIO1	4DI/4DO 2x5 pin (2.00mm) wafer
CPUFAN1	CPU Fan 1x4 pin (2.54mm) wafer
EDP1	EDP Panel 2x10 pin (1.25mm) wafer
HDMI1	HDMI1 Connector
CU1/2/3	USB 3.0 Type A connector
CU4/6/7/8	USB 2.0 port 1x4 pin (1.25mm) wafer
CL1/2/3/4	LAN RJ45 Connector
CL11/21/31/41	LAN wafer x 5 (2x4 pin 2.00mm) (For OEM)
CLED1/2/3/4	LAN LED wafer x 5 (1x4 pin 1.25mm) (For OEM)
CO1	SM Bus 1x4 pin (1.25mm) wafer
CI2C1	I2C Bus 1x4 pin (1.25mm) wafer
CA1	Line-out / Mic-in 2x3 pin (2.00mm) wafer (For OEM)
SATA1	SATA connector 7pin
NGFF1	M.2 NGFF M key sockets 75 pin H: 8.5mm
NGFF2	M.2 NGFF B key sockets 75 pin H: 8.5mm
SIM2	Nano SIM card socket
CAM1/2	MIPI CSI-2 camera FPC connector x 2 (1x22 pin 0.5mm)

3-2 CPI1: DC Power input (2x4 pin 2.00mm Rad Wafer)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	DC +12V	4	DC +12V
5	DC +12V	6	DC +12V
7	GND	8	GND
9	LAN LED-	10	LAN LED+

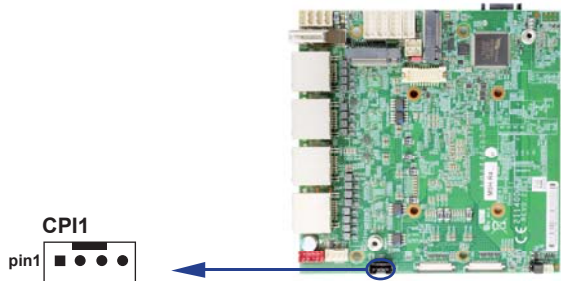
Note: 1. Very important check DC-in Voltage.



3-3 CPO1: +5V / +12V DC output (1x4 pin 2.00mm Black Wafer)

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

Note: Attention! Check Device Power in spec



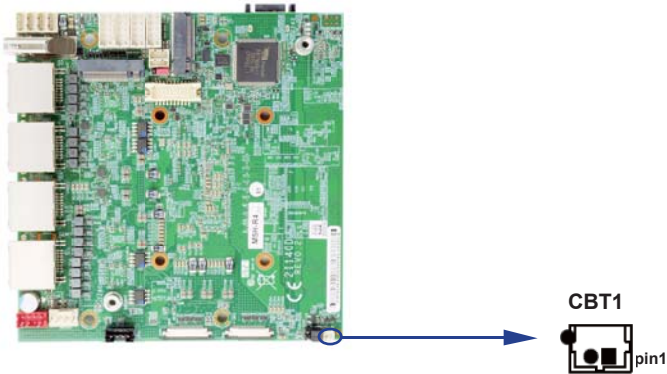
3-4 CMOS battery connector

• CBT1: CMOS Battery in 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 Port (2x5 pin 2.00mm Wafer)

● (RS232 Mode)

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

● (RS485 Mode)

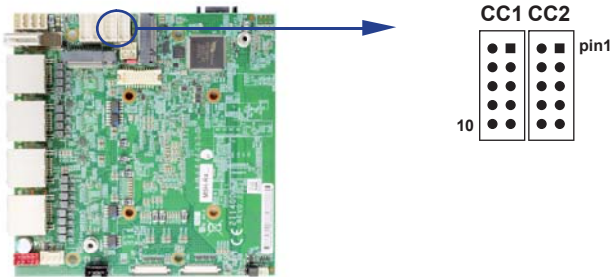
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data-	2	Data+
3	NC	4	NC
5	GND	6	NC
7	NC	8	NC
9	NC	10	+5V

● (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

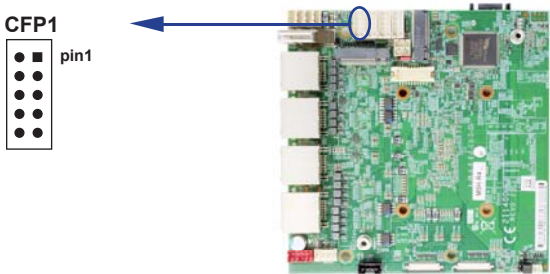
Note:

- 1. RS232 mode Pin 9 RI and Voltage setting For BOM control, default set RI
- 2. Default support RS232 / RS422 / RS485 by BIOS selected, default set RS232



3-6 CFP1: Front Panel connector (2x5 pin 2.00mm Wafer)

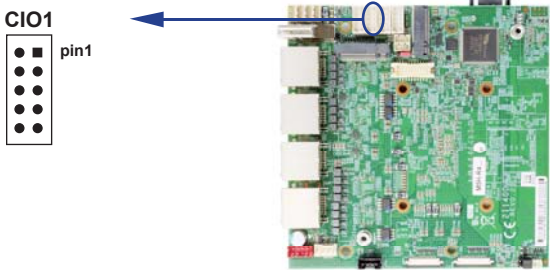
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Power button	2	GND
3	Reset	4	GND
5	Power LED-	6	Power LED+
7	HDD LED-	8	HDD LED+
9	LAN LED-	10	LAN LED+



3-7 CIO1: 4DI/4DO Port (2x5 pin 2.00mm 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 F81966 SMBus 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 console

The Sample code source you can download from

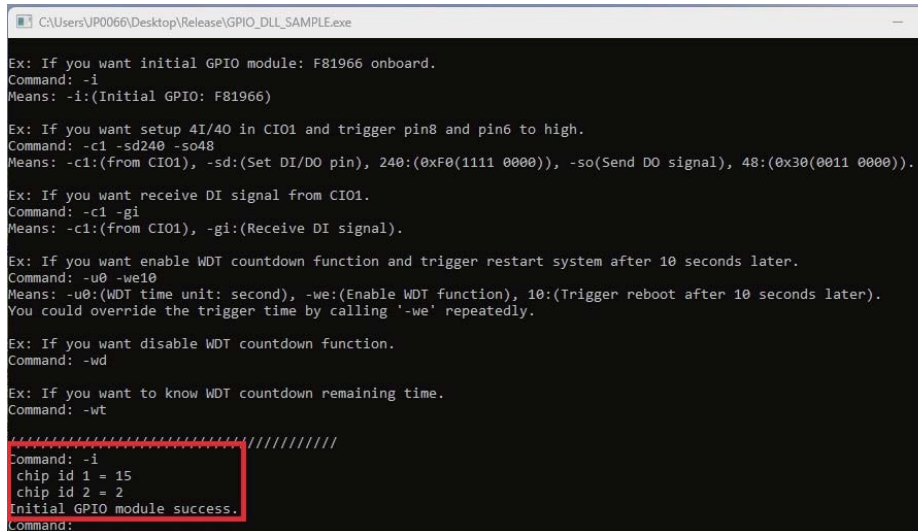
<https://www.lex.com.tw/en/download/download-hide?cid1=11&cid2=208#topDownload>

Initial F81966 module

If you want initial GPIO module: F81966 onboard.

Command: -i

Means: -i:(Initial GPIO: F81966 resource)



```
C:\Users\JP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe

Ex: If you want initial GPIO module: F81966 onboard.
Command: -i
Means: -i:(Initial GPIO: F81966)

Ex: If you want setup 4I/4O in CIO1 and trigger pin8 and pin6 to high.
Command: -c1 -sd240 -so48
Means: -c1:(from CIO1), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CIO1.
Command: -c1 -gi
Means: -c1:(from CIO1), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command:
```

Free F81966 module

If you want free GPIO module resource.

Command: -f

Means: -f:(Free GPIO: F81966 resource)

```
C:\Users\UP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe
Command: -i
Means: -i:(Initial GPIO: F81966)

Ex: If you want setup 4I/4O in CIO1 and trigger pin8 and pin6 to high.
Command: -c1 -sd240 -so48
Means: -c1:(from CIO1), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CIO1.
Command: -c1 -gi
Means: -c1:(from CIO1), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -f
Free GPIO module success.
Command:
```

Check F81966 chip is exist

If you want check F81966 module is exist on the device.

Command: -check

Means: -check:(Get F81966 chip ID: 0x1502)

```
C:\Users\UP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe

Ex: If you want setup 4I/4O in CIO1 and trigger pin8 and pin6 to high.
Command: -c1 -sd240 -so48
Means: -c1:(from CIO1), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CIO1.
Command: -c1 -gi
Means: -c1:(from CIO1), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -check
chip id 1 = 15
chip id 2 = 2
F81966 chip is exist.
Command:
```

Define GPIO pin status(DI/DO)

Setup GPIO pins status are DI or DO in CIO port.

Use 1 byte to indicate the status of the Pins.
Bit value = 1: pin status is DO; Bit value = 0: pin status is DI.

(Pin1 is bit0, Pin3 is bit1, Pin5 is bit2 and Pin7 is bit3)
(Pin8 is bit4, Pin6 is bit5, Pin4 is bit6 and Pin2 is bit7)

2-10 CIO1: DIO 0~3 2x5 pin (1.25mm) 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

If you want set CIO1 pins status is 4I/4O. (Bits: 0xF0)
Command: -c1 -sd240
Means: -c1:(CIO1), -sd:(set DI/DO), 240:(0xF0(1111 0000))

```
C:\Users\JP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe
Command: -i
Means: -i:(Initial GPIO: F81966)

Ex: If you want setup 4I/4O in CIO1 and trigger pin8 and pin6 to high.
Command: -c1 -sd240 -so48
Means: -c1:(from CIO1), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CIO1.
Command: -c1 -gi
Means: -c1:(from CIO1), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -c1 -sd240
Set CIO1 pin DI/DO(0xf0) success.
Command:
```

Trigger DO pin signal to high or low

Set DO pin register value in CIO port to trigger high or low status.

Use 1 byte to indicate the status of the Pins.
Bit value = 1: trigger to High; Bit value = 0: trigger to low.

(Pin1 is bit0, Pin3 is bit1, Pin5 is bit2 and Pin7 is bit3)
(Pin8 is bit4, Pin6 is bit5, Pin4 is bit6 and Pin2 is bit7)

2-10 CIO1: DIO 0~3 2x5 pin (1.25mm) 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

If you want to trigger CIO1 pins pin8 and pin6 to high. (Bits: 0x30)

Pin which be trigger, status must be DO.

Command: -c1 -so48

Means: -c1:(CIO1), -so(Send DO signal), 48:(0x30(0011 0000))

```
C:\Users\UP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe

Ex: If you want setup 4I/4O in CIO1 and trigger pin8 and pin6 to high.
Command: -c1 -sd240 -so48
Means: -c1:(from CIO1), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CIO1.
Command: -c1 -gi
Means: -c1:(from CIO1), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -c1 -sd240
Set CIO1 pin DI/DO(0xF0) success.
Command: -c1 -so48
Send CIO1 DO value = (0x30).
Command:
```

Receive DI pin current status

Receive DO pin register value from CIO port.

Use 1 byte to indicate the status of the Pins.
Bit value = 1: receive high; Bit value = 0: receive low.

(Pin1 is bit0, Pin3 is bit1, Pin5 is bit2 and Pin7 is bit3)

(Pin8 is bit4, Pin6 is bit5, Pin4 is bit6 and Pin2 is bit7)

2-10 CIO1: DIO 0~3 2x5 pin (1.25mm) 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

If you want receive CIO1 pins current status.

Pin status must be DI.
Attention: DI pin default register value is high. If pin not connect any device, return bits is always high.
Command: -c1 -gi
Means: -c1:(CIO1), -gi:(Receive DI signal)

If return value is 0x33(0011 0011), it means pin1 and pin3 in CIO1 port received high signal.
We only use pin1 and pin3 value, because CIO1 port pin status value is 0xF0(1111 0000)(4I/4O).

```
C:\Users\VP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe
Ex: If you want setup 4I/4O in CIO1 and trigger pin8 and pin6 to high.
Command: -c1 -sd240 -so48
Means: -c1:(from CIO1), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CIO1.
Command: -c1 -gi
Means: -c1:(from CIO1), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -c1 -sd240 -so48
Set CIO1 pin DI/DO(0xf0) success.
Send CIO1 DO value = (0x30).
Command: -c1 -gi
Receive CIO1 DI value = (0x33).
Command:
```

Enable Watch Dog Timer to reset system

If you want enable WDT countdown function and trigger restart system after 30 seconds later.

You could override the trigger time by calling '-we' repeatedly.

Command: -u0 -we30

Means: -u:(WDT time unit: second), -we:(Enable WDT function), 30:(Trigger reboot after 30 seconds later)

```
CAUsers\VP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe
Means: -c1:(from CI01), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CI01.
Command: -c1 -gi
Means: -c1:(from CI01), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

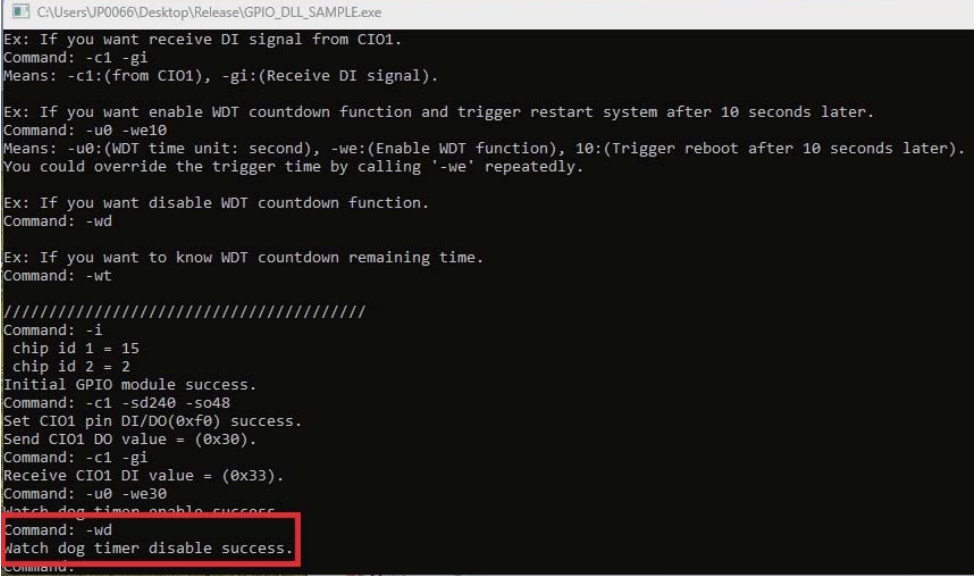
Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -c1 -sd240 -so48
Set CI01 pin DI/DO(0xF0) success.
Send CI01 DO value = (0x30).
Command: -c1 -gi
Receive CI01 DI value = (0x77)
Command: -u0 -we30
Watch dog timer enable success.
Command:
```

Disable Watch Dog Timer

If you want disable WDT countdown function.

