

3I640DW

**Intel Elkhart Lake ATOM® x6413E / J6412 SoC CPU,
DDR4 SODIMM,
5 x LAN / 2 x HDMI / USB / COM / M.2**

All-In-One SBC

**Intel Elkhart Lake ATOM® x6413E / J6412 SoC CPU
2 x HDMI, eDP, 5 x LAN, 8 x USB
1 x Mini PCIe, 1 x M.2, 1 x Nano SIM
2 x COM, Wide Range DC-IN 9~36V**

CAUTION

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

NO. 3I640DW

Release date: Sep. 19. 2023

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User Manual edition 0.1, Sep. 19. 2023

Warning !

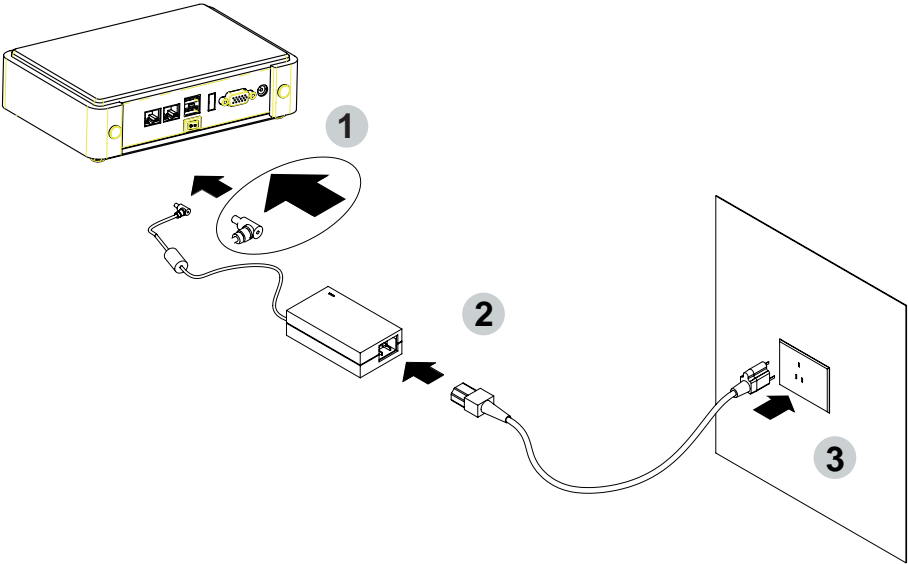
1. Battery
Batteries on board are consumables.
The life time of them are not guaranteed.
2. Fanless solution with HDD
The specification & limitation of HDD should be considered carefully when the fanless solution is implemented.
3. We will not give further notification in case of changes of product information 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

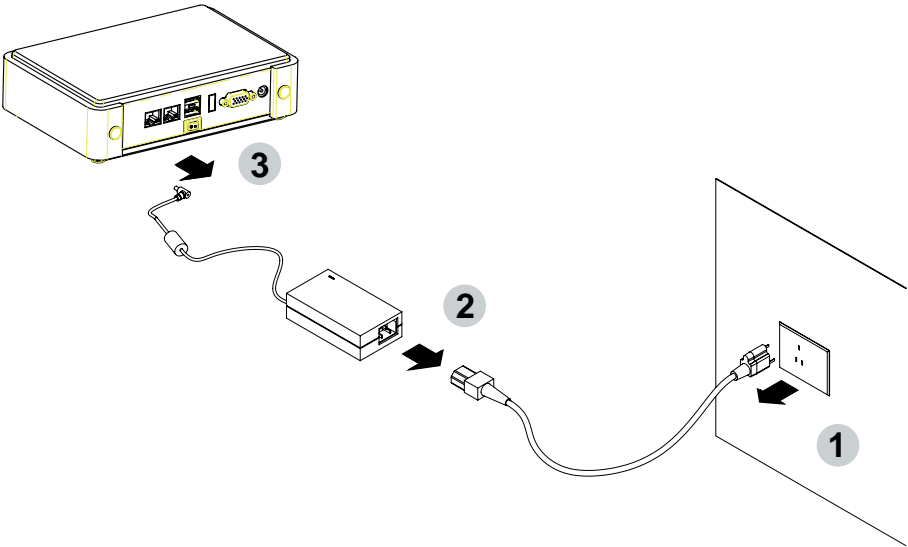
1. Before linking power supply with the motherboard, please attach DC-in adapter to the motherboard first. Then plug the adapter power to AC inlet.
Always shut down the computer normally before you move the system unit or remove the power supply from the motherboard. Please unplug the DC-in adapter first and then unplug the adapter from the AC inlet.
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 invalidate 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.
11. **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 3I640DW is a 3.5" (146 x 102 mm) motherboard powered with Intel Atom® x6000E series and Celeron® J (formerly Elkhart Lake) processor & offered the ideal platform for high performance applications. 3I640DW integrated 5 x 2.5 GbE LAN, 8 x USB, 2 x COM Port, 2 x HDMI (or DP) display interface and 1 x Mini PCIe, 1 x M.2 expansion slot offers the ideal platform for graphics performance with integrated AIoT features, real-time performance, manageability, and security. 3I640DW with excellent processor performance, multiple Giga Ethernet ports and wide range 9-36V DC-IN features is the ideal solution for AI accelerators platform and advanced Edge AI, Intelligent Control, Factory Automation Industry 4.0, Internet of Things (IoT) and Edge Computing applications

The 3I640DW supports high-speed data transfer interfaces such as PCIe gen2, USB 3.0, and SATA 6 Gb/s (SATA III) for mSATA interface M.2 B-Key device, with one-channel DDR4 3200 MHz memory up to 32 GB SODIMM slot and supports two serial port RS232 / RS485 / RS422 jumper free auto switch by BIOS. It supports 1 port of USB 3.0, 7 port of USB 2.0. The expandable interfaces include 1 Mini PCIe for PCIe and USB interface, 1 M.2 B-Key for SATA and USB 3.0 / 2.0 with nano SIM socket.

The embedded motherboard 3I640DW is specially designed with Wide-Range Voltage DC in (9~36V) for widely varying input voltage requirement. It supports with five 2.5 Gbps Ethernet for seamless broadband connectivity. With Wake-On LAN function and the PXE function in BIOS, these are perfect control boards for networking devices.

1-1 Major Feature

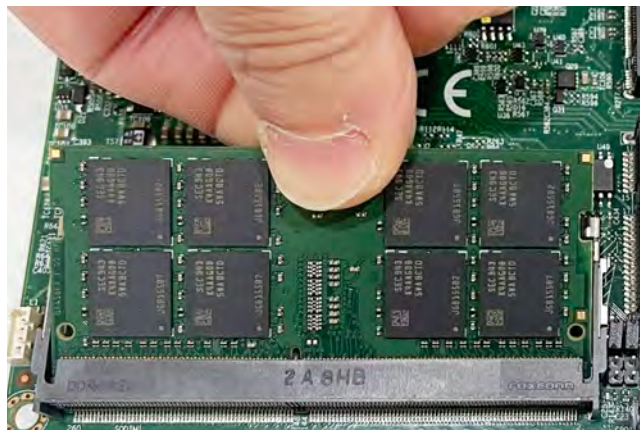
1. Intel® Atom x6413E Processor 1.5GHz / 2.7GHz (Quad Core),
Intel® Celeron Processor J6412 2.0GHz / 2.6GHz (Quad Core)
2. Intel® UHD Graphics for 10th Gen Intel® Atom x6413E 500MHz / 750MHz,
Intel® Celeron J6412 400MHz / 800MHz
3. DDR4 SODIMM slot x 1, up to 32GB
4. Support 5 x 2.5 Gbps Intel LAN port
5. Support 2 x RS232 selectable to RS485 / RS422 by BIOS
6. 1 x USB 3.0 and 7 x USB 2.0
7. Support extended 1 x Mini PCIe for PCIe and USB 2.0,
1 x M.2 B-Key for SATA and USB 3.0 / 2.0 with SIM socket
8. Hardware digital Input & Output, 4 x DI / 4 x DO, Hardware Watch Dog Timer,
0~255 sec programmable
9. Wide Range DC IN +9V~36V

1-2 Specification

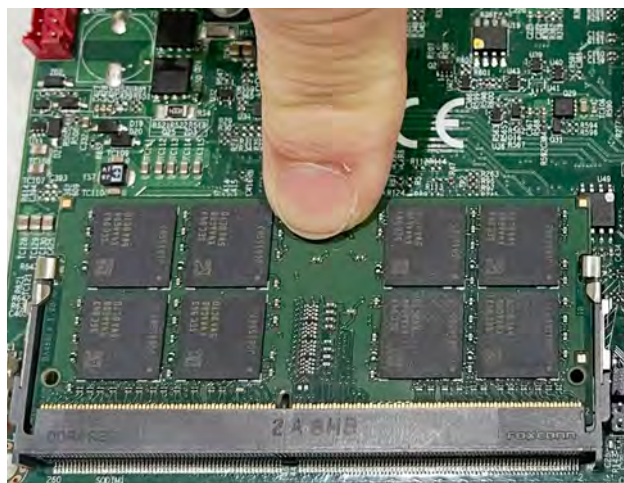
1. **SOC:** Intel® Atom x6413E Processor 1.5GHz / 2.7GHz (Quad Core),
Intel® Celeron Processor J6412 2.0GHz / 2.6GHz (Quad Core)
2. **Memory:** DDR4 SODIMM slot x 1, up to 32GB
3. **Graphics:** Intel® UHD Graphics for 10th Gen Intel® Atom x6413E 500MHz / 750MHz,
Intel® Celeron J6412 400MHz / 800MHz
4. **LAN:** 5 Intel I225 LAN chipset with 2.5 Gbps
5. **I/O Chip:** Switch chipset for 2 port RS232 / RS422 / RS485 selected by BIOS
6. **USB:** 1 type A USB 3.0, 7 x USB 2.0
7. **WDT/DIO:** Hardware digital Input & Output, 4 x DI / 4 x DO (Option) /
Hardware Watch Dog Timer, 0~255 sec programmable
8. **Expansion interface:** one Mini PCIe for PCIe and USB 2.0, one M.2 B-Key for SATA
and USB 3.0 / 2.0 with SIM socket
9. **BIOS:** Insyde UEFI BIOS
10. **Dimension:** 146 x 102 mm
11. **Power:** On board DC +9~36V

1-3 Installing the SO-DIMM

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

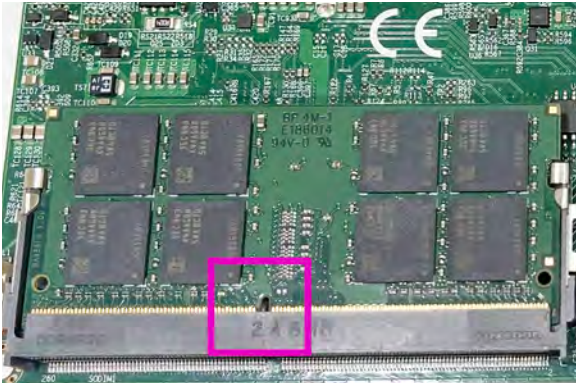


2. Press the SO-DIMM into the connector until you hear a click.

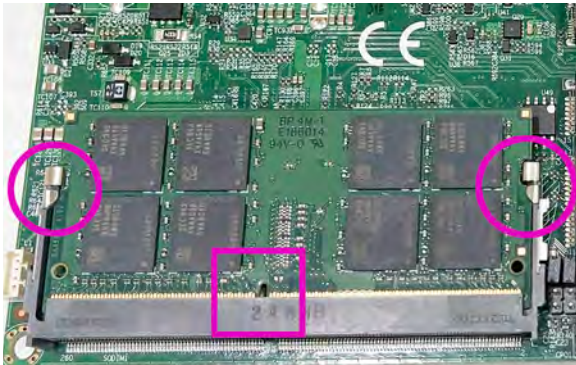


Notices:

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

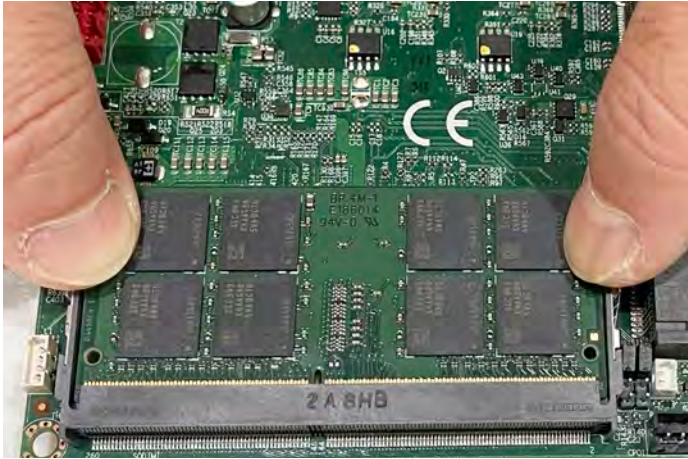


2. Make sure the retaining clips (on two sides of the slot) lock onto the notches of the card firmly.

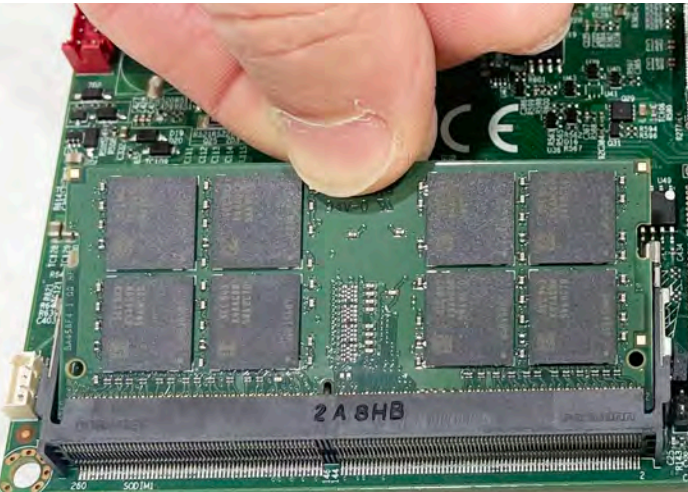


1-3-1-1 Removing the SO-DIMM

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

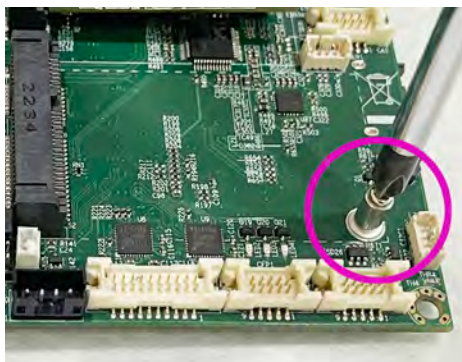


2. Lift the SO-DIMM out of its connector carefully.



1-4 Installing the Mini PCI-e Card (Full Size)