Command: -wd



```
C:\Users\JP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe
Ex: If you want receive DI signal from CI01.
Command: -c1 -gi
Means: -c1:(from CI01), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -c1 -sd240 -so48
Set CI01 pin DI/D0(0xf0) success.
Send CI01 D0 value = (0x30).
Command: -c1 -gi
Receive CI01 DI value = (0x33).
Command: -u0 -we30
Watch dog timer enable success.
Command: -wd
Watch dog timer disable success.
Command:
```

Get Watch Dog Timer countdown time

If you want to know WDT countdown remaining time.

Command: -wt

```
C:\Users\JP0066\Desktop\Release\GPIO_DLL_SAMPLE.exe

Ex: If you want setup 4I/4O in CIO1 and trigger pin8 and pin6 to high.
Command: -c1 -sd240 -so48
Means: -c1:(from CIO1), -sd:(Set DI/DO pin), 240:(0xF0(1111 0000)), -so(Send DO signal), 48:(0x30(0011 0000)).

Ex: If you want receive DI signal from CIO1.
Command: -c1 -gi
Means: -c1:(from CIO1), -gi:(Receive DI signal).

Ex: If you want enable WDT countdown function and trigger restart system after 10 seconds later.
Command: -u0 -we10
Means: -u0:(WDT time unit: second), -we:(Enable WDT function), 10:(Trigger reboot after 10 seconds later).
You could override the trigger time by calling '-we' repeatedly.

Ex: If you want disable WDT countdown function.
Command: -wd

Ex: If you want to know WDT countdown remaining time.
Command: -wt

////////////////////////
Command: -i
chip id 1 = 15
chip id 2 = 2
Initial GPIO module success.
Command: -u0 -we30
Watch dog timer enable success.
Command: -wt
Watch dog countdown 26 seconds.
Summary:
```

F81966 DIO direct connect

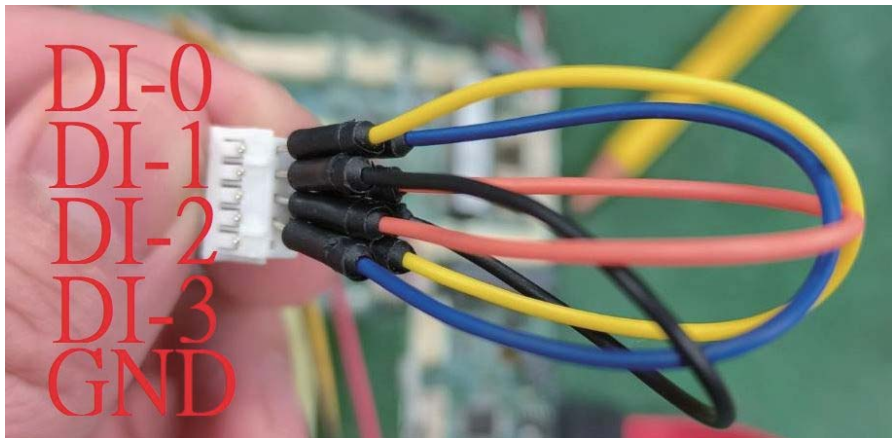
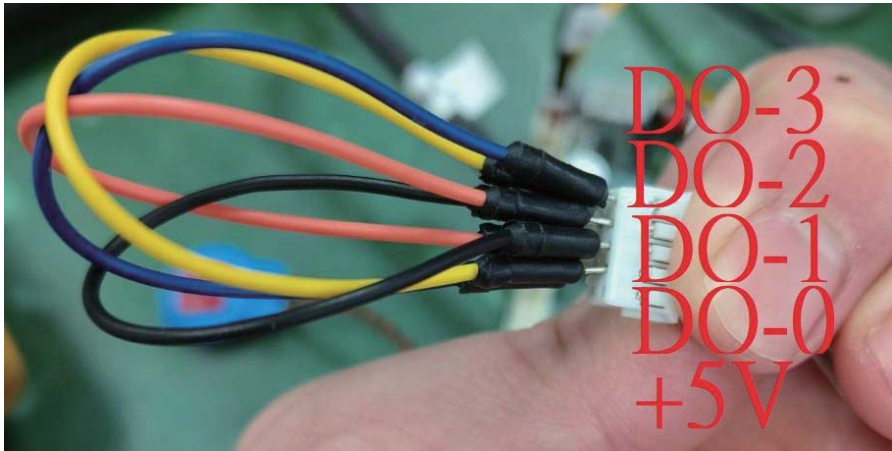
Using 2I130HW to example how to connect.
DI-0(yellow) to DO-0(yellow) 、 DI-1(black) to DO-1(black) 、 DI-2(orange) to DO-2(orange) 、 DI-3(blue) to DO-3(blue). GND and +5V are empty.

3-7 DIO Interface

• CIO1: DIO 0~3 2x5 pin (1.25mm) wafer

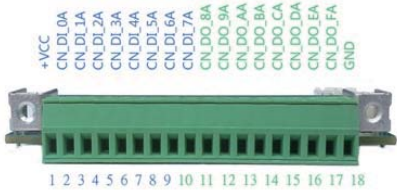
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DI-0	2	DO-3
3	DI-1	4	DO-2
5	DI-2	6	DO-1
7	DI-3	8	DO-0
9	GND	10	+5V

Note: DIO and WDT function from SIO F81966D-L.



F81966 DIO with CIO116_B

CN-DI_0A(white_red) to CN-DO_8A(white_red) 、CN-DI_1A(green) to CN-DO_9A(green) 、
CN-DI_2A(yellow) to CN-DO_AA(yellow) 、CN-DI_3A(orange) to CN-DO_BA(orange) 、
CN-DI_4A(red) to CN-DO_CA(red) 、CN-DI_5A(brown) to CN-DO_DA(brown) 、CN-DI_6A(black) to
CN-DO_EA(black) 、CN-DI_7A(white) to CN-DO_FA(white).
GND and +VCC connect to power.



PIN NO.	DESCRIPTION
1	+VCC
2	CN-DI_0A
3	CN-DI_1A
4	CN-DI_2A
5	CN-DI_3A
6	CN-DI_4A
7	CN-DI_5A
8	CN-DI_6A
9	CN-DI_7A
10	CN-DO_8A
11	CN-DO_9A
12	CN-DO_AA
13	CN-DO_BA
14	CN-DO_CA
15	CN-DO_DA
16	CN-DO_EA
17	CN-DO_FA
18	GND

CIO1-DI_1
CIO1-DI_2
CIO1-DI_3
CIO1-DI_4
CIO2-DI_1
CIO2-DI_2
CIO2-DI_3
CIO2-DI_4
CIO1-DO_1
CIO1-DO_2
CIO1-DO_3
CIO1-DO_4
CIO2-DO_1
CIO2-DO_2
CIO2-DO_3
CIO2-DO_4

F81966_DLL Function

```
F81966_DLL_API int F81966_DLL_Init();  
F81966_DLL_API int F81966_DLL_Free();  
F81966_DLL_API int F81966_DLL_CheckDeviceExist();  
  
F81966_DLL_API int F81966_DLL_SetDioPinStatus(int nCioPort, BYTE bDIOBits);  
F81966_DLL_API int F81966_DLL_GetDioPinStatus(int nCioPort, BYTE& bDIOBits);  
  
F81966_DLL_API int F81966_DLL_SendDOValue(int nCioPort, BYTE bDOVal);  
F81966_DLL_API int F81966_DLL_GetDOValue(int nCioPort, BYTE& bDOVal);  
F81966_DLL_API int F81966_DLL_GetDIValue(int nCioPort, BYTE& bDIVal);  
  
F81966_DLL_API int F81966_DLL_StartWatchDogTimer(int nUnit, int nCount);  
F81966_DLL_API int F81966_DLL_StopWatchDogTimer();  
F81966_DLL_API int F81966_DLL_GetWatchDogCountdown(int& nUnit, int& nCount);
```

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

The Sample code source you can download from

<https://www.lex.com.tw/en/download/download-hide?cid1=11&cid2=208#topDownload>

<FTP>

Source file: F81966_LPC_Utility_L_src

Binary file: F81966_LPC_Utility

F81966 Library : libF81966_bin_x86_64

MB Support List

Elkhart Lake	Raptor Lake
2I640CW	3I130TW

Introduction F81966 CIO

```
test@test-3I130DW:~/test/DIO$ sudo ./F81966_DIO
Usage: ./F81966_DIO <function> <CIO_number> [value]
Function options:
  read      - Read CIO port value
  write     - Write CIO port value (value required)
  getbit    - Read specific bit of CIO port (bit position required)
  setbit    - Set specific bit of CIO port (bit position and value required)
  wdt       - Test WDT function
  hmon      - Read hardware monitor values (voltages and temperatures)

Examples:
./F81966_DIO read 1
./F81966_DIO write 1 0xF
./F81966_DIO getbit 1 0
./F81966_DIO setbit 1 0 1
./F81966_DIO wdt
./F81966_DIO hmon
```

- 1.Use GET_CIO_INPUT to get the digital input data
- 2.Use SET_CIO_OUTPUT_DATA to set digital output data
- 3.Single bit setting can use SetCIOXBit0, SetCIOXBit1
- 4.Read a single bit using GetCIOXBit
- 5.Enable WDT and continuously reset WDT to ensure that the restart signal will not be triggered when the system is normal

libF81966.so Function

```
bool F81966_OPEN();
void F81966_Init();

BYTE GET_CIO_INPUT(int CIO_Number);
BYTE GET_CIO_OUTPUT_DATA(int CIO_Number);
BYTE SET_CIO_OUTPUT_DATA(int CIO_Number, BYTE byteValue);

BYTE GetCIOXBit(int CIO_Number, BYTE bitPosition);
BYTE SetCIOXBit0(int CIO_Number,BYTE byteValue, BYTE bitPosition);
BYTE SetCIOXBit1(int CIO_Number,BYTE byteValue, BYTE bitPosition);

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

float GetVoltage(DWORD dwAddrVal);
int GetTemperature(DWORD dwAddrVal);
```

test_F81966 CIO Input/Ooutput sample code

```
Set CIO1 Digital Output all bit low
test_F81966 write 0xf;
```

```
Set CIO2 Digital Output all bit low
test_F81966 write 2 0x0;
```

```
Set CIO3 Digital Output all bit high
test_F81966 write 3 0xf;
```

```
Get CIO4 Digital Input
test_F81966 read 4;
```

```
read bit position
test_F81966 getbit 1 1
```

```
write bit position
test_F81966 setbit 1 0 1
```

Watch Dog test

sample code
test_F81966 getbit 1 1

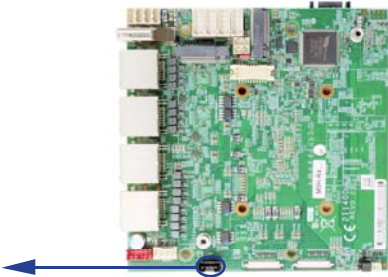
Set WDT 10 sec
test_F81966 wdt enable 10;

Disable WDT
test_F81966 wdt disable;

3-8 CPUFAN1: CPU Fan (1x4 pin 2.54mm Wafer)

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	Tachometer Sensor Input
4	PWM Output

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

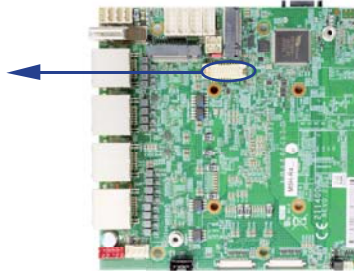
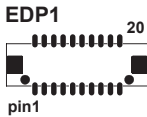


3-9 EDP1: EDP Interface Panel (2x15 pin 1.25mm Wafer)

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_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 By BOM OEM to +5V



3-10 Display Interface

• **HDMI1: HDMI type A connector**

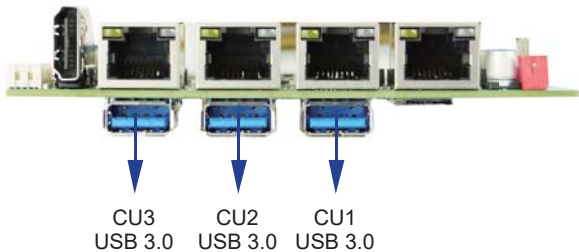
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TMDS DATA2+	2	GND
3	TMDS DATA2-	4	TMDS DATA1+
5	GND	6	TMDS DATA1-
7	TMDS DATA0+	8	GND
9	TMDS DATA0-	10	TMDS CLK+
11	GND	12	TMDS CLK-
13	NC	14	NC
15	DDC CLOCK	16	DDC DATA
17	GND	18	+5V
19	H.P. Detect		



3-11 USB Interface

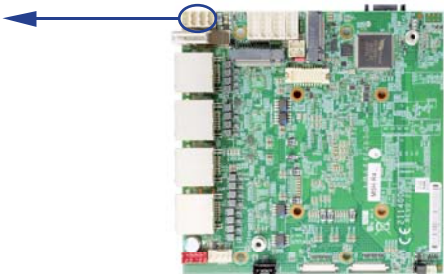
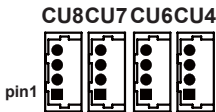
• CU1.CU2.CU3: USB 3.0 Type A connector

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+



• CU4/6/7/8: USB 2.0 port (1x4 pin 1.25mm Wafer)

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



3-12 LAN Connector

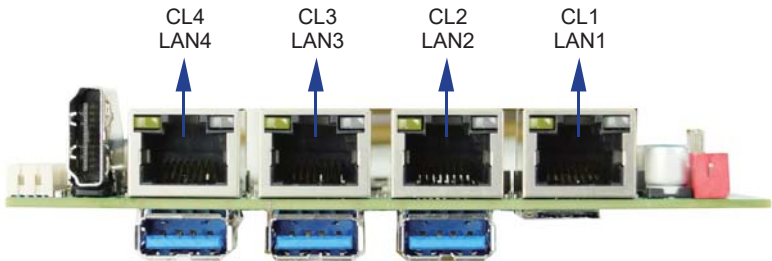
• CL1/2/3/4: LAN RJ45 Connector

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

• LAN RJ45 Connector for 2.5 Giga 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



• **CL11/21/31/41: LAN Wafer (2x4 pin 2.00mm Wafer) (For OEM)**

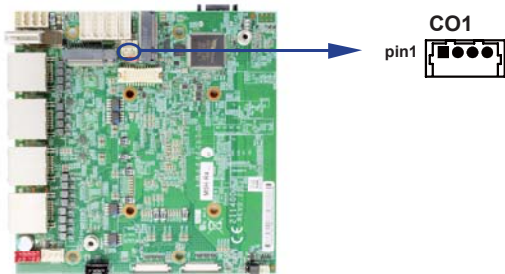
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDI0-	2	MDI0+
3	MDI2+	4	MDI1+
5	MDI1-	6	MDI2-
7	MDI13	8	MDI3+

• **CLED1/2/3/4: LAN LED Wafer (1x4 pin 1.25mm Wafer) (For OEM)**

PIN NO.	DESCRIPTION
1	VCC
2	ACT_LED
3	Speed 1000M
4	Speed 2500M

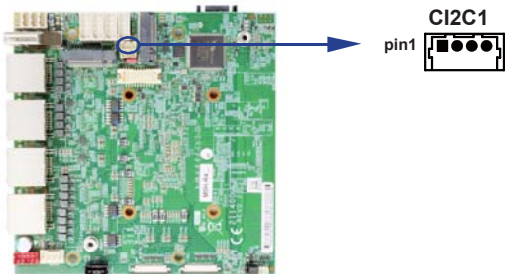
3-13 CO1: SMBUS (1x4 pin 1.25mm Wafer)

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



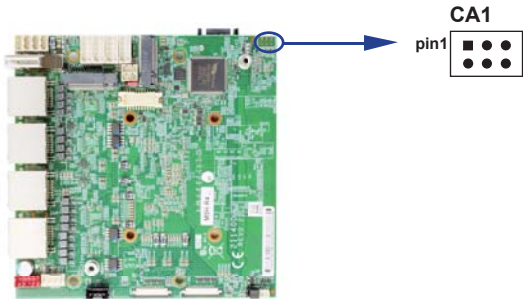
3-14 CI2C1: I2C BUS (1x4 pin 1.25mm Wafer)

PIN NO.	DESCRIPTION
1	+3.3V
2	GND
3	I2C Clock
4	I2C DATA



3-15 CA1: Line-out / Mic-in (2x3 pin 2.00mm Wafer) (For OEM)

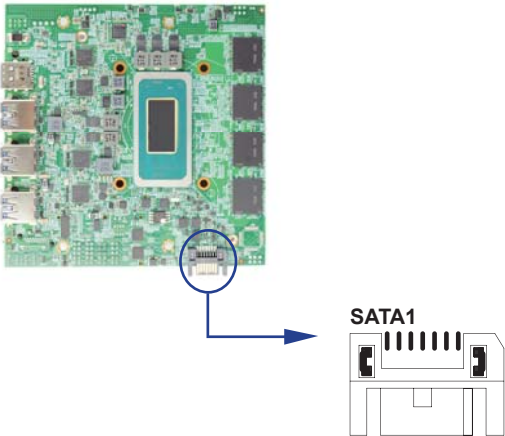
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Line-out-R	2	MIC-IN
3	GND	4	GND
5	Line-out-L	6	MIC-IN



3-16 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



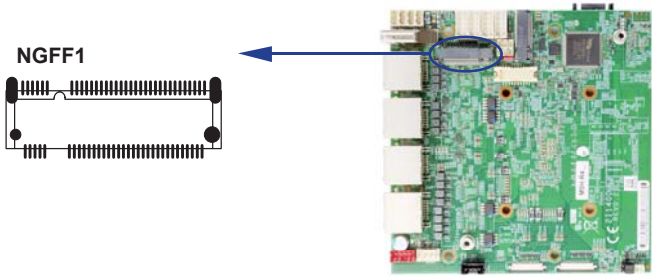
3-17 NGFF1: M.2 NGFF Card M Key Sockets 75pin (Size 2280 H=8.5)

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_MSRp	42	NC
43	PCIE4_Rp0_MSRe	44	NC
45	GND	46	NC
47	PCIE4_Tn0_MSTn	48	NC
49	PCIE4_Tp0_MSTp	50	M2_PRST_N
51	GND	52	SRCCCLKREQ_N
53	CLK_SRC0_DN	54	NC
55	CLK_SRC0_DP	56	NC

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
57	GND	58	NC
Mechanical 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. NGFF1 support mSATA / PCIe Auto detect
- 2. NGFF1 support PCIe4 NVMe device Only

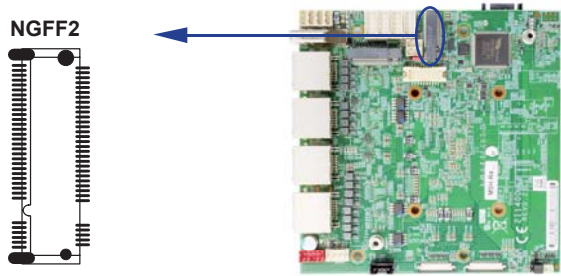


3-18 NGFF2: M.2 NGFF Card B Key Sockets 75pin (Size 3042 H=8.5)

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	Pull up to +3.3V
7	USB2_DP	8	Pull up to +3.3V
9	USB2_DN	10	NC
11	GND		
Mechanical Key			
21	GND	20	NC
23	NC	22	NC
25	NC	24	NC
27	GND	26	Pull up to +3.3V
29	M2_PERn4_U3Rn2	28	NC
31	M2_PERp4_U3Rp2	30	SIM_RST_M2
33	GND	32	SIM_CLK_M2
35	M2_PETn4_U3Tn2	34	SIM_DATA_M2
37	M2_PETp4_U3Tp2	36	SIM_PWR_M2
39	GND	38	NC
41	M2_PERn3	40	NC
43	M2_PERp3	42	NC
45	GND	44	NC
47	M2_PETn3	46	NC
49	M2_PETp3	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 or +3.7V
73	GND	72	+3.3V or +3.7V
75	CFG2 power select	74	+3.3V or +3.7V

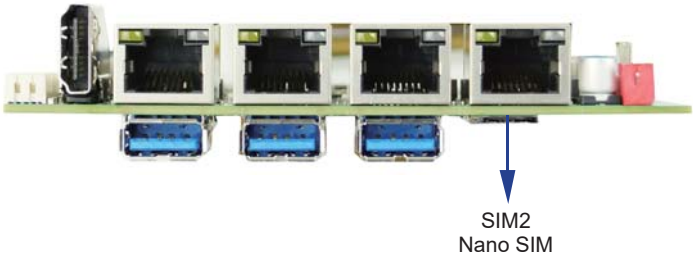
Note:
1. VCC voltage default is +3.3V, when use 4G LTE device
the VCC voltage is +3.7V by Auto detect.



3-19 SIM2: Nano SIM card socket

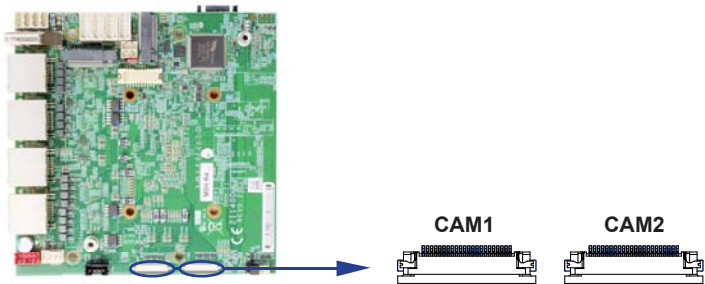
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	5	GND
2	RST	6	NC
3	CLK	7	DATA
4	NC	8	DET

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



3-20 CAM1/2: CSI-2 4 Lane FPC 1x22 pin (0.5mm) Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	I2C_SDA
3	I2C_SCL	4	GND
5	CAM_MCLK	6	CAM_PWDN
7	GND	8	CSI_D3_P
9	CSI_D3_N	10	GND
11	CSI_D2_P	12	CSI_D2_N
13	GND	14	CSI_CLK_P
15	CSI_CLK_N	16	GND
17	CSI_D1_P	18	CSI_D1_N
19	GND	20	CSI_D0_P
21	CSI_D0_N	22	GND



3-21 Connector wafer of Compatible Brand and part number list

Location	CKTS	PITCH	Brand Name	Mating connector	Cable housing
CPI1	2x4 8Pin	2.00mm	JST	B8B-PHDSS	PHDR-08VS
CPO1	1x4 4Pin	2.00mm	JST	B4B-PH-KL	PHR-4
CBT1	1x2 2Pin	1.25mm	MOLEX	53047-0210	51021-0200
CC1/CC2	2x5 10Pin	2.00mm	JST	B10B-PHDSS	PHDR-10VS
CFP1	2x5 10Pin	2.00mm	JST	B10B-PHDSS	PHDR-10VS
CIO1	2x5 10Pin	2.00mm	JST	B10B-PHDSS	PHDR-10VS
EDP1	2x10 20Pin	1.25mm	HIROSE	DF13-20DS-1.25C	DF13-20DP-1.25V
CU4/6/7/8	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CO1	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CI2C1	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CA1	2x3 10Pin	2.00mm	JST	B10B-PHDSS	PHDR-06VS

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.

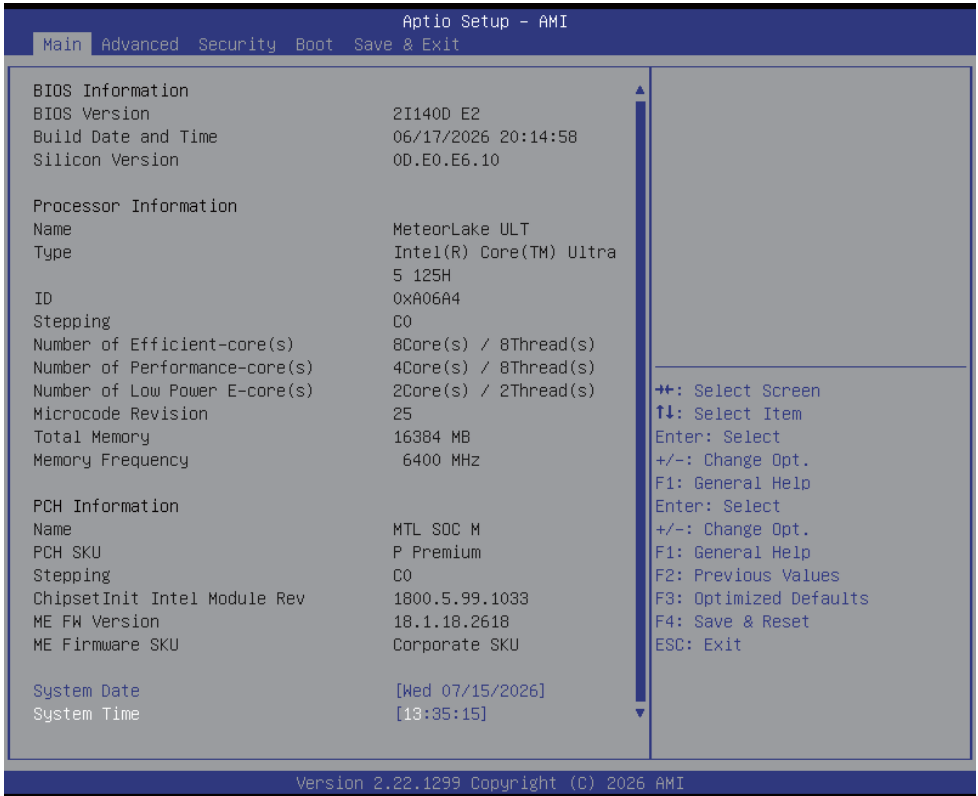
Press Page Up/Page Down or +/- keys to modify the BIOS parameters for the active option.

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

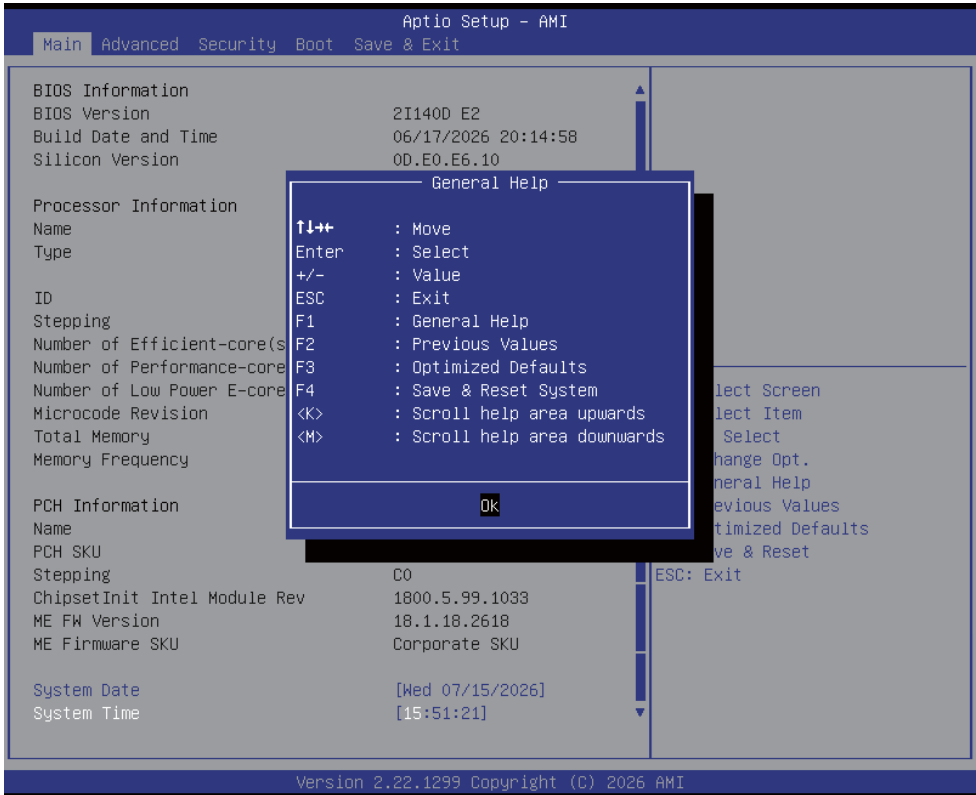


In the above BIOS Setup main menu of, you can see several options.