1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle



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



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

1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle

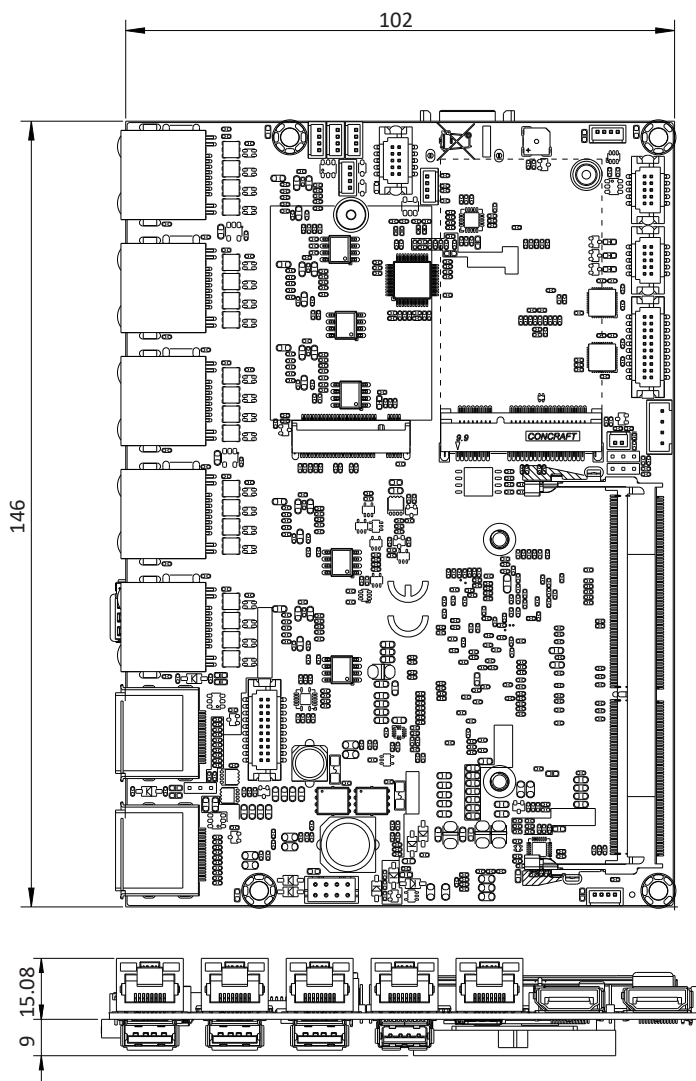


3. Gently push down the Mini Card and screw the screw back.



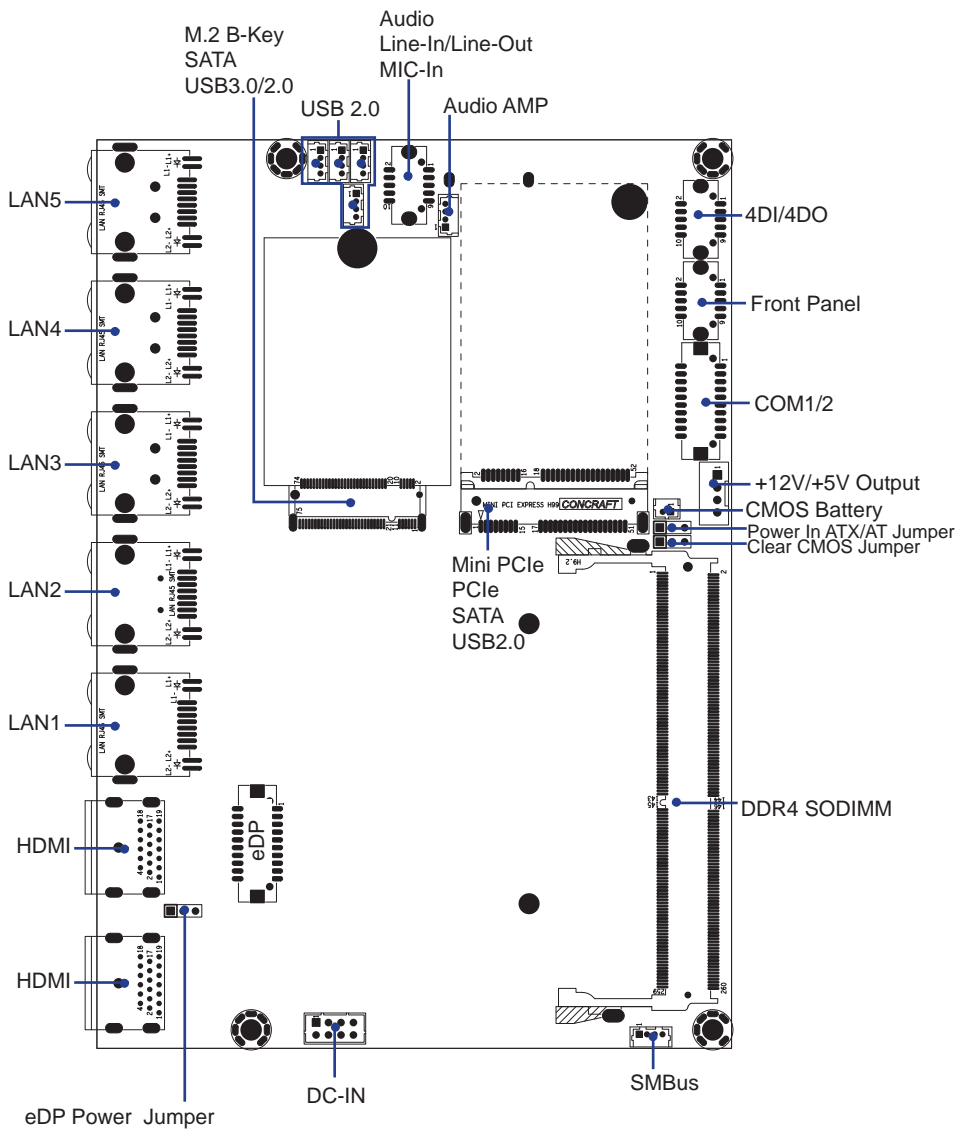
Chapter-2

2-1 Dimension-3I640DW

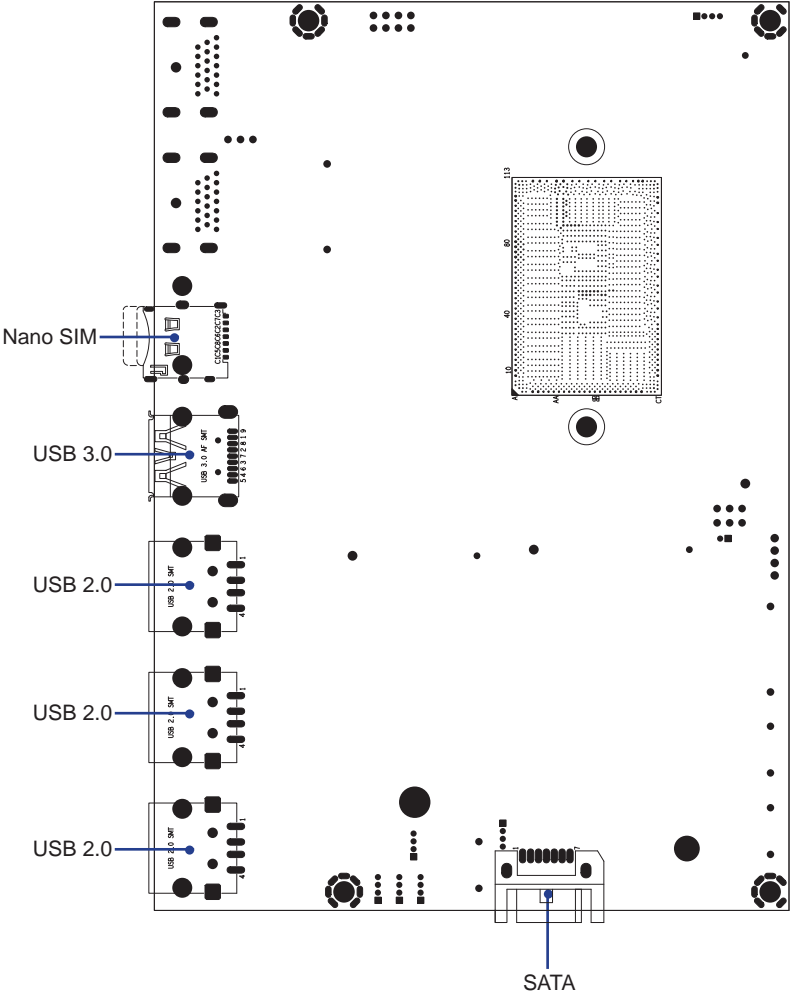


2-2 Layout-3I640DW-Function Map

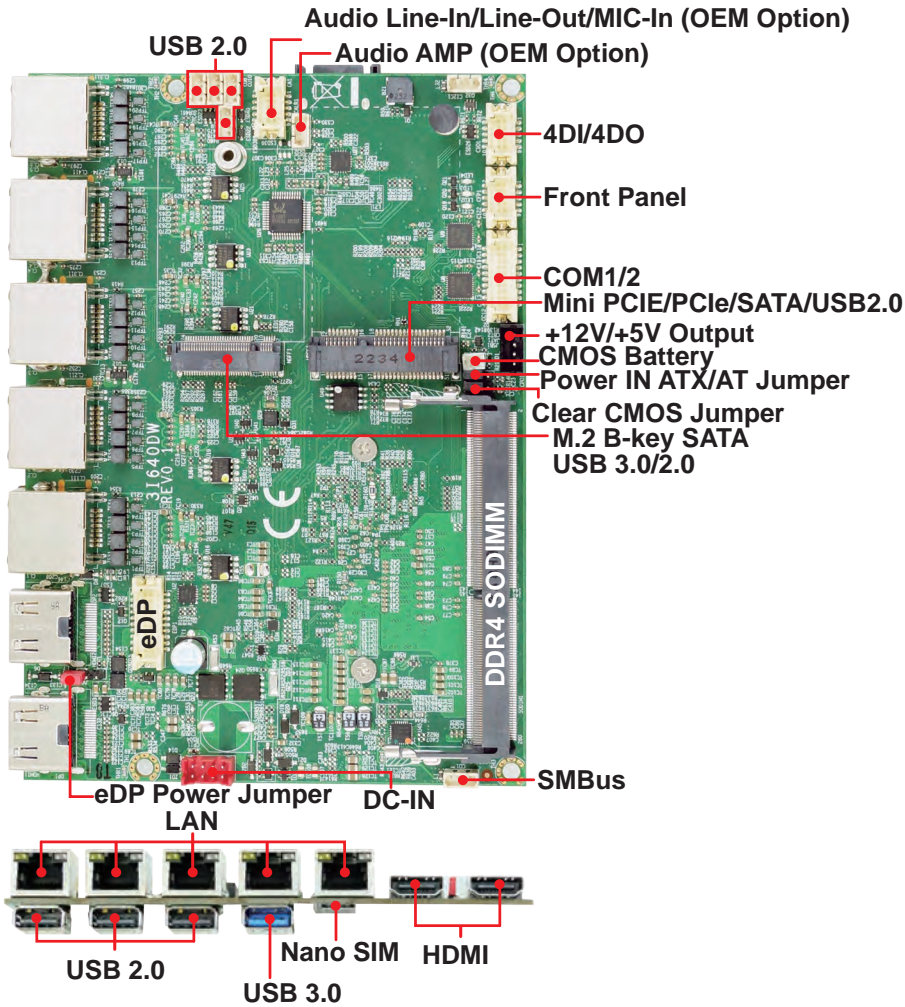
TOP



2-2-1 Layout-3I640DW-Function Map
BOT

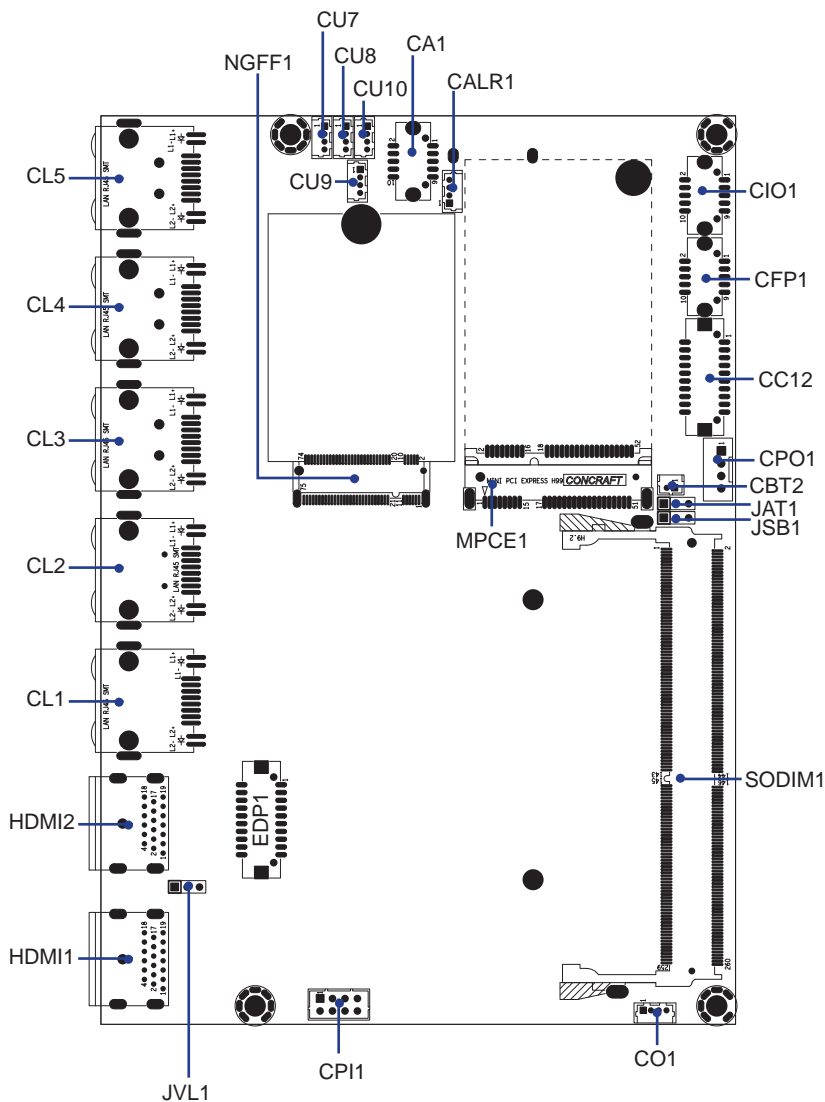


2-3 Function Map-3I640DW



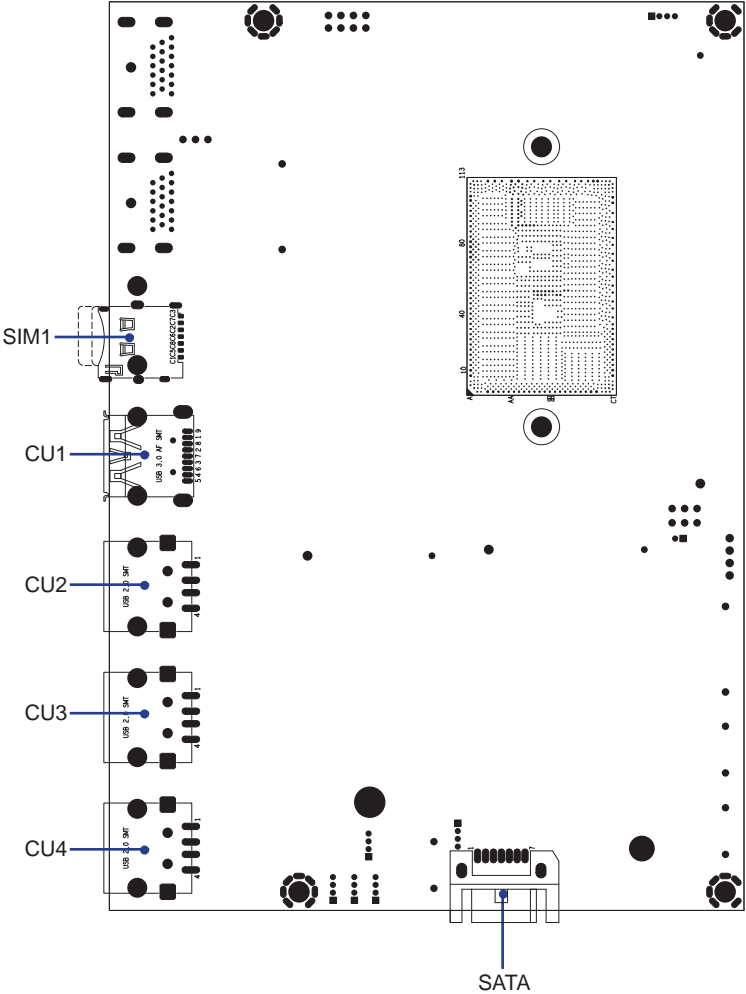
2-4 Connector MAP-3I640DW

TOP



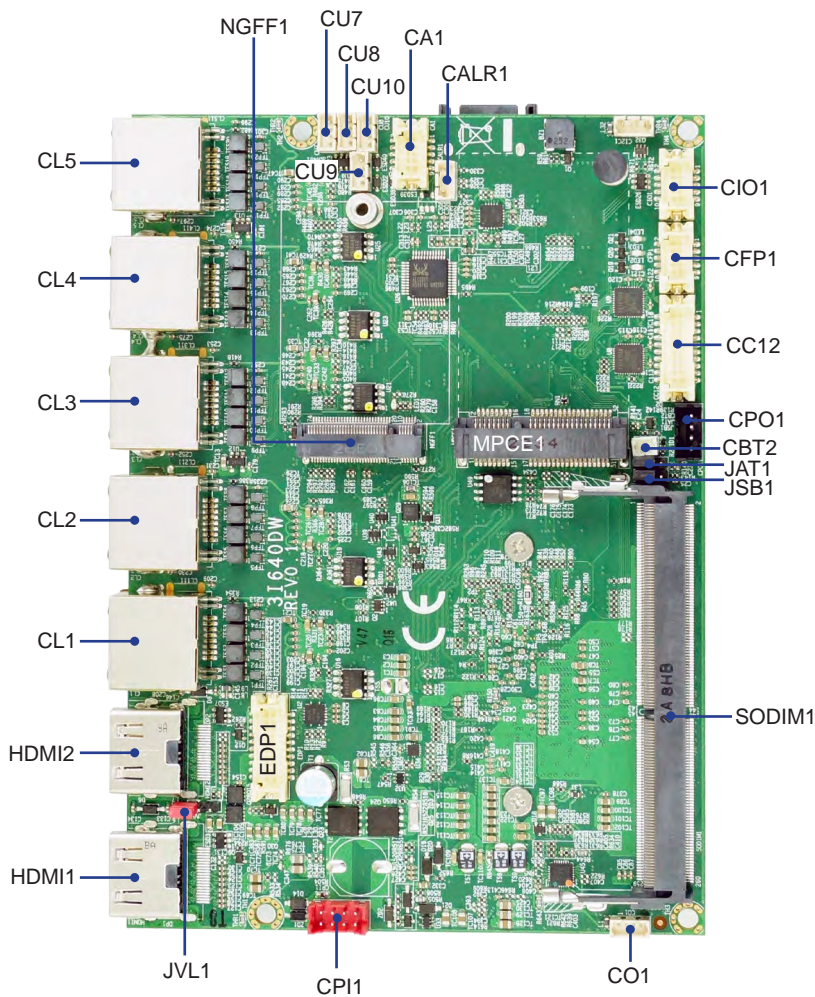
2-4-1 Connector MAP-3I640DW

BOT



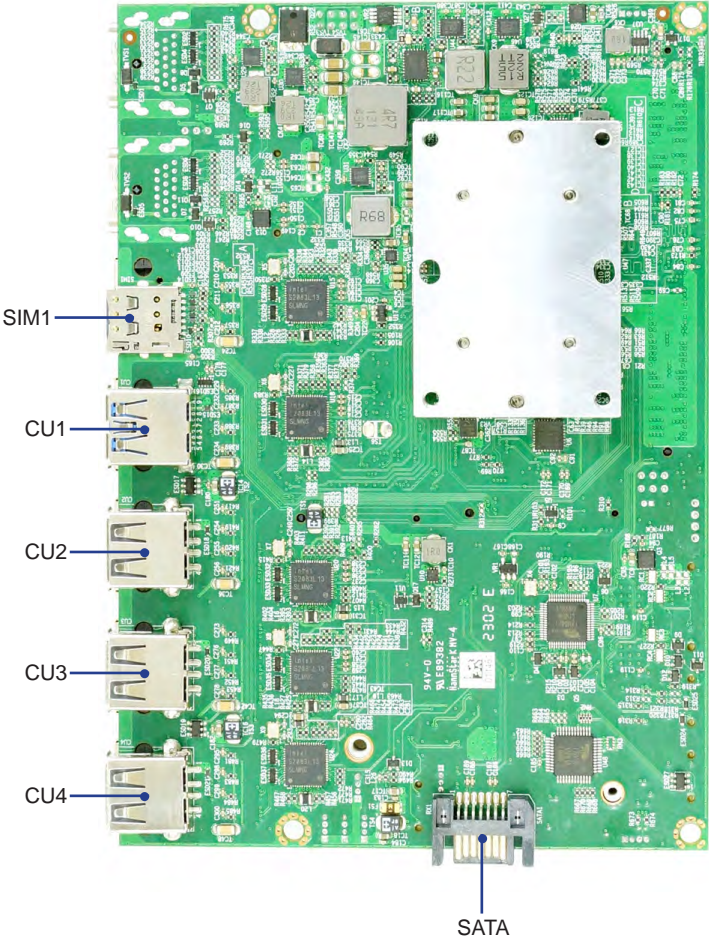
2-5 Diagram- 3I640DW

TOP



2-5-1 Diagram- 3I640DW

BOT



2-6 List of Jumpers

- JSB1: CMOS DATA Clear
- JAT1: Power in always ON function
- 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.

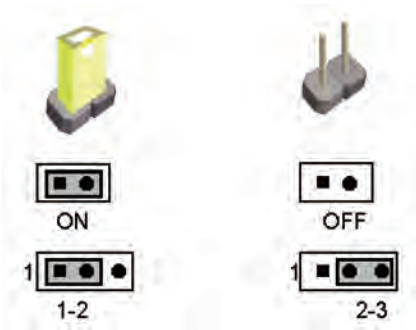


Figure 2.2

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 JSB2 to store the CMOS data.

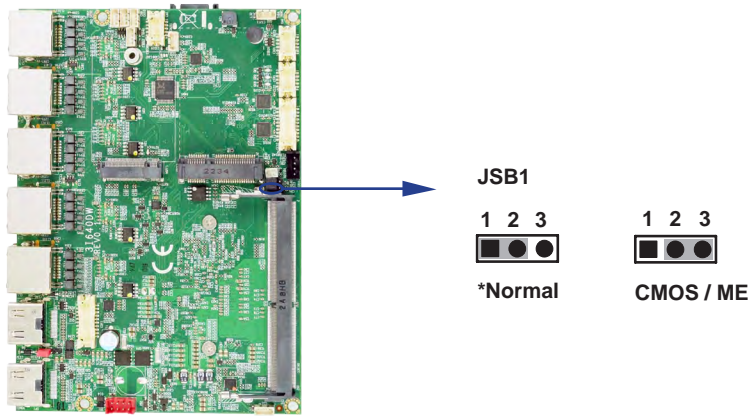
To clear the CMOS, follow the procedures below:

- 1. Turn off the system and unplug the AC power
- 2. Remove DC IN power cable from DC IN power connector
- 3. Locate JSB2 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

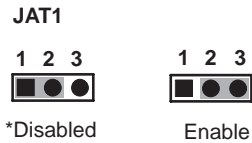
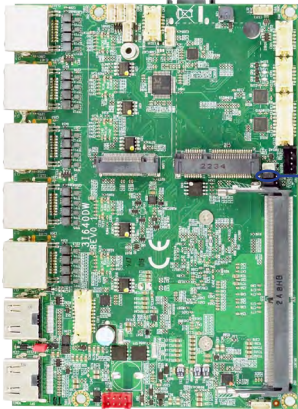
- 1. *Troubleshooting*
- 2. *Forget password*
- 3. *You fail over-clocking system*



2-9 JAT1: Power in always ON function

JAT1	DESCRIPTION
*1-2	Disabled
2-3	Enable

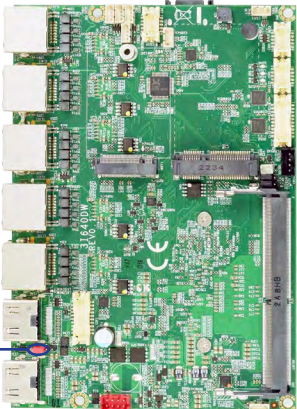
NOTE: Power always on function default is disabled.