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

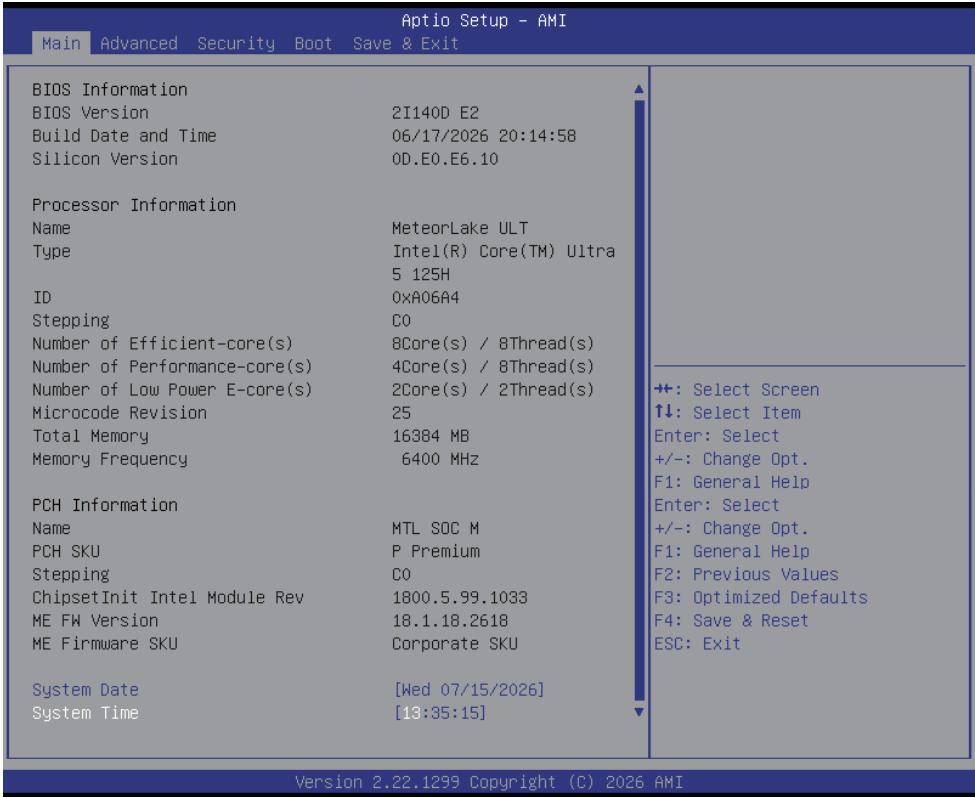
Boot Quiet boot or boot from USB selected.

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.

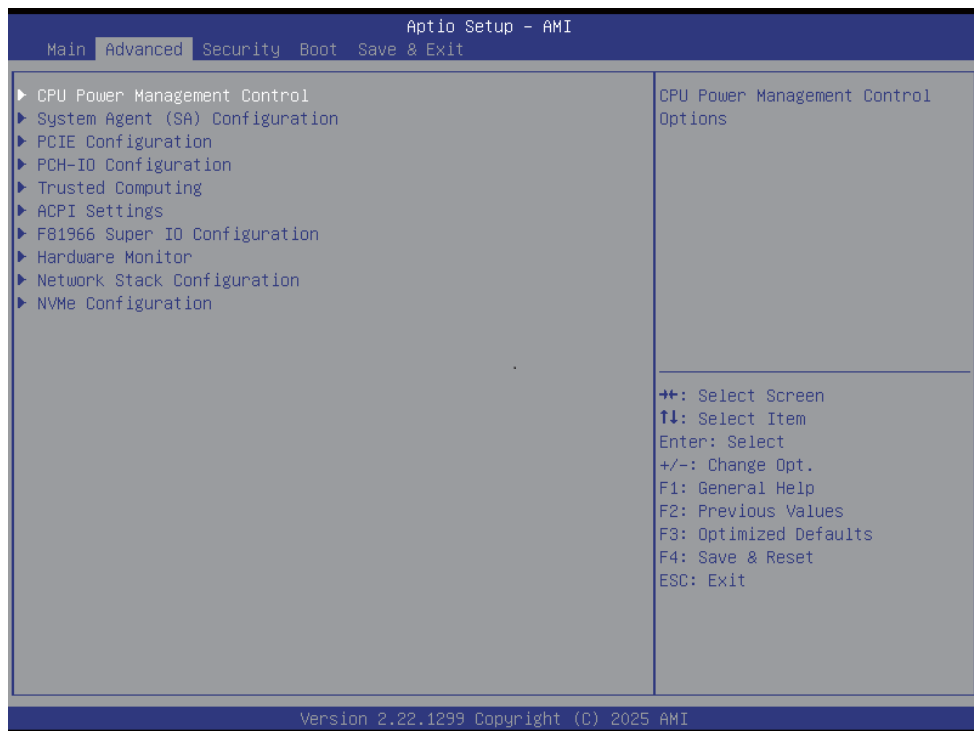
System Date

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

System Agent (SA) Configuration

Please refer section 4-6-2

PCIe Configuration

Please refer section 4-6-3

PCH-IO Configuration

Please refer section 4-6-4

Trusted Computing

Please refer section 4-6-5

ACPI Settings

Please refer section 4-6-6

F81966 Super IO Configuration

Please refer section 4-6-7

Hardware Monitor

Please refer section 4-6-8

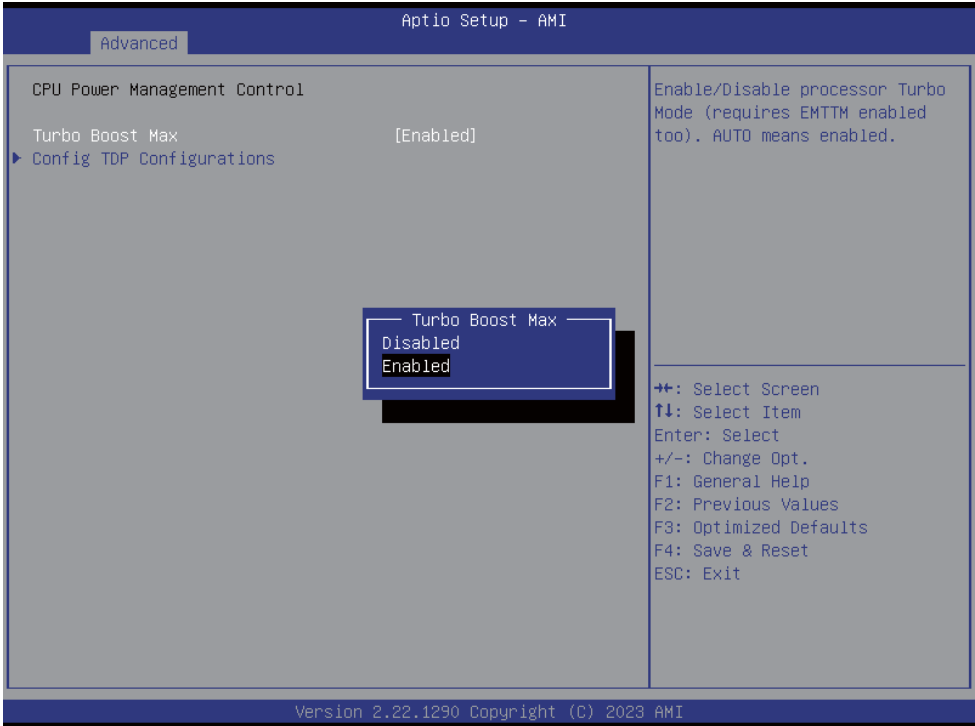
Network Stack Configuration

Please refer section 4-6-9

NVMe Configuration

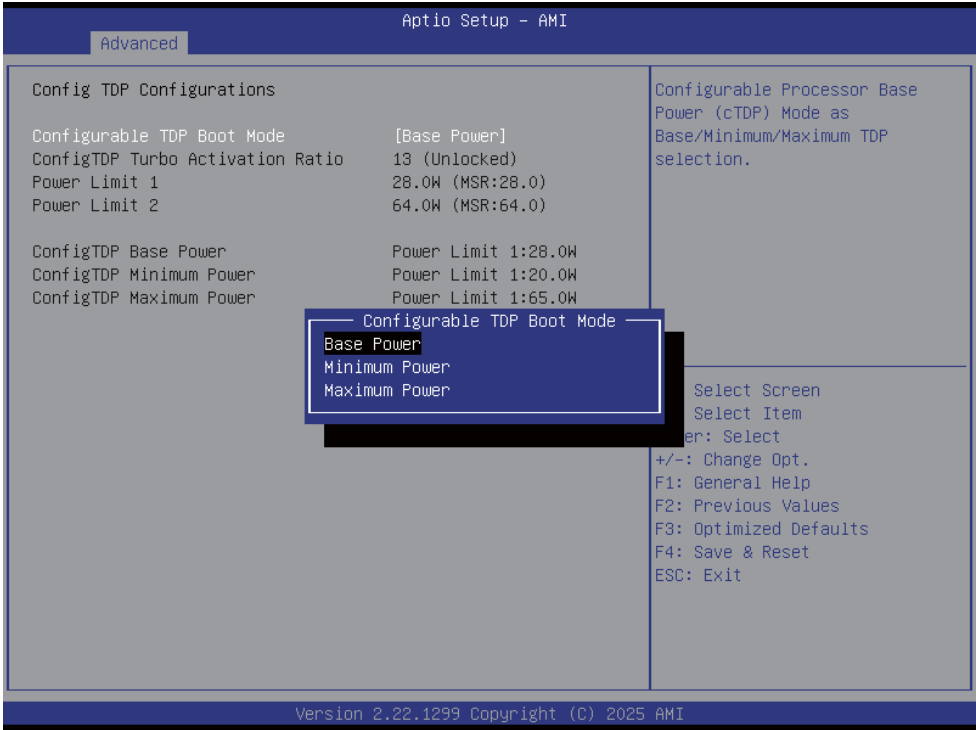
Please refer section 4-6-10

4-6-1 CPU Power Management Control



Turbo Boost Max

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

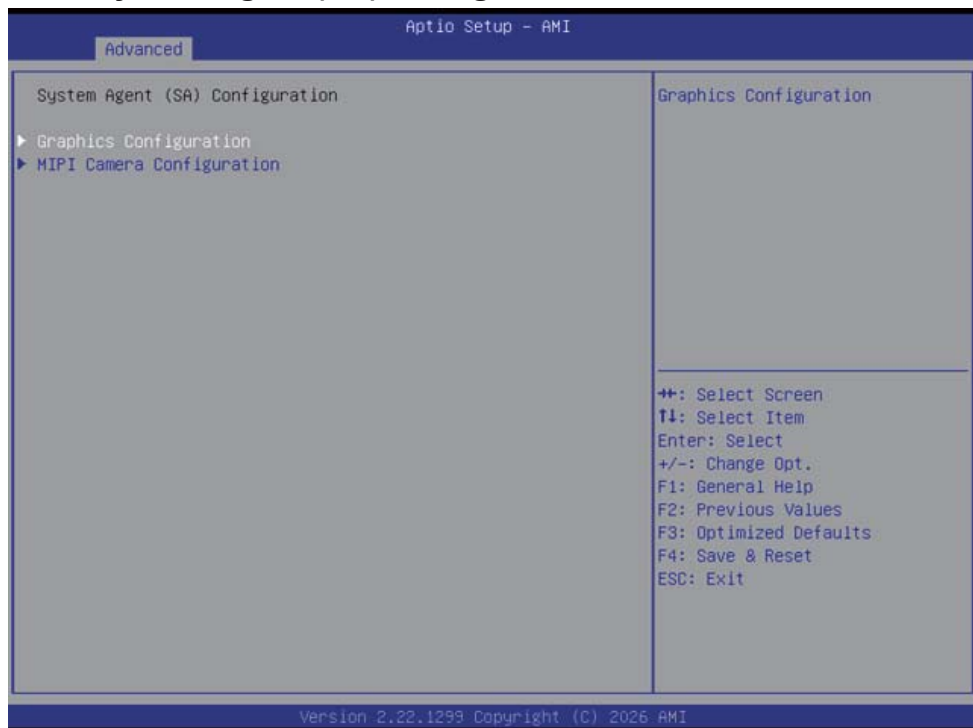


Config TDP Configurations

Configurable TDP Boot Mode

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

4-6-2 System Agent (SA) Configuration



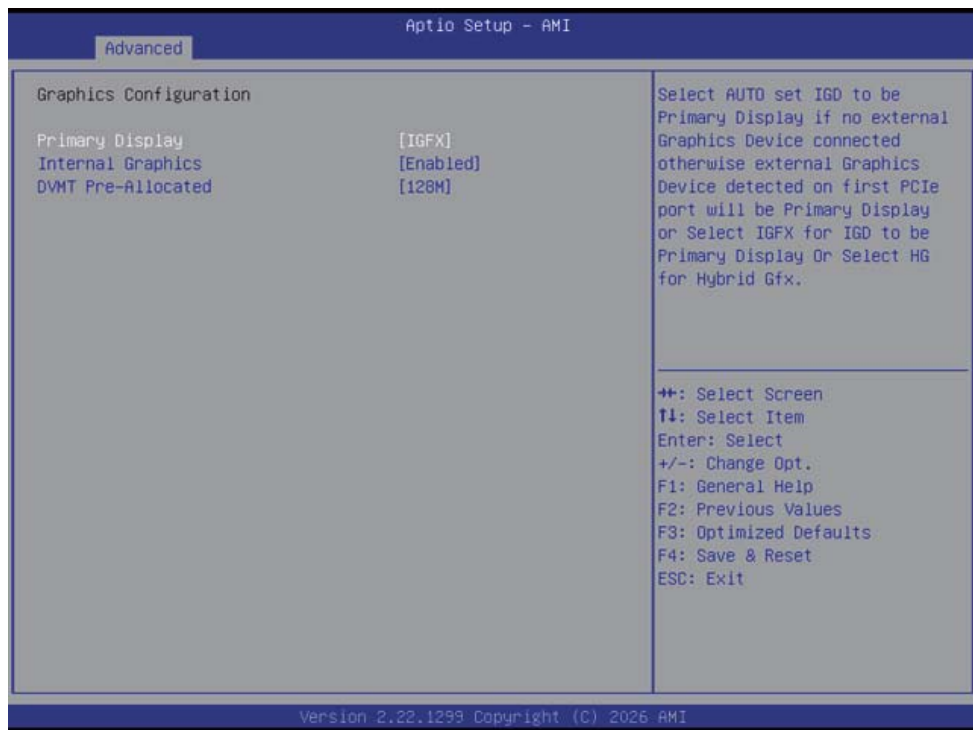
Graphics Configuration.

Please refer section 4-6-1-1

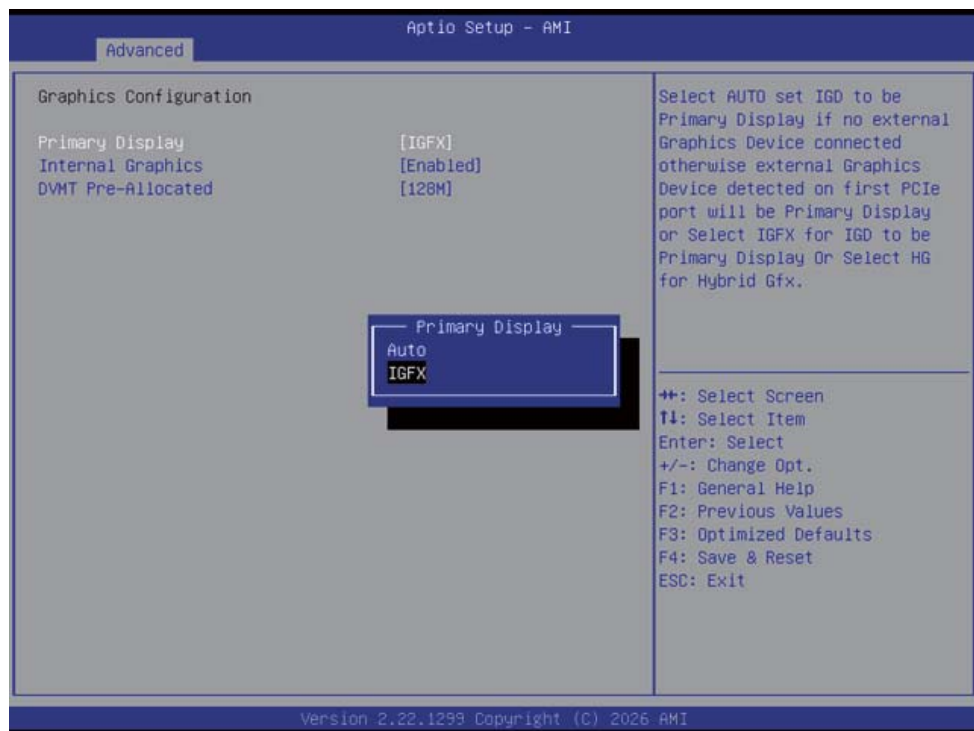
MIPI Camera Configuration.

Please refer section 4-6-1-2

4-6-2-1 ► Graphics Configuration

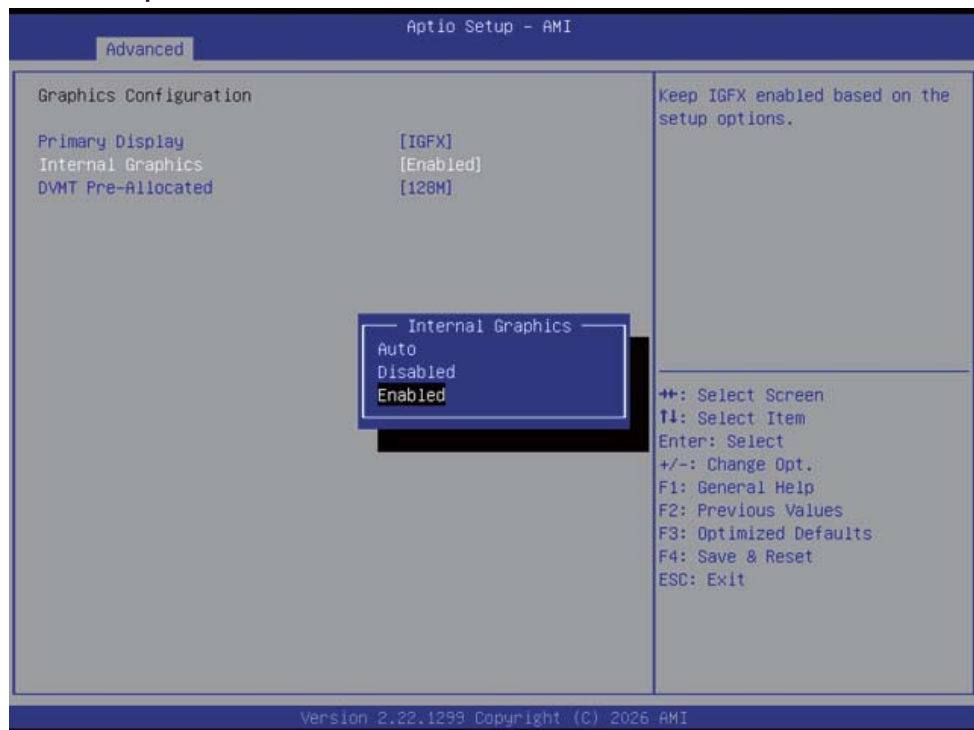


Primary Display



Primary display. The optional settings are: Auto, IGFX

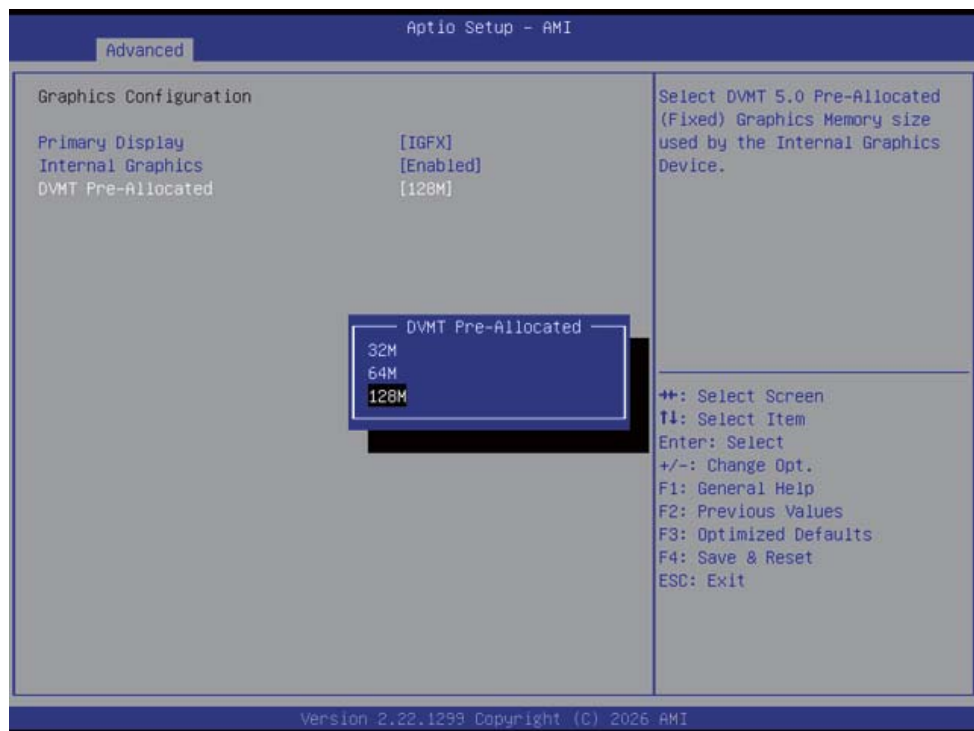
Internal Graphics



Internal Graphics Translation Table Size. The optional settings are:

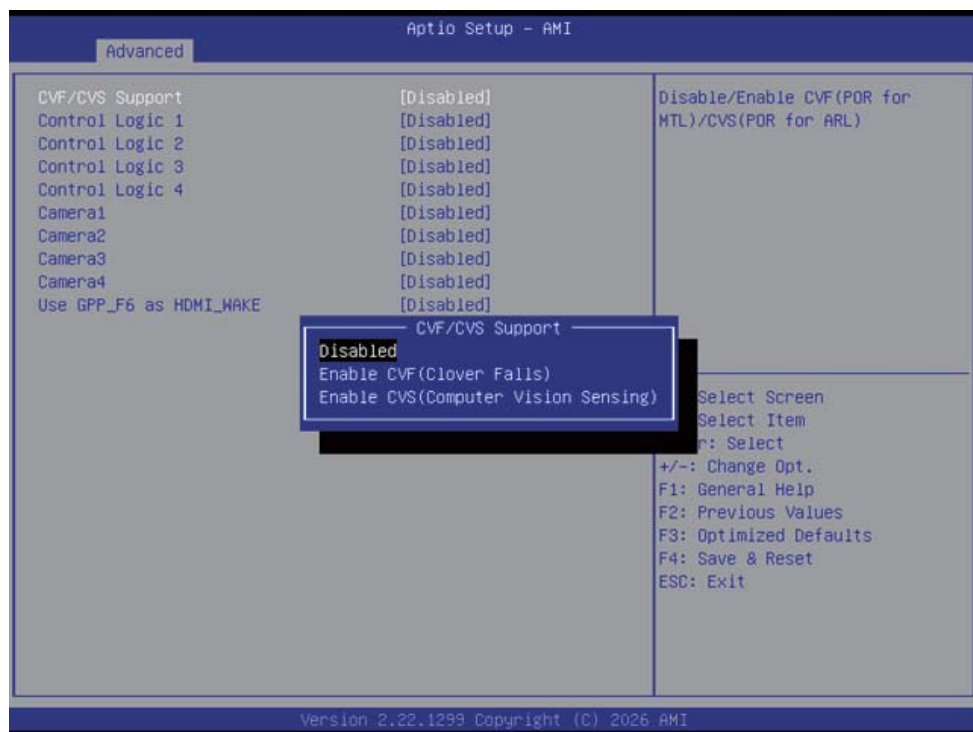
Auto, Disabled, Enabled,

DVMT Pre-Allocated

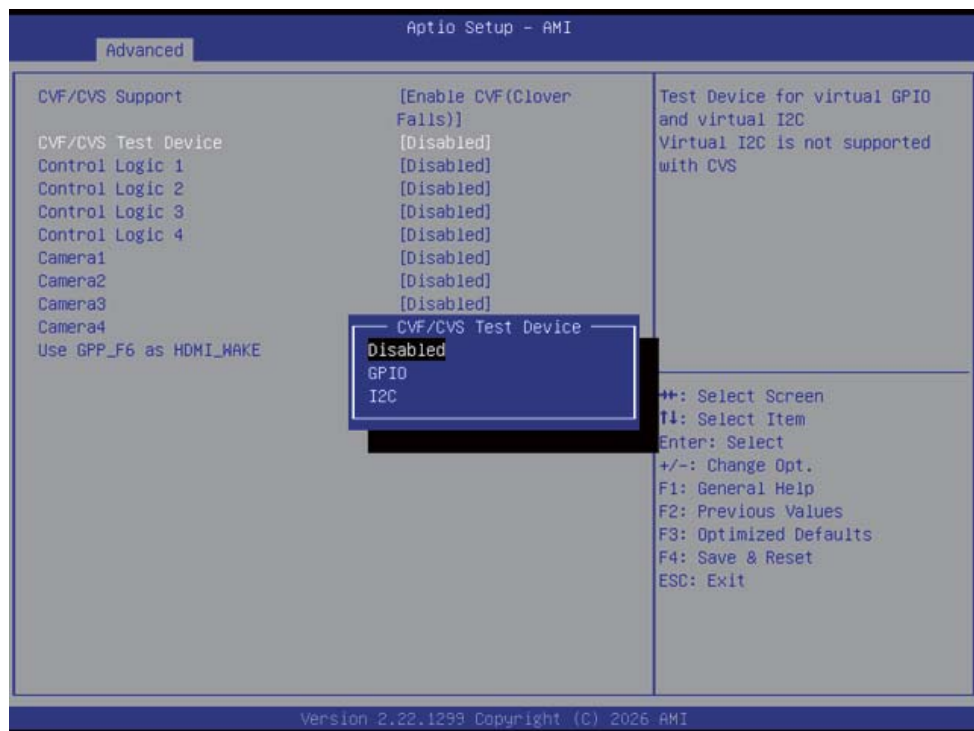


The optional settings are: 32MB, 64MB, 128MB(default)