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

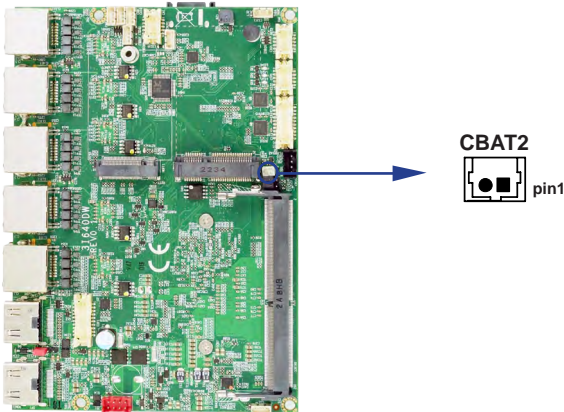
CBT2:	CMOS Battery in 1x2 pin (1.25mm) wafer
CU1:	USB 3.0 type A connector
CU2:	USB 2.0 type A connector
CU3:	USB 2.0 type A connector
CU4:	USB 2.0 type A connector
CU7:	USB 2.0 port 1x4 pin (1.25mm) wafer
CU8:	USB 2.0 port 1x4 pin (1.25mm) wafer
CU9:	USB 2.0 port 1x4 pin (1.25mm) wafer
CU10:	USB 2.0 port 1x4 pin (1.25mm) wafer
CL1:	RJ45 LAN connector
CL2:	RJ45 LAN connector
CL3:	RJ45 LAN connector
CL4:	RJ45 LAN connector
CL5:	RJ45 LAN connector
CL11:	LAN port 2x4 pin (2.0mm) wafer (option)
CL21:	LAN port 2x4 pin (2.0mm) wafer (option)
CL31:	LAN port 2x4 pin (2.0mm) wafer (option)
CL41:	LAN port 2x4 pin (2.0mm) wafer (option)
CL51:	LAN port 2x4 pin (2.0mm) wafer (option)
CL111:	LAN LED 1x4 pin (1.0mm) wafer (option)
CL211:	LAN LED 1x4 pin (1.0mm) wafer (option)
CL311:	LAN LED 1x4 pin (1.0mm) wafer (option)
CL411:	LAN LED 1x4 pin (1.0mm) wafer (option)
CL511:	LAN LED 1x4 pin (1.0mm) wafer (option)
CC12:	COM1 2x10 pin (1.25mm) wafer
CFP1:	Front Panel connector 2x5 pin (1.25mm) wafer
CIO1:	4DI/4DO 2x5 pin (1.25mm) wafer
CO1:	SMBus 1x4 pin (1.25mm) wafer
CPI1:	DC-IN 2x4 pin (2.0mm) Red wafer
EDP1:	eDP 2x10 pin (1.25mm) wafer
SIM1:	Nano SIM card socket

- SODIM1: DDR4 SODIMM H: 9.2mm
- NGFF1: M.2 B key 3042 H=8.5 sockets 75 pin
- MPCE1: Full size mini card port sockets 52 pin
- HDMI1: HDMI typeA connector
- HDMI2: HDMI typeA connector
- DP1: DisplayPort connector (option)
- DP2: DisplayPort connector (option)
- CA1: Line-out / Line-in / Mic-in 2x5 pin (1.25mm) Wafer
- CALR1: Amp Line-out 2 channel 4 pin (1.25mm) wafer
- SATA1: SATA connector 7 pin
- CPO1: +12V / +5V output 1x4 pin (2.0mm) Black wafer

3-2 CBT2: CMOS Battery in 1x2 pin (1.25mm) wafer

PIN NO.	DESCRIPTION
1	Battery in (GND)
2	Battery in (+3V)

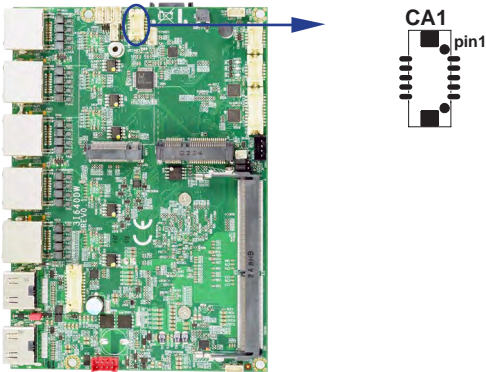
NOTE: CBT2 for external connector can extend battery capacity.



3-3 Audio interface

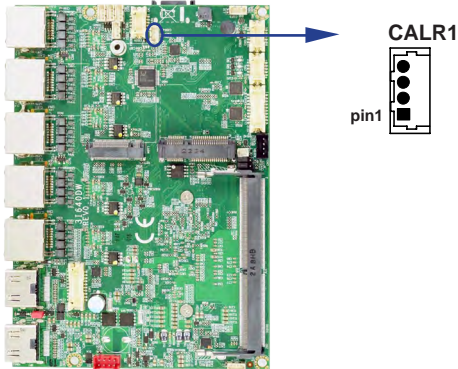
● CA1: Line-out / Line-in / MIC-in 2x5 pin (1.25mm) wafer

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Line-out-R	2	MIC-IN
3	Line-in-R	4	GND
5	GND	6	GND
7	Line-in-L	8	+5V
9	Line-out-L	10	MIC-IN



● CALR1: Amplifier Line-out Right & Left channel 1x4 pin (1.25mm) wafer

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Left+	2	Left-
3	Right-	4	Right+



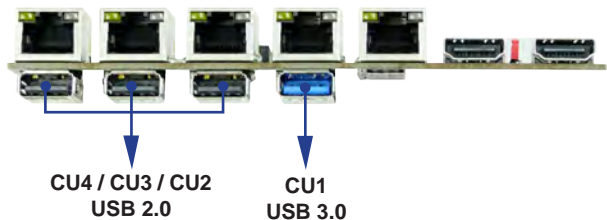
3-4 USB Interface

• **CU1: Dual USB 3.0 / 2.0 Type A connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	USB 2.0 D-
3	USB 2.0 D+	4	GND
5	USB3.0 RX-	6	USB 3.0 RX+
7	GND	8	USB 3.0 TX-
9	USB 3.0 TX+		

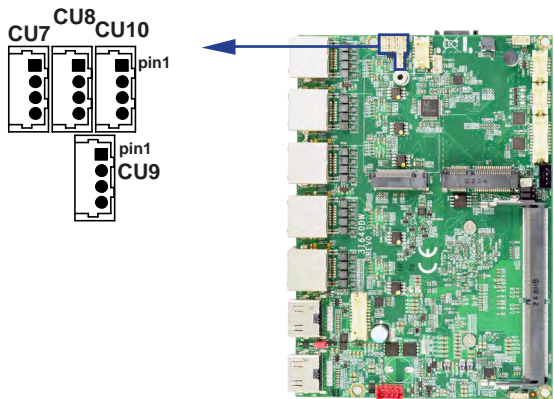
• **CU2 / CU3 / CU4: Dual USB 2.0 Type A Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	USB 2.0 D-
3	USB 2.0 D+	4	GND



• **CU7 / CU8 / CU9 / CU10: USB 2.0 1x4 pin (1.25mm) wafer**

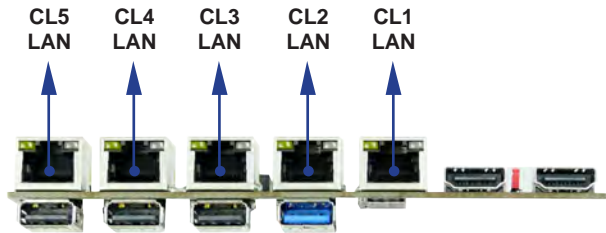
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	DATA-
3	DATA+	4	GND



3-5 LAN Interface

• CL1 / CL2 / CL3 / CL4 / CL5: RJ45 LAN Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TD0+/TX+	2	TD0-/TX-
3	TD1+/RX+	4	TD2+/NC
5	TD2-/NC	6	TD1-/RX-
7	TD3+/NC	8	TD3-/NC



3-6 CC12: COM1 / 2 2x10 pin (2.0mm) wafer

• RS232 Mode

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	+5V
3	DCD1	4	DCD2
5	DSR1	6	DSR2
7	RXD1	8	RXD2
9	RTS1	10	RTS2
11	TXD1	12	TXD2
13	CTS1	14	CTS2
15	DTR1	16	DTR2
17	RI1	18	RI2
19	GND	20	GND

Note :

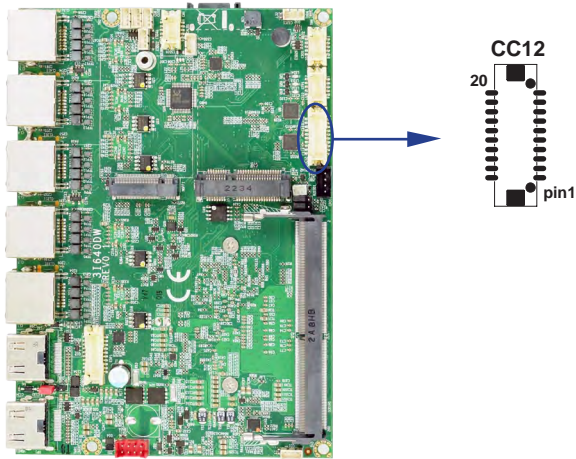
1. COM 1/2 Default RS232, RS485 / RS422 by BIOS control.
2. The pin9 RI can be modify to Power to supply device. The power voltage can be set +12V or +5V.
The RI change Voltage function set by BOM control. Default is RI signal.
3. Pin 1/2 provides +5V for external device.

• RS485 Mode

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	+5V
3	Data1-		Data2-
5	NC		NC
7	Data1+		Data2+
9	NC		NC
11	NC		NC
13	NC		NC
15	NC		NC
17	NC		NC
19	GND	20	GND

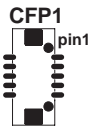
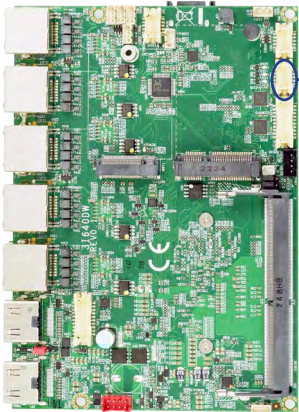
• RS422 Mode

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	+5V
3	TX1-		TX2-
5	NC		NC
7	TX1+		TX2+
9	NC		NC
11	RX1+		RX2+
13	NC		NC
15	RX1-		RX2-
17	NC		NC
19	GND	20	GND



3-7 CFP1: Front Panel 2x5 pin (1.25mm) wafer

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

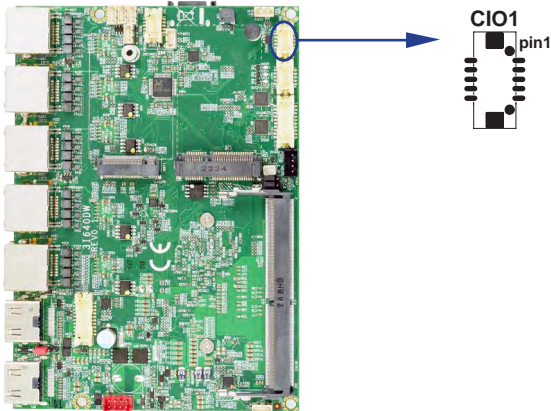


3-8 Digital Input / Output / Watch Dog Time

• CIO1 DIO 0~3 (2x5pin 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. DI pin default pull up 10KΩ to +5V.
 - 2. If use need isolate circuit to control external device.



3-8-1 IO Device: F75113 LPC under Windows (64bit)

Contents [hide]

- 1 The Sample code source you can download from
- 2 How to use this Demo Application
- 3 F75113 GPIO Picture
- 4 Introduction
 - 4.1 F75113 driver connection
 - 4.2 GPIO Status Register Write
 - 4.3 GPIO Status Register Read
 - 4.4 GPIO Comparison
 - 4.5 F75113 driver delete
- 5 Version update details
 - 5.1 Version 2.1 update code removes default naming change to wafer name and write comment

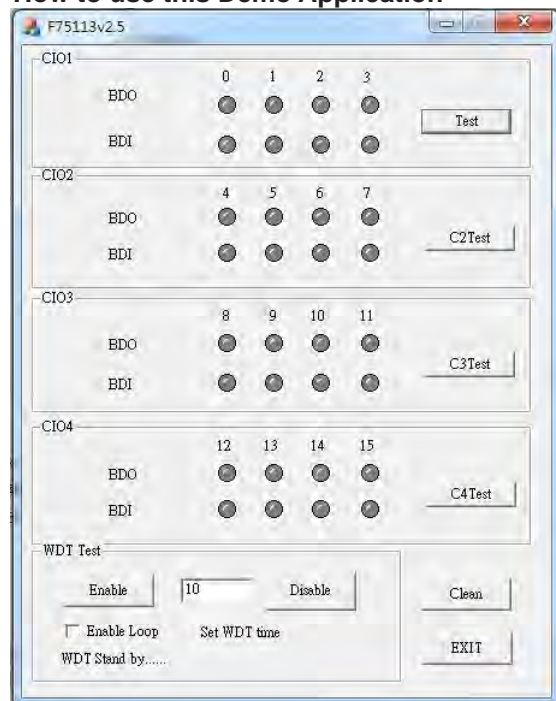
The Sample code source you can download from

Source file: F75113v2.5W_src.zip

Binary file: F75113v2.5W_bin_x64.zip

We do the demo test with a test tool which Dlx connect to DOx with Relay.

How to use this Demo Application



1. Press the "Test" button to test CIO1 function
2. Press the "C2test" button to test CIO2 function
3. Press the "C3test" button to test CIO3 function
4. Press the "C4test" button to test CIO4 function

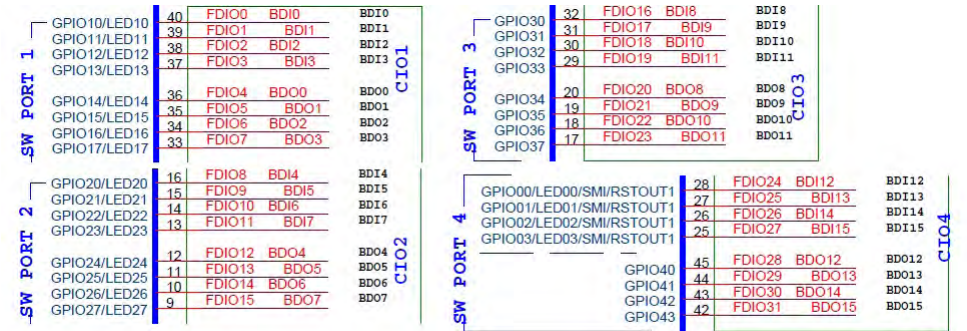
If the next picture appears



MB no LPC or the drive placement is wrong
Drive the location for the next picture

IOSetting	2017/7/20 下午 0...	檔案資料夾	
F75113v2.0.exe	2017/7/20 下午 0...	應用程式	6,184 KB
Fintek.cat	2007/11/6 下午 0...	安全性目錄	7 KB
Fintek.dll	2011/3/2 下午 12...	應用程式擴充	104 KB
Fintek.sys	2007/11/6 下午 0...	系統檔案	15 KB
FintekInfo.ini	2017/1/4 上午 02...	組態設定	1 KB
Readme.txt	2017/1/23 上午 1...	文字文件	1 KB

F75113 GPIO Picture



Introduction

F75113 driver connection

```
hinstLib = LoadLibrary(L"Fintek.dll");
if (hinstLib == NULL)
{
    if(Application->MessageBoxW(L"Load fail Fintek.dll,Continued?",L"Error",16+4)==IDNO)
    {
        Application->Terminate();
    }
    return;
}
```

GPIO Status Register Write

```
SETINT2PROC ProcAdd;
char *endptr;
char Numbers[] = "0x20";
char Value[] = "0xF0";
ProcAdd = (SETINT2PROC) GetProcAddress(hinstLib, "GPIO_LPC_W");
if (NULL != ProcAdd)
{
    if (! (*ProcAdd)( strtol(Numbers, &endptr, 16), strtol(Value, &endptr, 16)))
    {
        ShowMessage("Write Fail");
    }
}
```

GPIO Status Register Read

```
GETINT2PROC ProcAdd1;
int datatest;
char NRtest[] = "0x22";
ProcAdd1 = (GETINT2PROC) GetProcAddress(hinstLib, "GPIO_LPC_R");
if (NULL != ProcAdd1)
{
    if (! (*ProcAdd1)( strtol(NRtest, &endptr, 16), &datatest))
    {
        ShowMessage("Read Fail");
    }
}
```

GPIO Comparison

```
if( data == 0xF0 )
{
    ((CStatic *)GetDlgItem(IDC_LED_DO0))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Green)));
    ((CStatic *)GetDlgItem(IDC_LED_DO1))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Green)));
    ((CStatic *)GetDlgItem(IDC_LED_DO2))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Green)));
    ((CStatic *)GetDlgItem(IDC_LED_DO3))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Green)));
    if( data2 == 0x01 )
    {
        ((CStatic *)GetDlgItem(IDC_LED_DI0))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Green)));
        ((CStatic *)GetDlgItem(IDC_LED_DI1))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Red)));
        ((CStatic *)GetDlgItem(IDC_LED_DI2))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Red)));
        ((CStatic *)GetDlgItem(IDC_LED_DI4))->SetBitmap(::LoadBitmap(AfxGetInstanceHandle(),MAKEINTRESOURCE(IDB_BITMAP_Red)));
    }
    .....
}
```

F75113 driver delete

```
char N9[] = "0x10";
char V9[] = "0x00";
ProcAdd = (SETINT2PROC) GetProcAddress(hinstLib, "GPIO_LPC_W");
if (NULL != ProcAdd)
{
    if (!(*ProcAdd)( strtol(N9, &endptr, 16), strtol(V9, &endptr, 16)))
    {
        ShowMessage("Write Fail");
    }
}
if (hinstLib != NULL)
{
    FreeLibrary(hinstLib);
}
```

Version update details

Version 2.1 update code removes default naming change to wafer name and write comment

Category: AllowPages
AllowPages > AllowPages

3-8-2 IO Device:F75113 LPC under Linux(64bit)

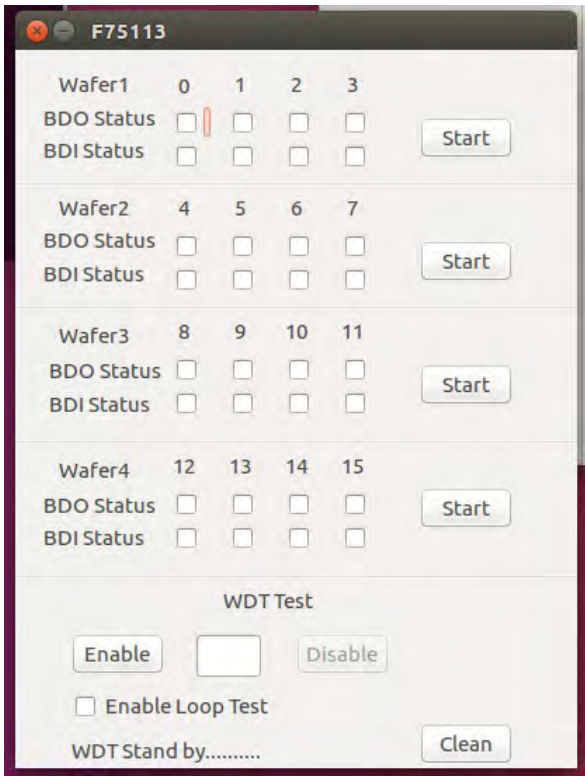
Contents [hide]

- 1 The Sample code source you can download from
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 - 4.1 GPIO Status Register Write
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 - 4.3 GPIO Comparison
 - 4.4 F75113 driver delete

The Sample code source you can download from

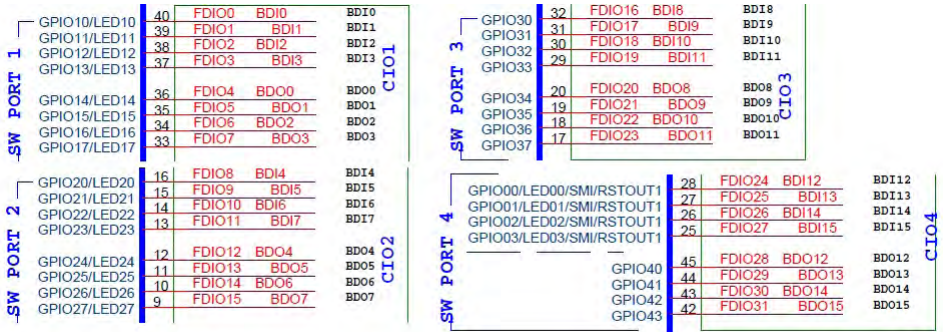
Source file: F75113v2.5_linux_src.tar.gz
Binary file: Linux_F75113v2.5_bin.tar.gz
We do the demo test with a test tool which Dlx connect to DOx with Relay.

How to use this Demo Application



1. Press the "Start" button to test CIO1 function
 2. Press the "Start" button to test CIO2 function
 3. Press the "Start" button to test CIO3 function
 4. Press the "Start" button to test CIO4 function
 5. Press the "Enable" button to test WDT function
- If you need to use the WDT, Please use "sh F75113set.sh"
He can help you set the WDT register for normal use WDT

F75113 GPIO Picture



Introduction

GPIO Status Register Write

```
init_fintek_sio(eSIO_TYPE_F81866, 0, &sio_data)
ActiveSIO(sio_data.ic_port, sio_data.key);
CHECK_RET(_EnableGPIO(0x06, eGPIO_Mode_Enable));
CHECK_RET(_SetGpioOutputEnableIdx( 0x06, eGPIO_Direction_Out));
CHECK_RET(_SetGpioDriveEnable( 0x06, eGPIO_Drive_Mode_OpenDrain));
CHECK_RET(_SetGpioOutputDataIdx( 0x06, 1));
DeactiveSIO(sio_data.ic_port);
```

GPIO Status Register Read

```
init_fintek_sio(eSIO_TYPE_F81866, 0, &sio_data)
ActiveSIO(sio_data.ic_port, sio_data.key);
CHECK_RET(_EnableGPIO(0x06, eGPIO_Mode_Enable));
CHECK_RET(_SetGpioOutputEnableIdx( 0x06, eGPIO_Direction_In));
CHECK_RET(_GetGpioInputDataIdx( 0x06, &data));
DeactiveSIO(sio_data.ic_port);
```

GPIO Comparison

```
CHECK_RET(_GetGpioInputDataIdx (0x10,&BDIO_data));
if((BDIO_data == 1) & (BDIO_startvalue_data == 0) )
{
    gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(checkbutton2), TRUE);
}
CHECK_RET(_GetGpioInputDataIdx (0x11,&BDI1_data));
if((BDI1_data == 1) & (BDI1_startvalue_data == 0) )
{
    gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(checkbutton4), TRUE);
}
CHECK_RET(_GetGpioInputDataIdx (0x12,&BDI2_data));
if((BDI2_data == 1) & (BDI2_startvalue_data == 0) )
{
    gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(checkbutton6), TRUE);
}
CHECK_RET(_GetGpioInputDataIdx (0x13,&BDI3_data));
if((BDI3_data == 1) & (BDI3_startvalue_data == 0) )
{
    gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(checkbutton8), TRUE);
}
```

F75113 driver delete

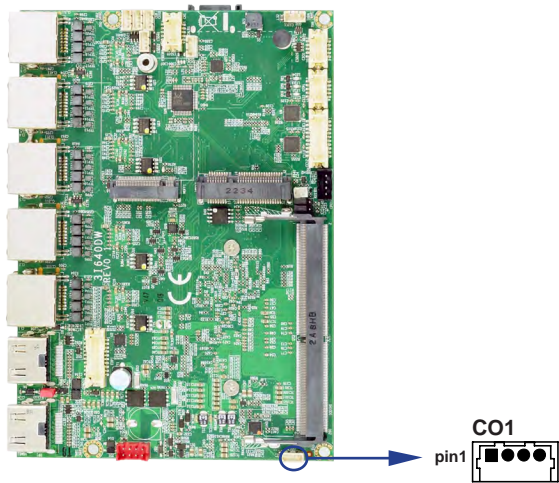
```
on_window1_destory (GtkObject *object,
                    gpointer user_data)
{
    int nRet = 0;
    sFintek_sio_data sio_data;
    set_debug(1);
    if( nRet = init_fintek_sio(eSIO_TYPE_F75113,0, &sio_data))
    {
        fprintf(stderr,"init_fintek_sio error\n");
        exit(3);
    }
    ActiveSIO(sio_data.ic_port, sio_data.key);
    DeactiveSIO(sio_data.ic_port);
    gtk_main_quit();
}
```