4-6-2-3 ► MIPI Camera Configuration

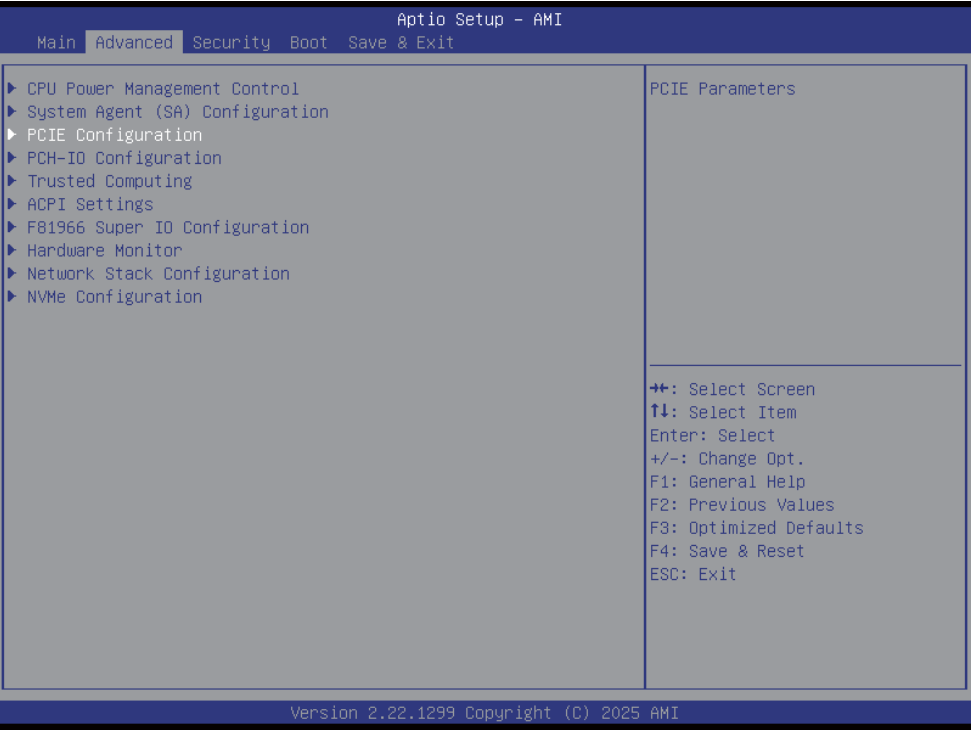


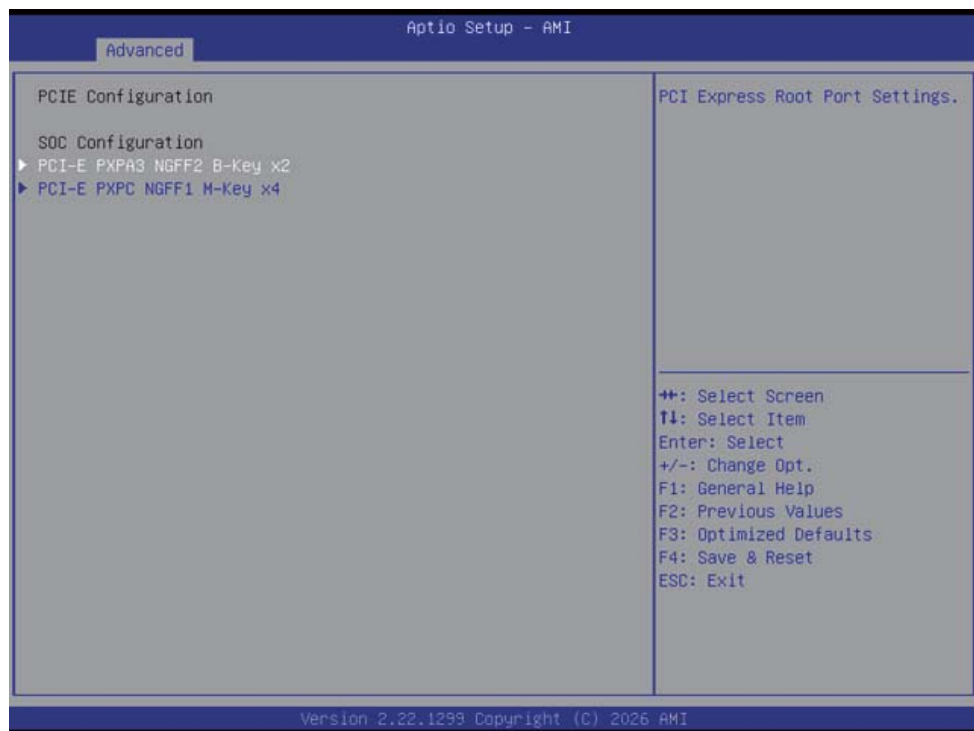
To enable Clover Falls or Computer Vision Sensing mode. Default is Disabled



To select control mode by GPIO or I2C (Depends on Hardware)

4-6-3 PCIE Configuration



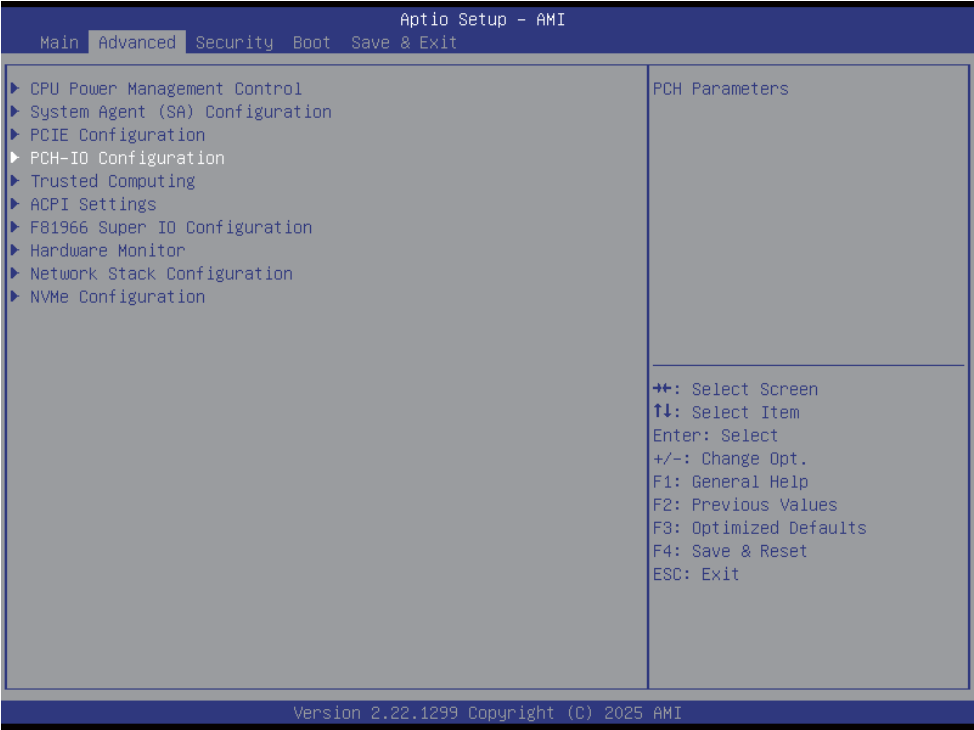


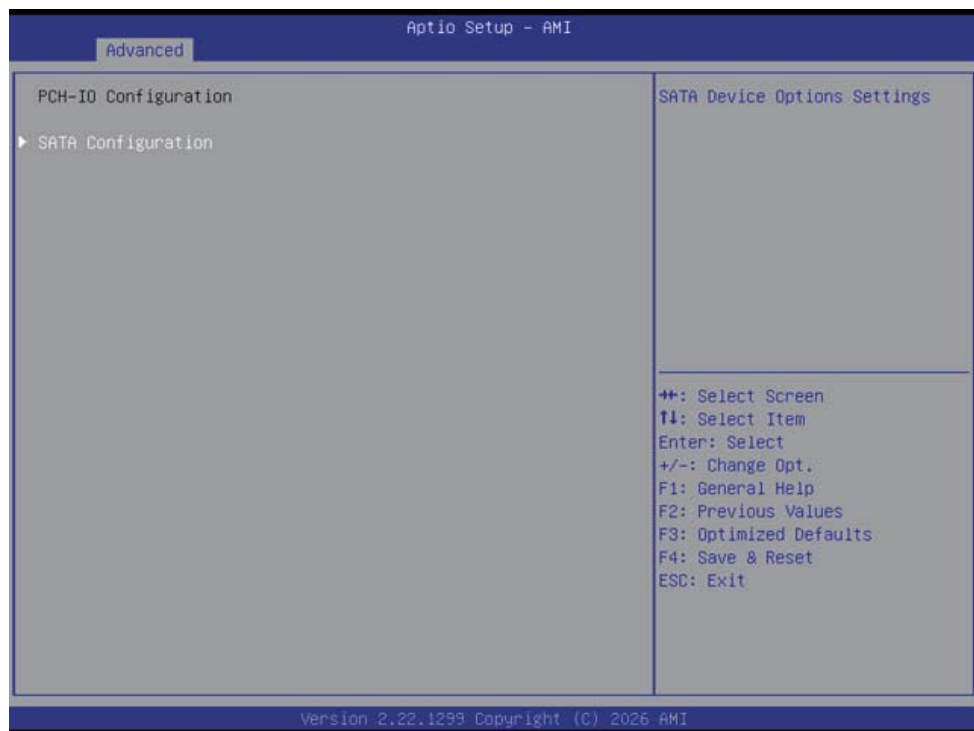
The optional settings are: Enabled (default), Disabled.

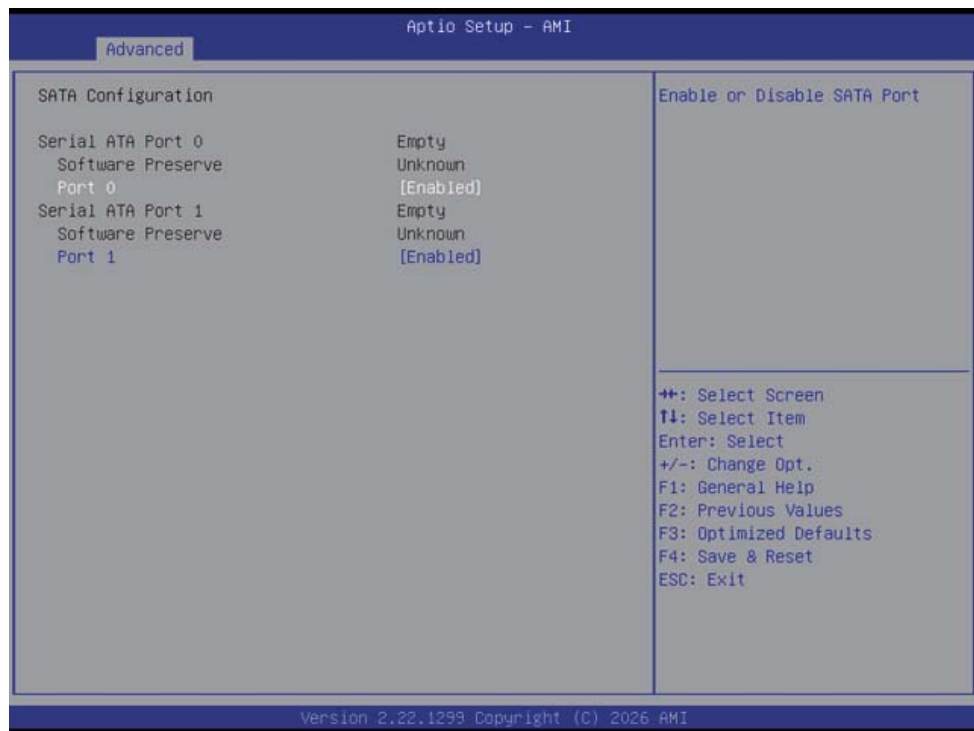
To select NGFF1 & NGFF2 PCI Express port speed.

The optional settings are: Auto (default), Gen1, Gen2, Gen3 Gen4

4-6-4 PCH-IO Configuration



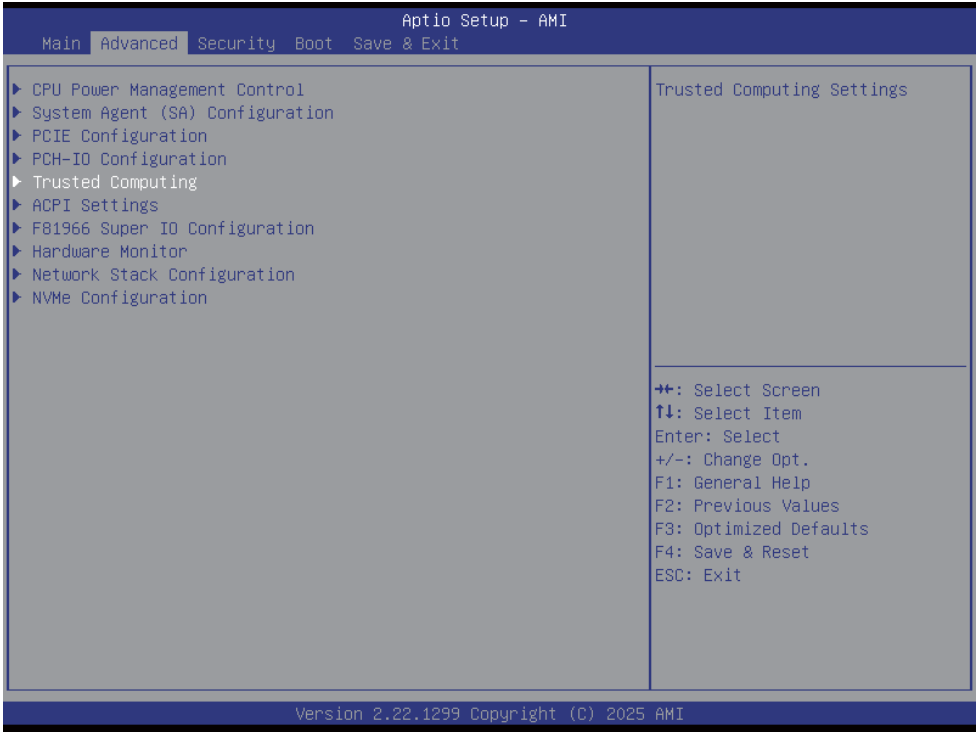




SATA Configuration

To enable or disable SATA mode, default is enabled.