Category: AllowPages
AllowPages > AllowPages

3-9 SMBus Interface

• CO1: SMBus 1x4 pin (1.25mm) wafer

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	GND
3	SMBus Clock	4	SMBus Data

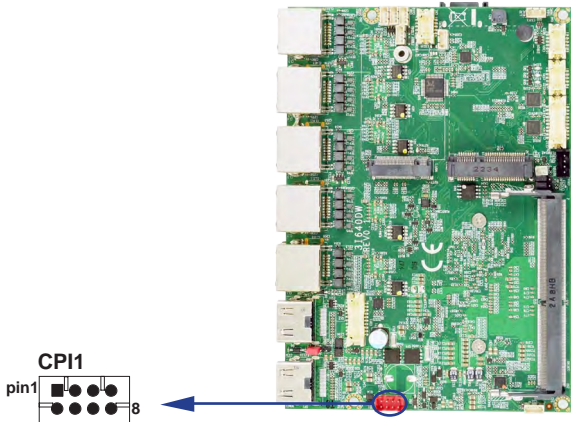


3-10 DC power input

- **CPI1: DC Power input 2x4 pin (2.0mm) wafer (RED)**

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

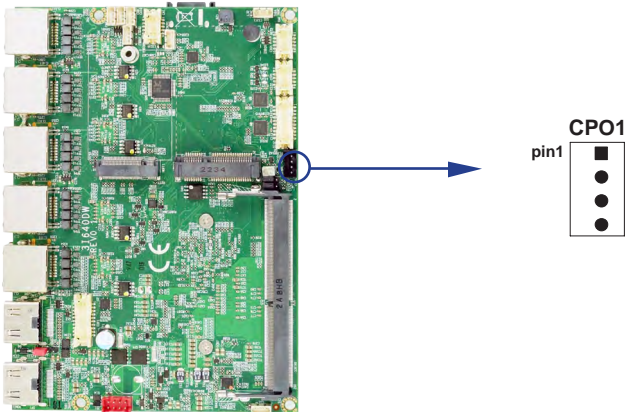
Note: Very important check DC-in Voltage.



- **CPO1: +12V / +5V DC voltage output 1x4 pin (2.0mm) wafer (Black)**

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

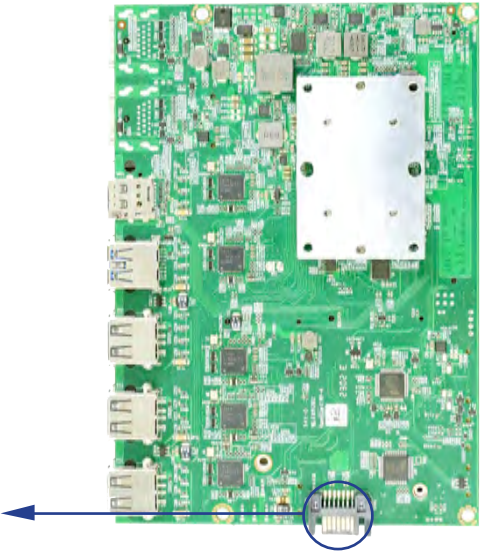
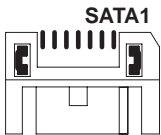
Note: Attention! Check Device Power in spec.



3-11 SATA interface

• **SATA1: SATA port 1x7pin Connector**

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

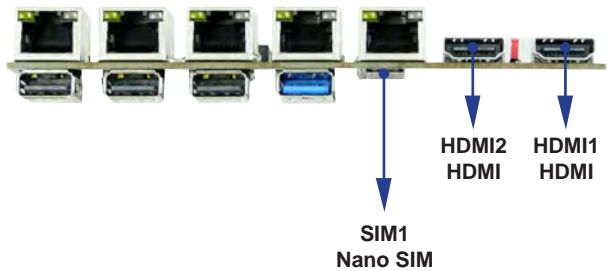


3-12 SIM1: SIM Socket

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

3-13 HDMI1 / HDMI2: 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		



3-14 DP1 / DP2: Display Port connector (option)

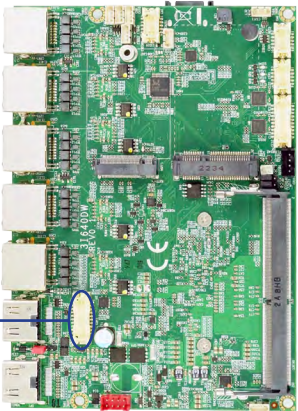
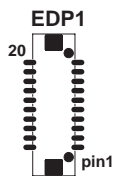
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Lane0+	2	GND
3	Lane0-	4	Lane1+
5	GND	6	Lane1-
7	Lane2+	8	GND
9	Lane2-	10	Lane3+
11	GND	12	Lane3-
13	GND	14	GND
15	AUX_CH+	16	GND
17	AUX_CH-	18	H.P. Detect
19	GND	20	+3.3V

3-15 EDP1: eDP interface 2x10 pin (1.25mm) wafer

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Lane-0-DATA-	2	+12V
3	Lane-0-DATA+	4	+12V
5	Lane-1-DATA-	6	GND
7	Lane-1-DATA+	8	GND
9	Backlight Enable	10	GND
11	PWM dimming	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:

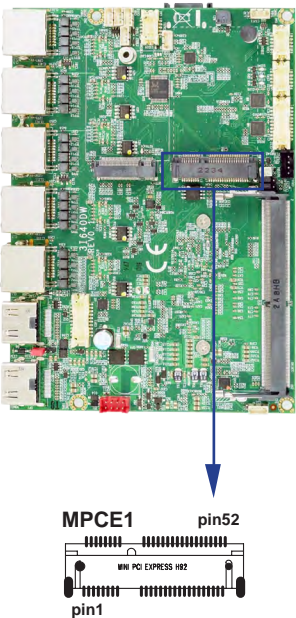
1. eDP interface support 2 lanes.
2. JVL1: eDP panel +5V / +3.3V (default) Voltage select.
3. eDP1 PIN 9 for panel backlight enable. +3.3V Level
4. eDP1 PIN 11 for panel backlight dimming control



3-16 Module socket

● MPCE1 PCI Express Mini card

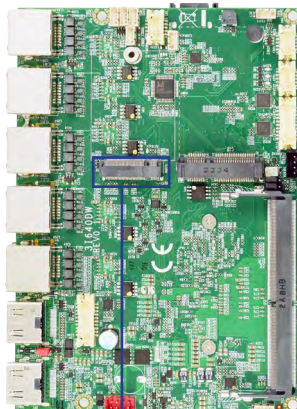
PIN NO.	Description	PIN NO.	Description
1	NC	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	NC	8	NC
9	GND	10	NC
11	PCIe-CLK-	12	NC
13	PCIe-CLK+	14	NC
15	GND	16	NC
KEY			
17	NC	18	GND
19	NC	20	NC
21	GND	22	Reset
23	PCIe-RX- / SATA RX+	24	+3.3V
25	PCIe-RX+ / SATA RX-	26	GND
27	GND	28	+1.5V
29	GND	30	SMB-CLK
31	PCIe-TX- / SATA TX-	32	SMB-DATA
33	PCIe-TX+ / SATA TX+	34	GND
35	GND	36	USB-DATA-
37	GND	38	USB-DATA+
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	mSATA / PCIe detect	52	+3.3V



Note: Support PCIe or SATA & USB2.0
PCIe / SATA, BOM control. Default PCIeI signal.

3-17 NGFF1: PCI Express M.2 B key 3042 H=8.5 sockets 75pin

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CFG3_USB3_PCIE	2	+3.3V / +3.7V
3	GND	4	+3.3V / +3.7V
5	GND	6	FULL_CARD_PWR
7	USB2.0_P	8	W_DISABLE_1
9	USB2.0_N	10	M2_LED
11	GND		
B Key notch			
		20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	W_DISABLE_2
27	GND	28	NC
29	USB3Rn	30	SIM_RST_M2
31	USB3Rp	32	SIM_CLK_M2
33	GND	34	SIM_DATA_M2
35	USB3Tn	36	SIM_PWR_M2
37	USB3Tp	38	NC
39	GND	40	NC
41	SATA-RX+n0	42	NC
43			NC
45	GND	46	NC
47	SATA-TX-	48	NC
49	SATA-TX+	50	PREST
51	GND	52	NC
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	SIM_DET
67	MD_RESET_N	68	NC
69	PEDET	70	+3.3V / +3.7V
71	GND	72	+3.3V / +3.7V
73	GND	74	+3.3V / +3.7V
75	CONFIG_2		



NGFF1



Note:

1. NGFF1 support USB 3.0 / SATA-SSD.
2. VCC voltage default support +3.3V.
3. 4G LTE device VCC voltage is +3.7V.

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.

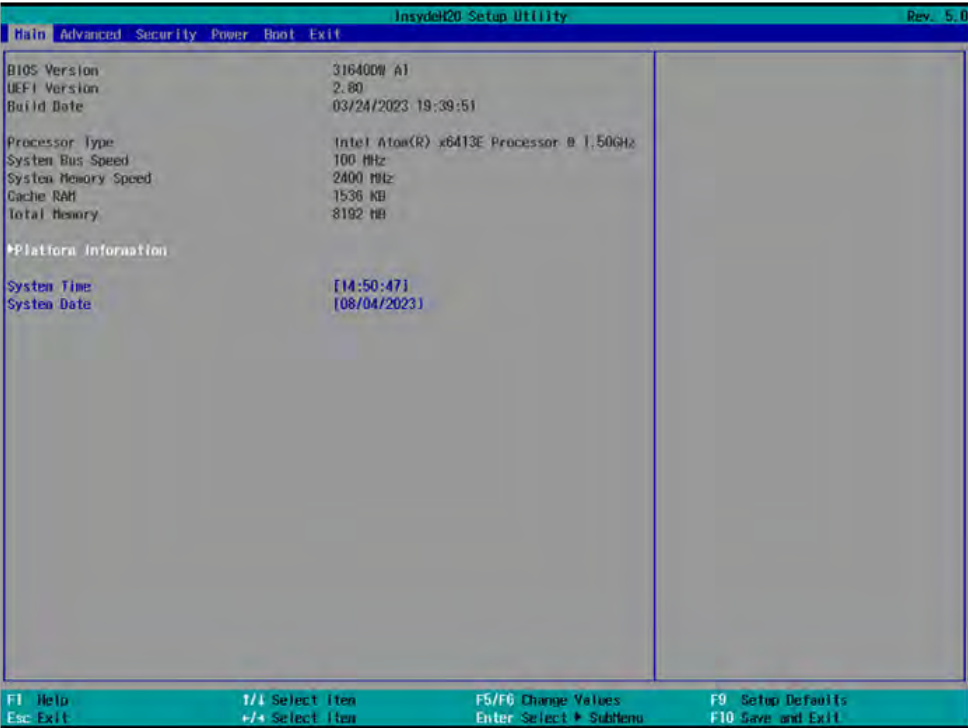
Press Page Up / Page Down or +/- keys to modify the BIOS parameters for the active option.

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.

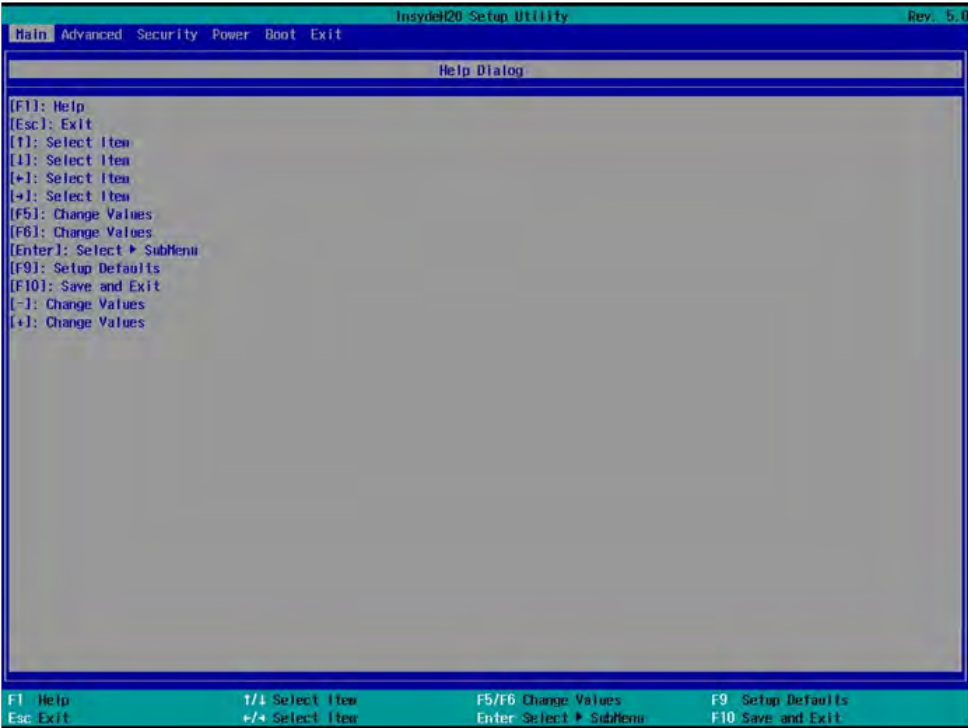
4-2 BIOS Menu Screen & Function Keys



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 General 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>.