4-6-5 Trusted Computing

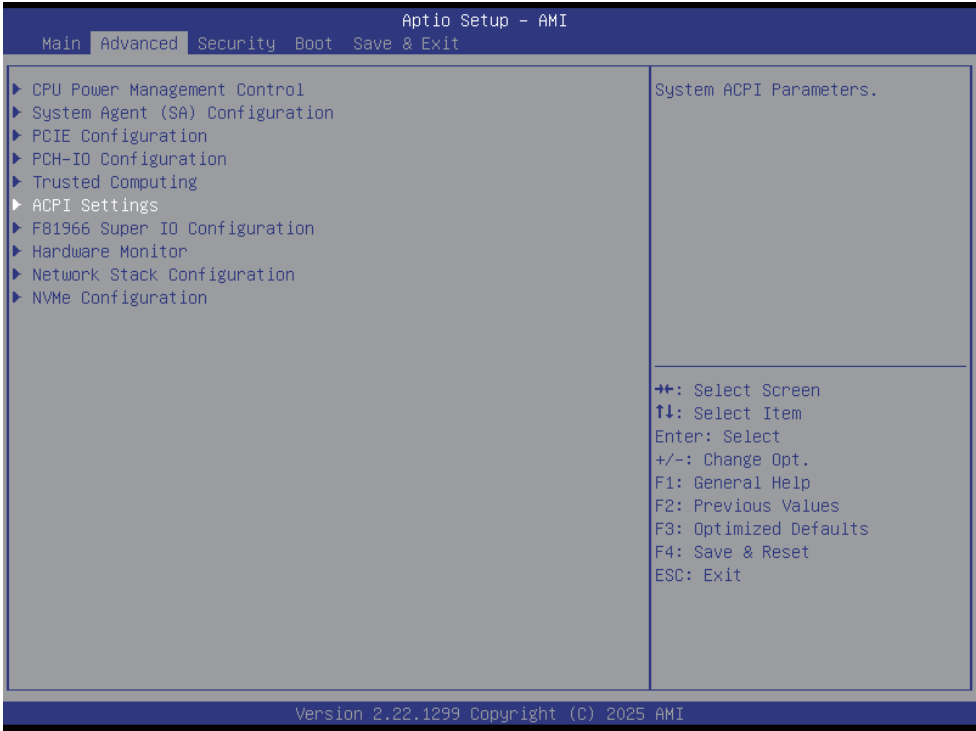


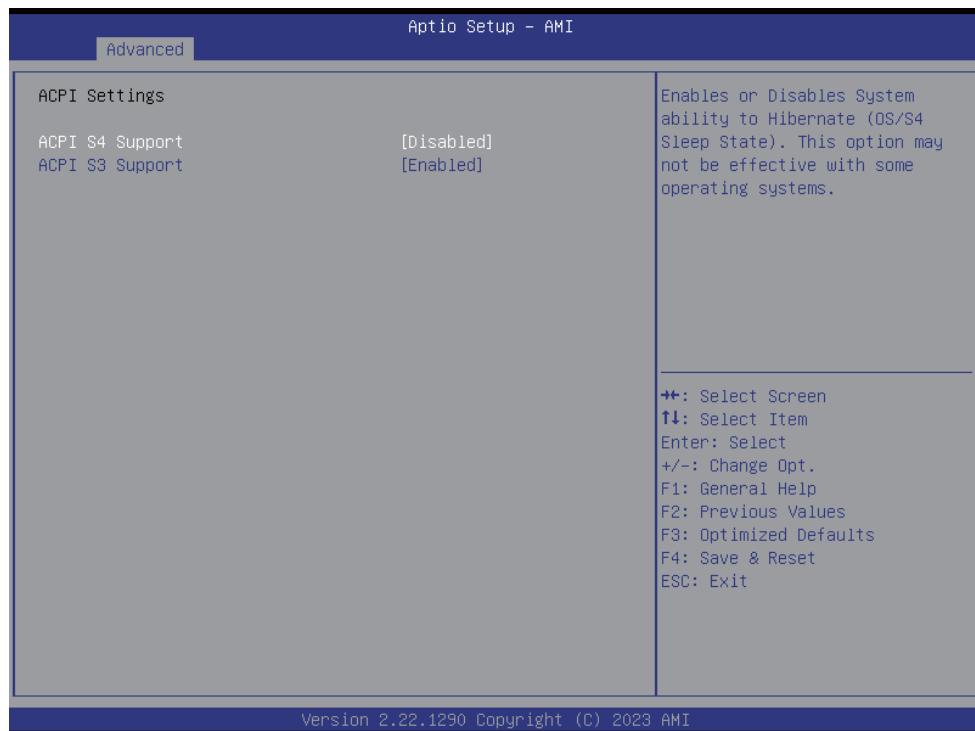


Security Device Support

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

4-6-6 ACPI Settings





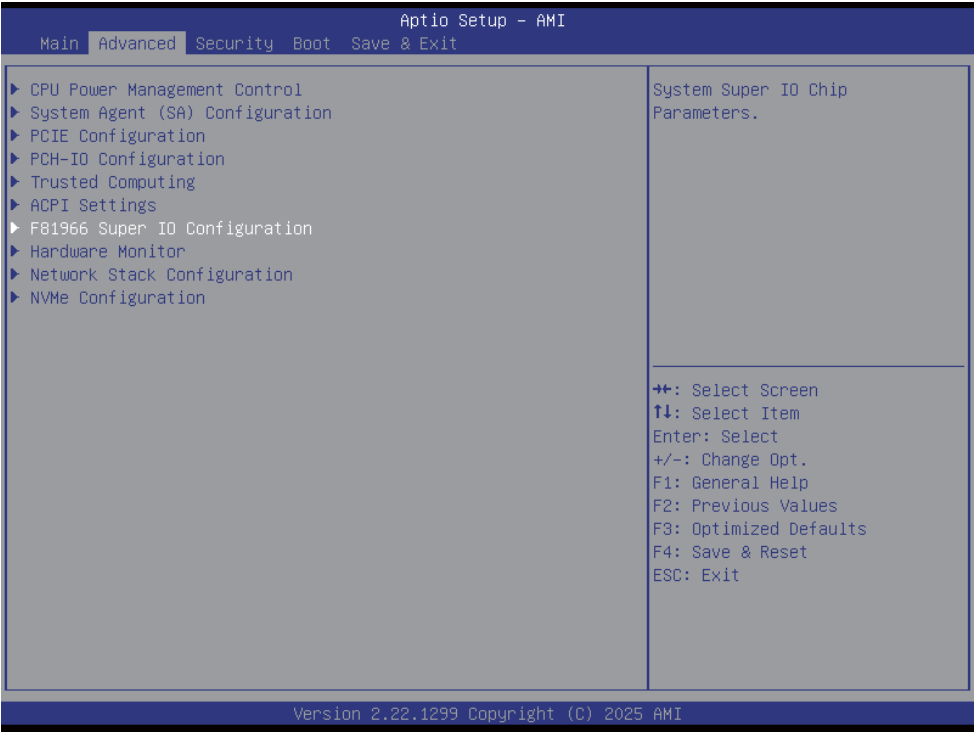
ACPI S4 Support

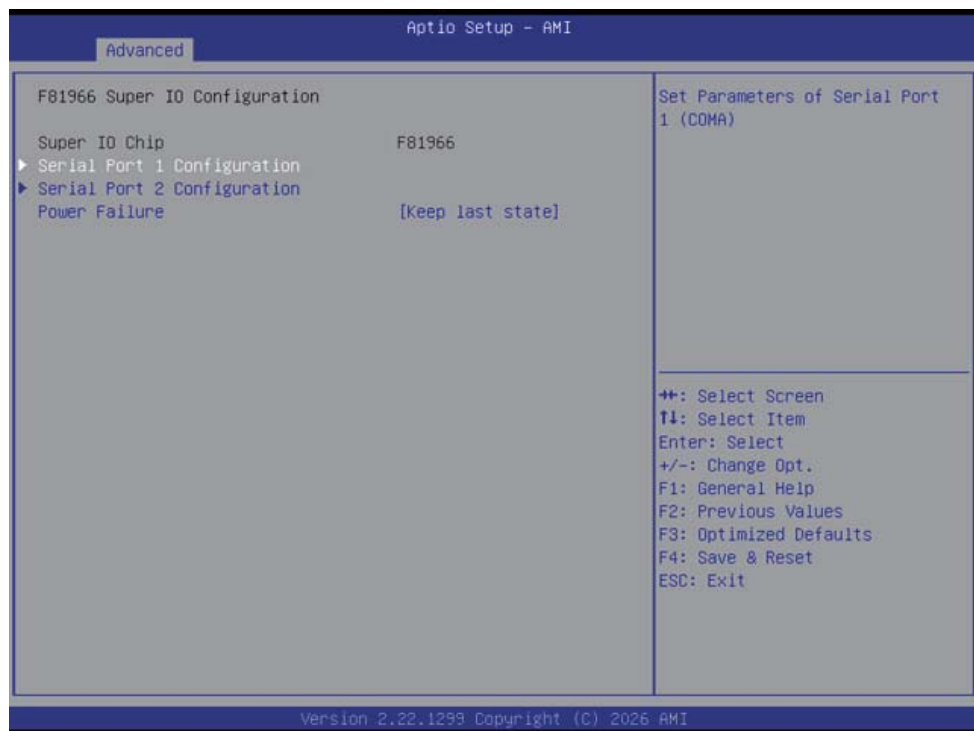
To enable support S4 mode, default is Disabled.

ACPI S3 Support

To enable support S3 mode, default is Enabled.

4-6-7 F81966 Super IO Configuration





Serial Port 1 Configuration

Please refer section 4-6-6-1

Serial Port 2 Configuration

Please refer section 4-6-6-2

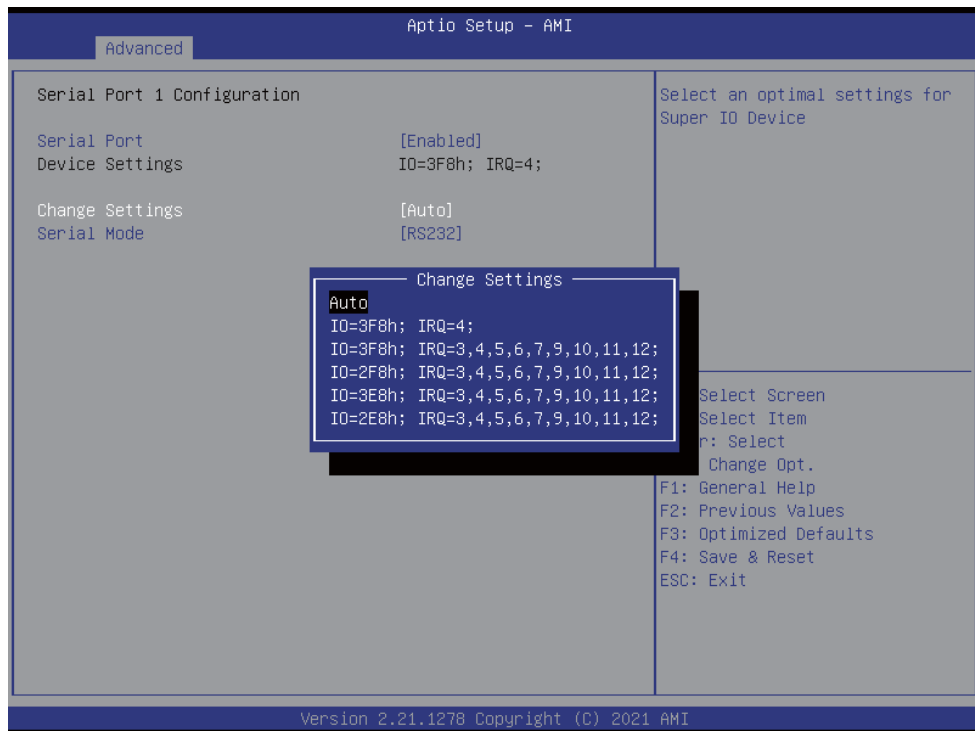
Power Failure

Please refer section 4-6-6-3

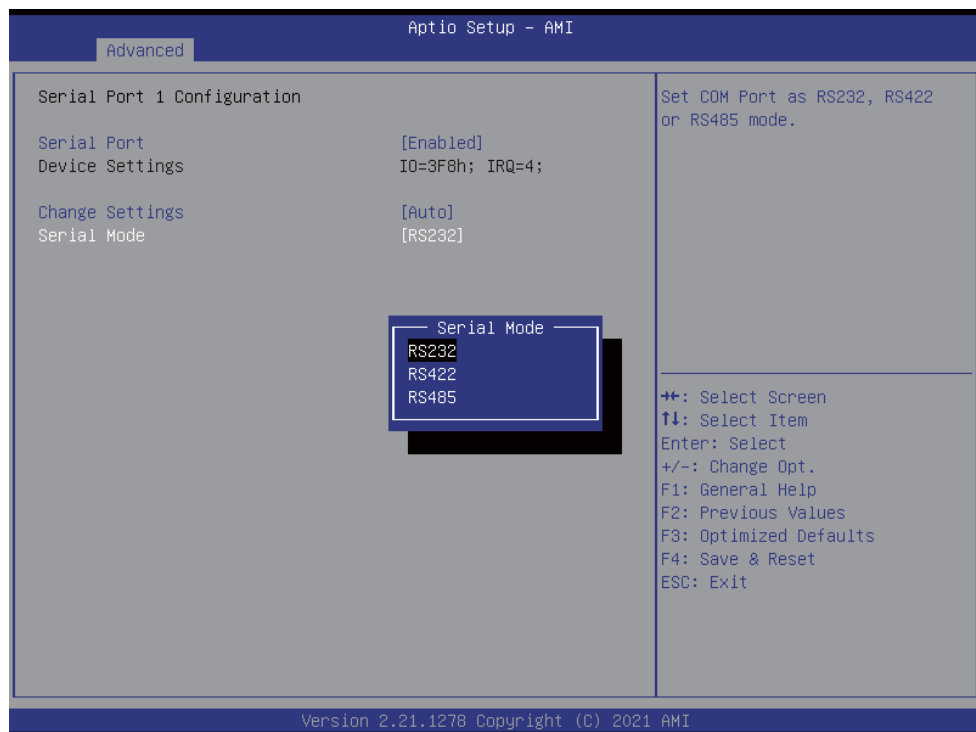
4-6-7-1 ► Serial Port 1 Configuration



To Enable Serial port or not, default is Enabled.



Change Settings, default is Auto.