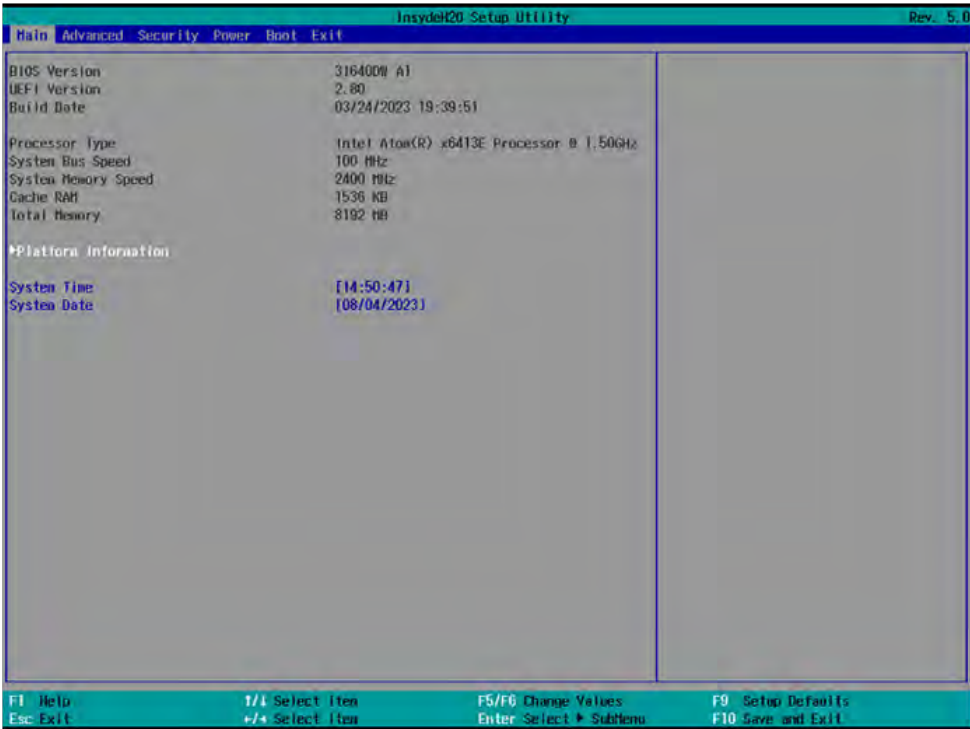
4-4 Menu Bars

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.

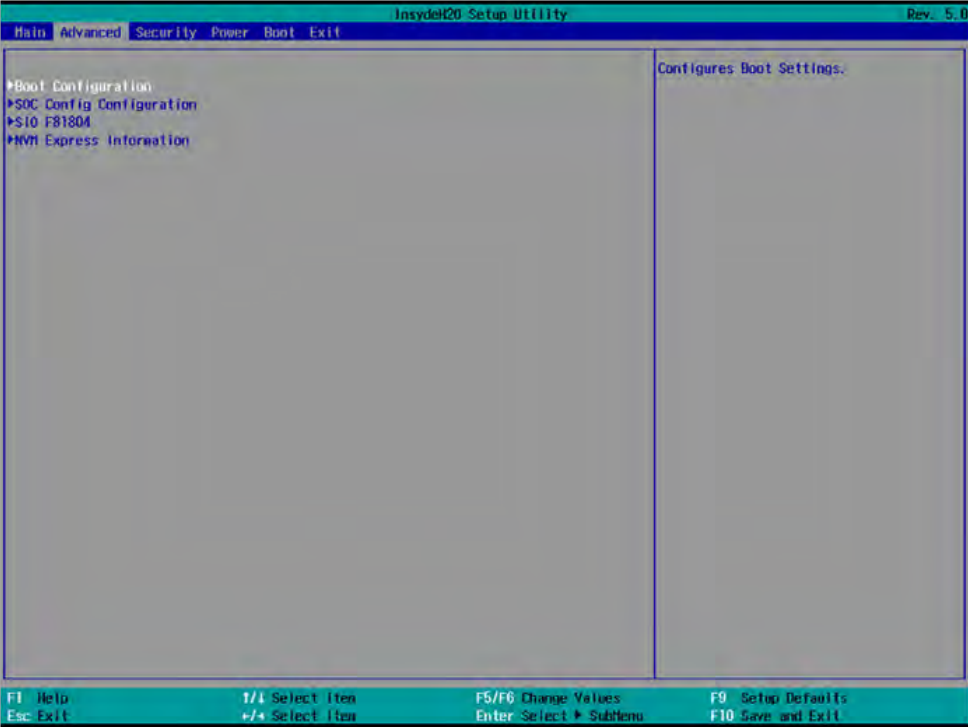
System Date

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



Boot Configuration

Please refer section 4-6-1

SOC Config Configuration

Please refer section 4-6-2

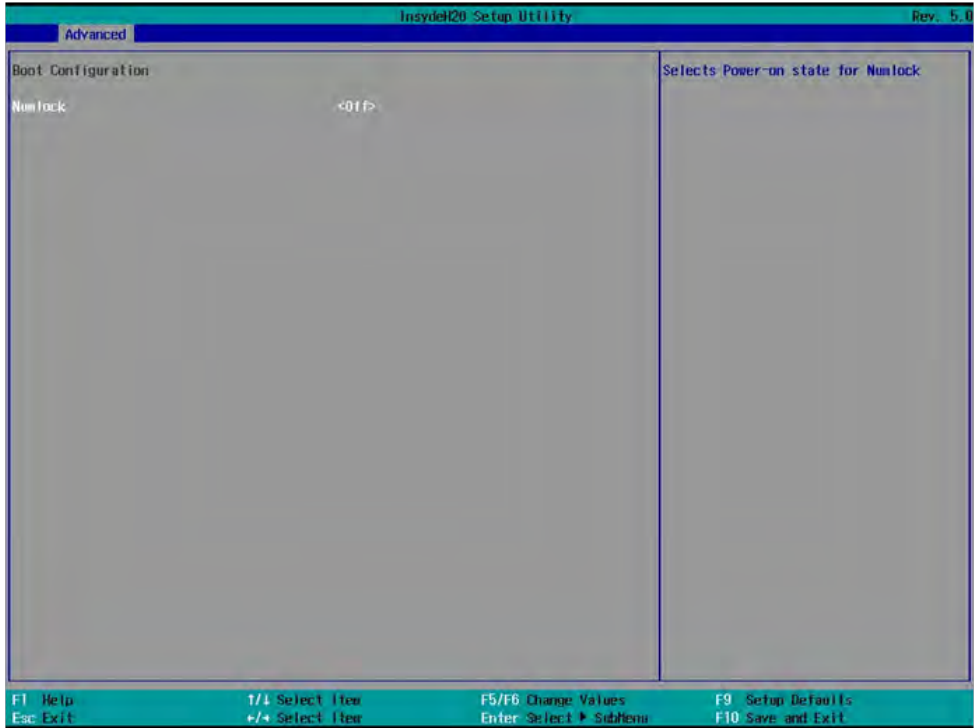
SIO F81804

Please refer section 4-6-3

NVM Express information

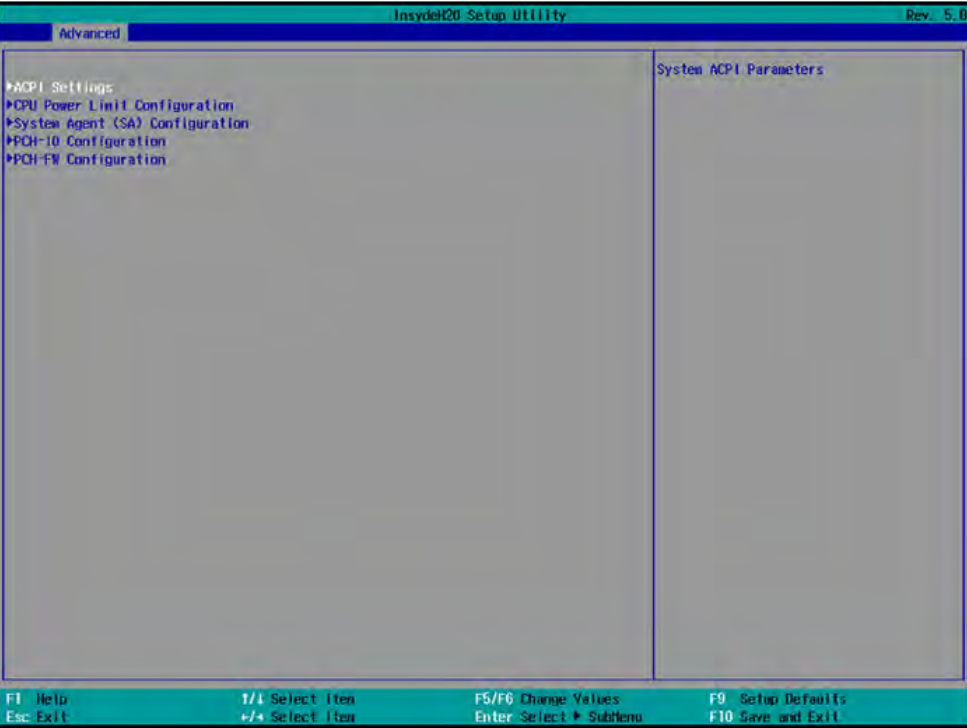
Please refer section 4-6-4

4-6-1 Boot Configuration



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

4-6-2 SOC Config Configuration



ACPI Settings
Please refer section 4-6-2-1

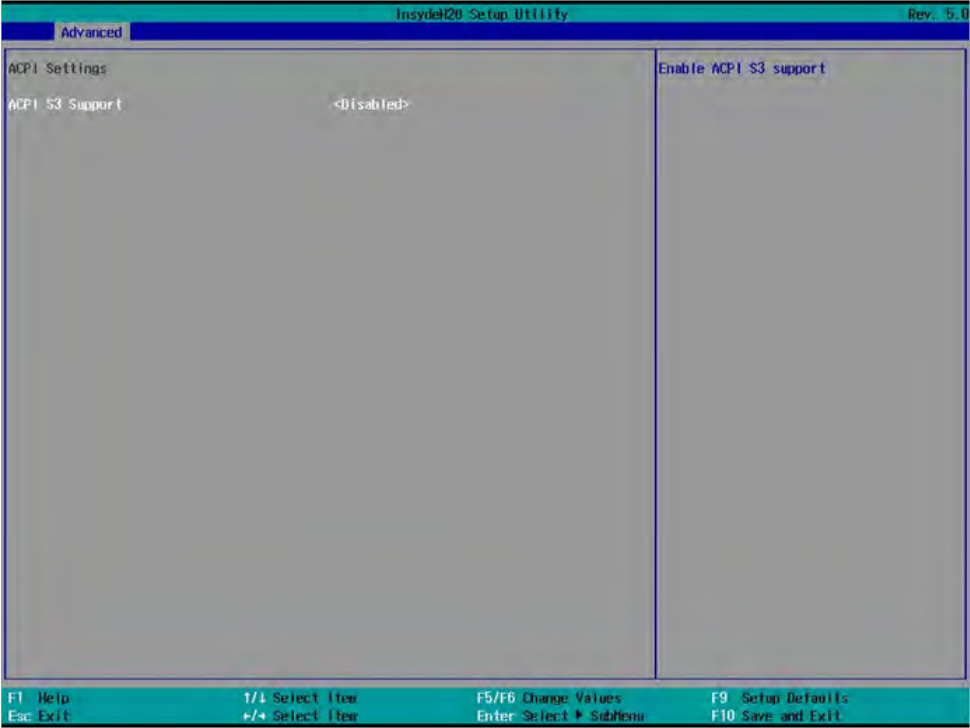
CPU Power Limit Configuration
Please refer section 4-6-2-2