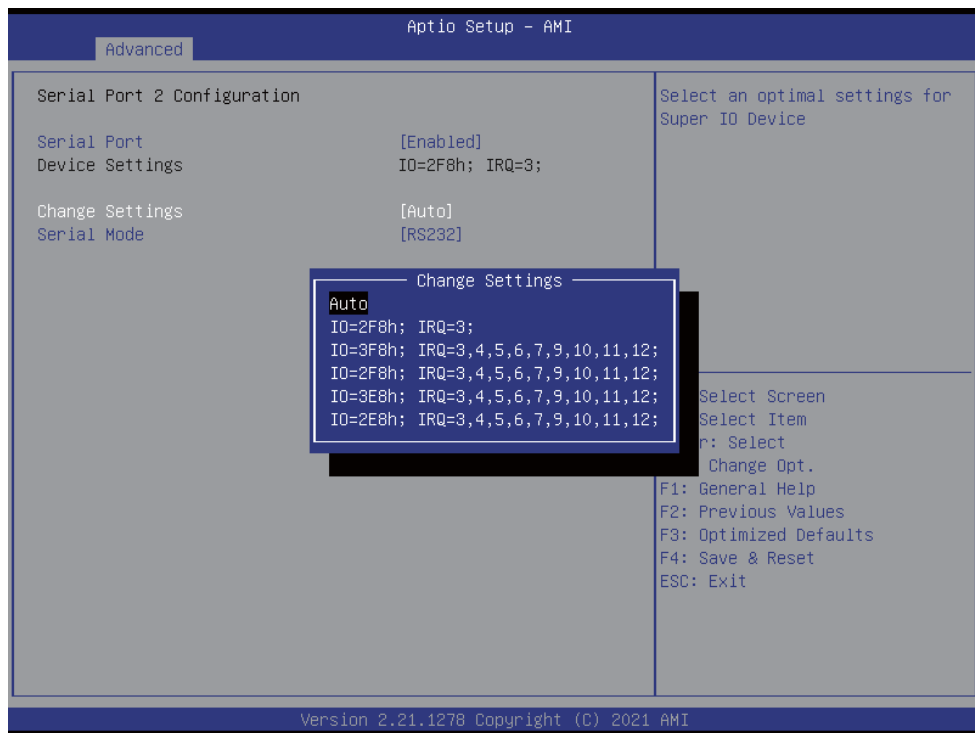


To select the Serial port to RS232 / RS422 / RS485, default is RS232.

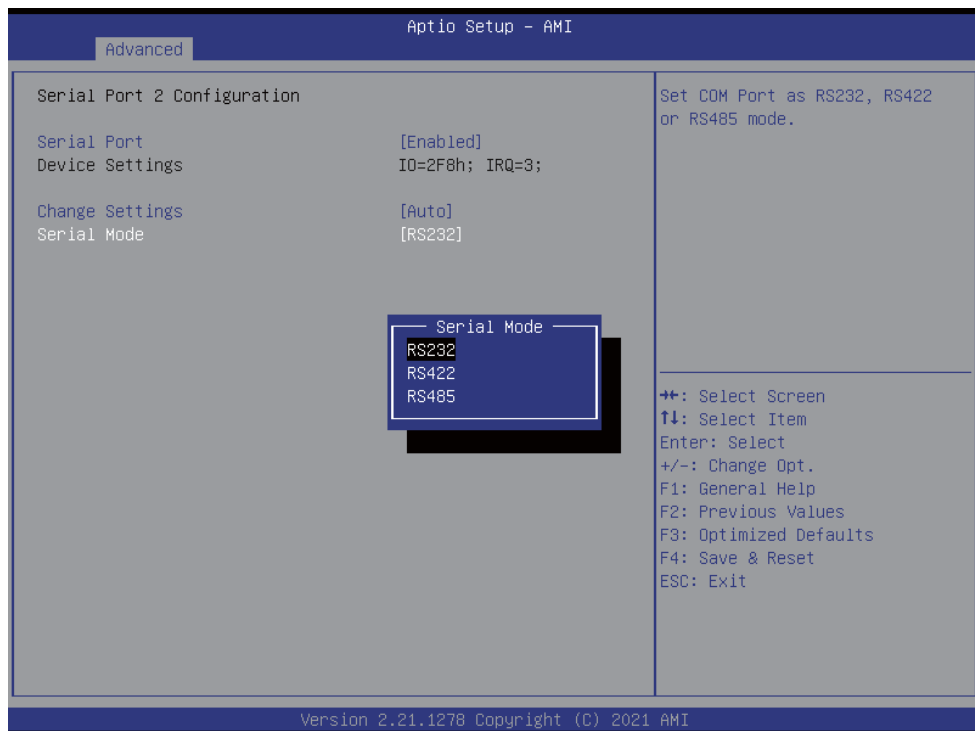
4-6-7-2 ► Serial Port 2 Configuration

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.

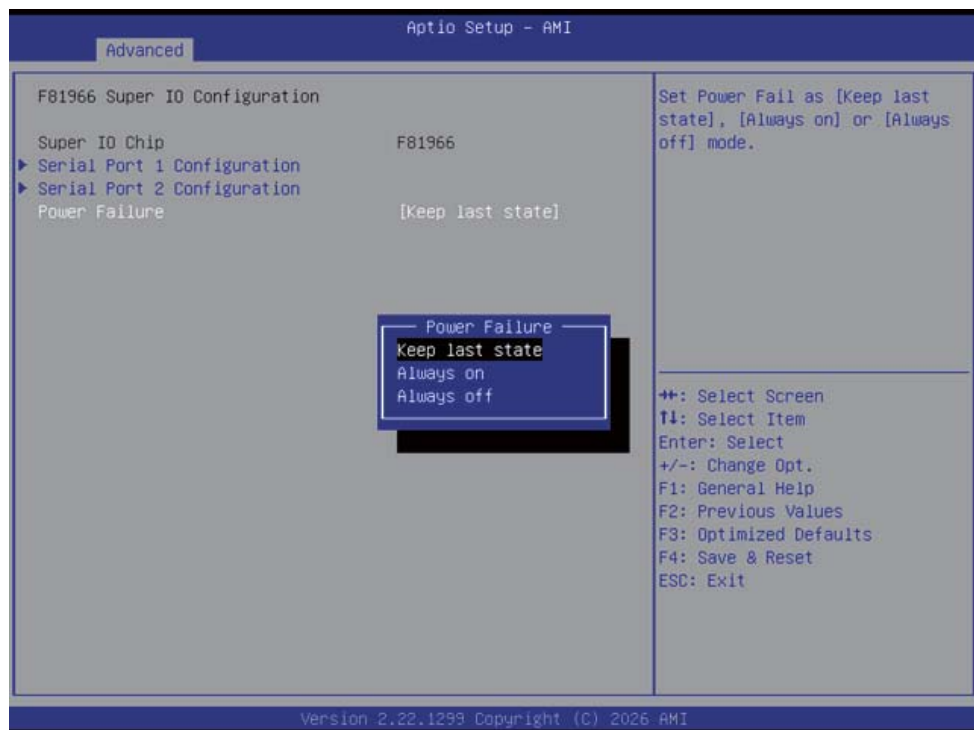


Change Settings, default is Auto.



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

4-6-7-3 ► Power Failure



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

4-6-8 Hardware Monitor





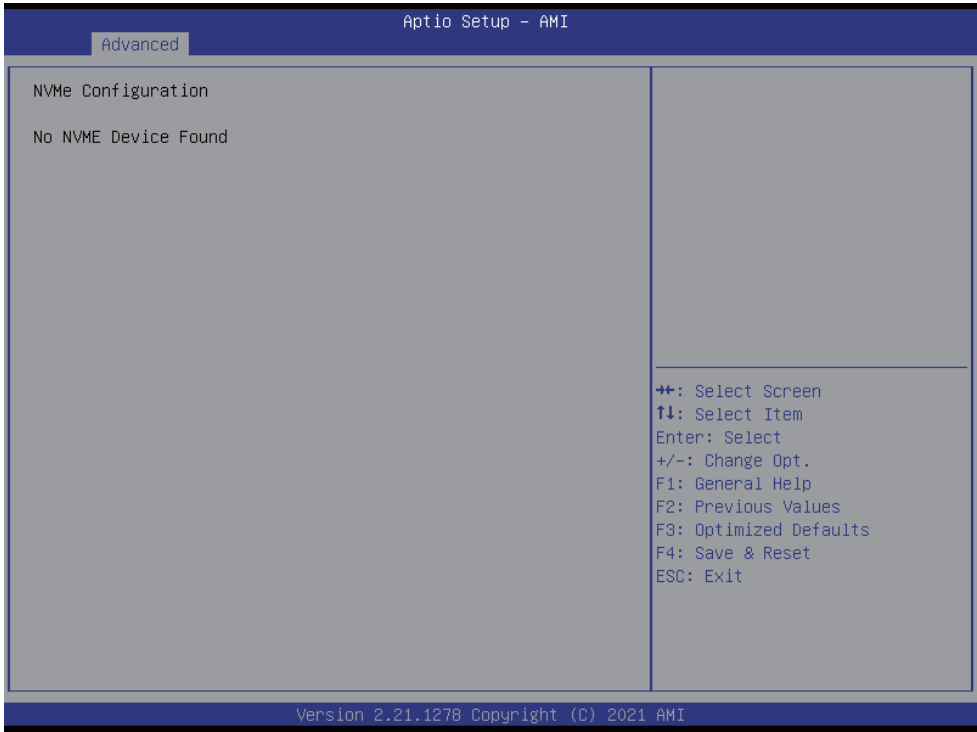
CPU Fan Mode: To adjust Fan speed manually or Auto. Default is Auto.

4-6-9 Network Stack Configuration



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

4-6-10 NVMe Configuration



To detect NVMe storage automatically.

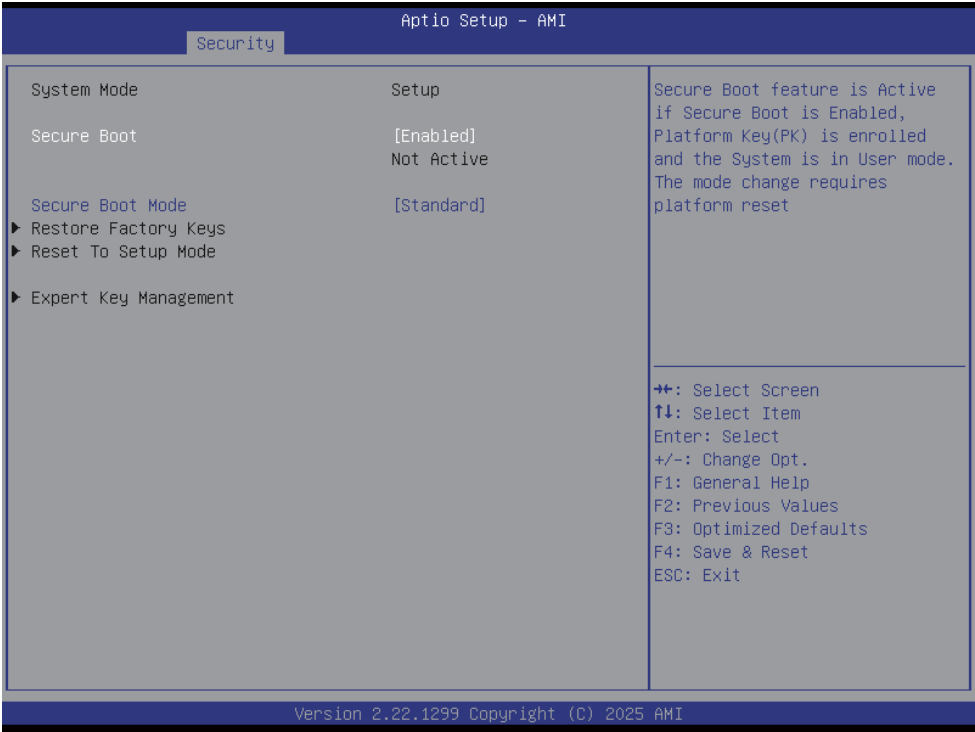
4-7 Security



Administrator Password

User Password

To set up an Administrator or an User password



Secure Boot
To active secure boot

4-8 Boot



Bootup NumLock State

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

Quiet Boot

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

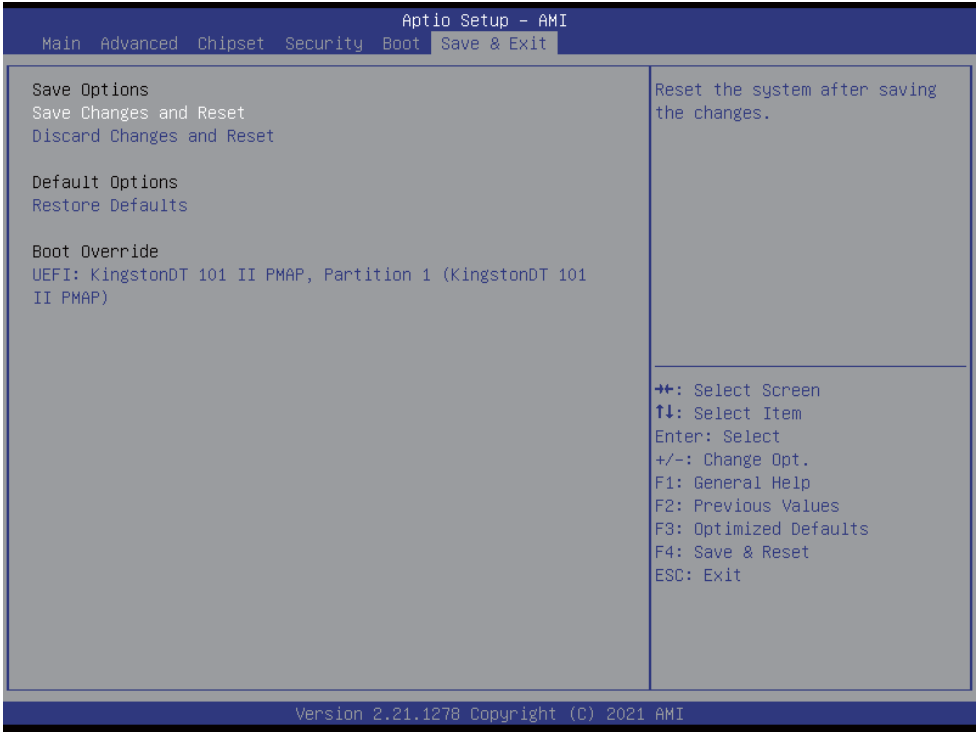
Wake-Up On LAN

The optional settings are: Enabled (default), Disabled

Wake-Up On USB

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

4-9 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

4-10 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 2I140D 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 2I140DA2.ROM -BIOS -ALL

2I140DA2.ROM is the file name of the latest BIOS.

It may be 2I140DA1.ROM or 2I140DA2.ROM, etc.

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

By Bay Trail series mainboard, please type

X:\: H2OFFT-D.EXE 2I140DA2.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)