System Agent (SA) Configuration
Please refer section 4-6-2-3

PCH-IO Configuration
Please refer section 4-6-2-4

PCH-FW Configuration
Please refer section 4-6-2-5

4-6-2-1 ► ACPI Settings



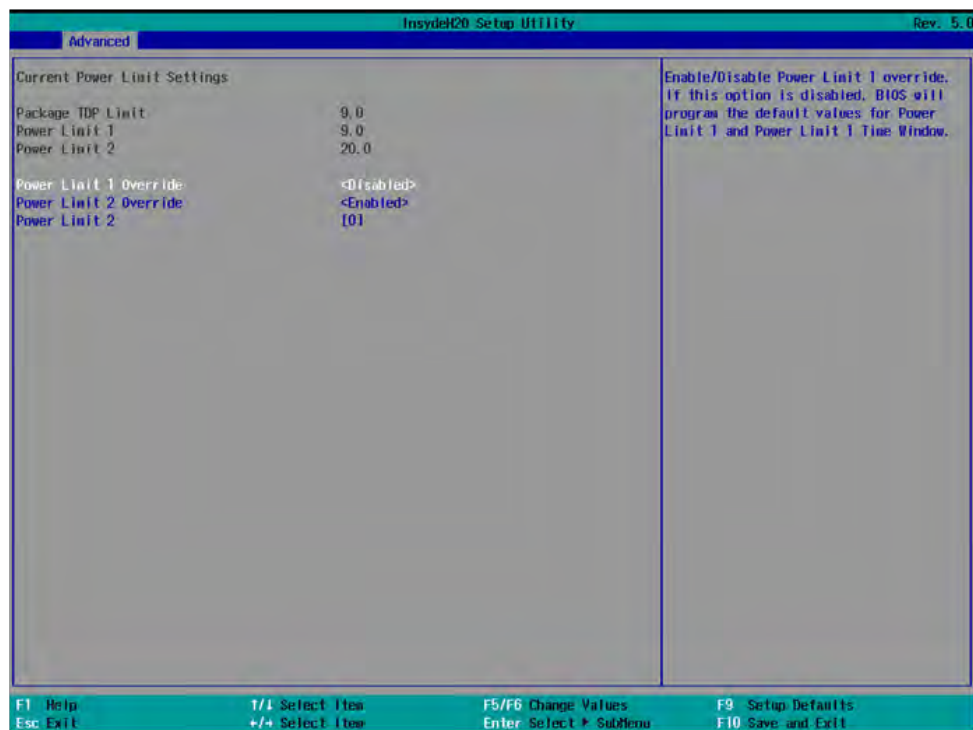
ACPI S3 Support

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

4-6-2-2 ► CPU Power Limit Configuration



The setting follows INTEL Celeron J6412 CPU power limit default configuration.



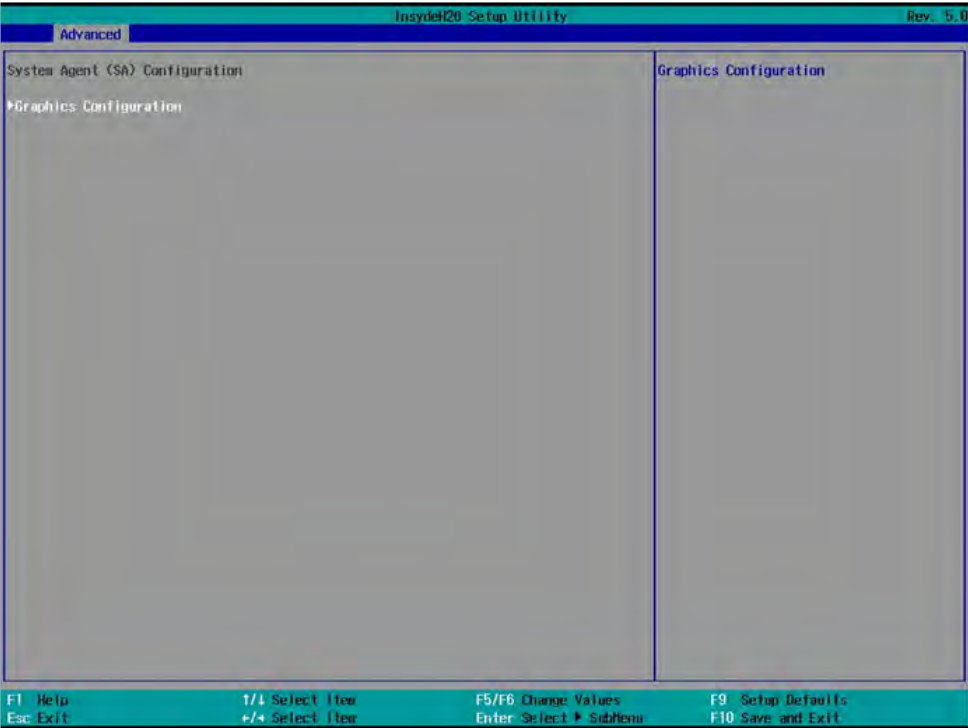
The setting follows INTEL Atom x6413E power limit default configuration.

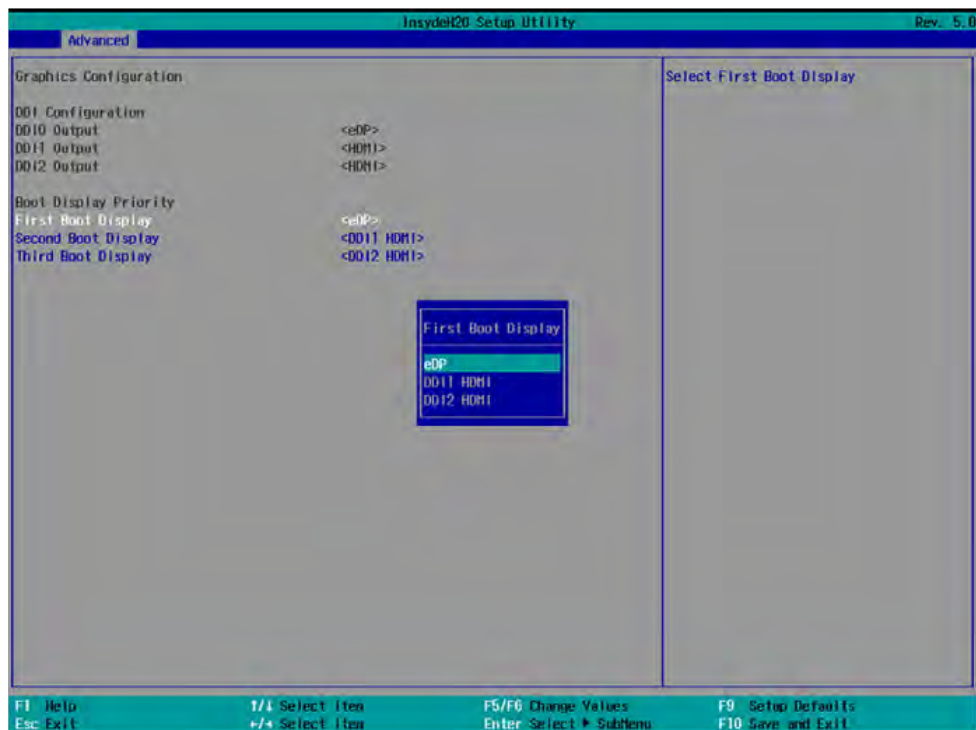
InsydeH2O Setup Utility		Rev. 5.0
Advanced		
Current Power Limit Settings		Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and TDP Limit. If value is 0, BIOS will program TDP value.
Package TDP Limit	10.0	
Power Limit 1	10.0	
Power Limit 2	20.0	
Power Limit 1 Override	<Enabled>	
Power Limit 1	[0]	
Power Limit 2 Override	<Enabled>	
Power Limit 2	[0]	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <div style="background-color: black; color: white; padding: 2px 10px; margin-bottom: 5px;"> </div> <div style="display: flex; justify-content: space-around; border-top: 1px solid black;"> [Yes] [No] </div> </div>		
<div style="display: flex; justify-content: space-between; font-size: small;"> F1 Help T/L Select Item F5/F6 Change Values F9 Setup Defaults </div> <div style="display: flex; justify-content: space-between; font-size: small;"> Esc Exit +/- Select Item Enter Select * SubMenu F10 Save and Exit </div>		

Power Limit Override

Enable / disable PL1 / PL2 and enter the power numerical value from 0 to 20000 to get higher or lower CPU TDP

4-6-2-3 ► System Agent (SA) Configuration





Boot Display Priority

First Boot Display

To select First Boot Display priority, there are eDP, DDI1 HDMI, DDI2 HDMI, default is eDP

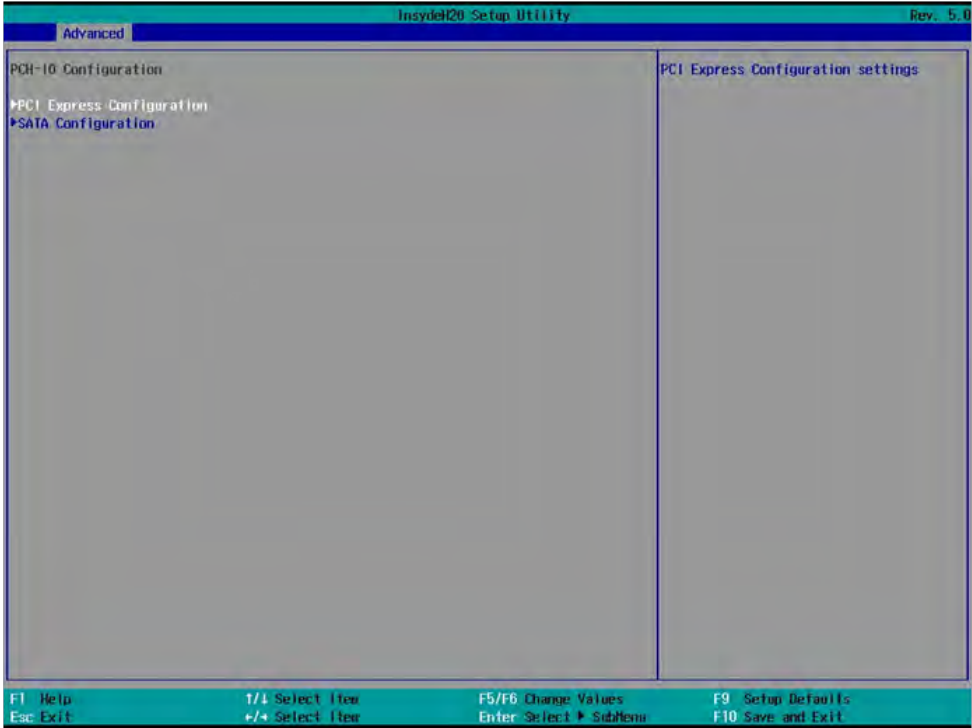
Second Boot Display

To select Second Boot Display priority, there are DDI1 HDMI, DDI2 HDMI, default is DDI1 HDMI

Third Boot Display

To select Third Boot Display priority, there is DDI2 HDMI

4-6-2-4 ► PCH-IO Configuration



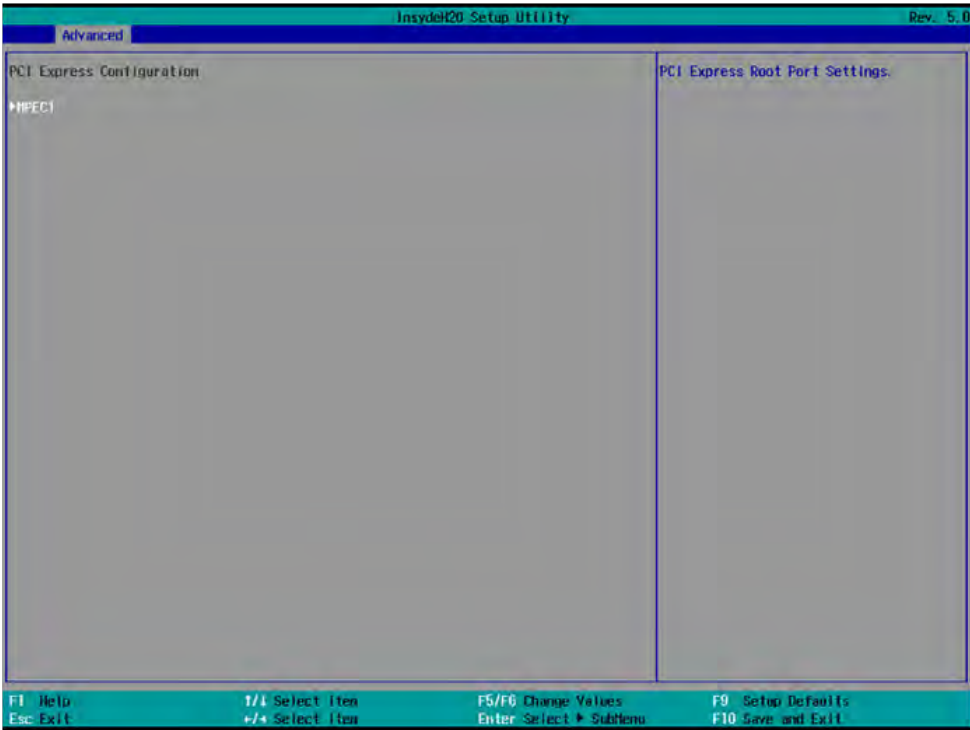
PCI Express Configuration

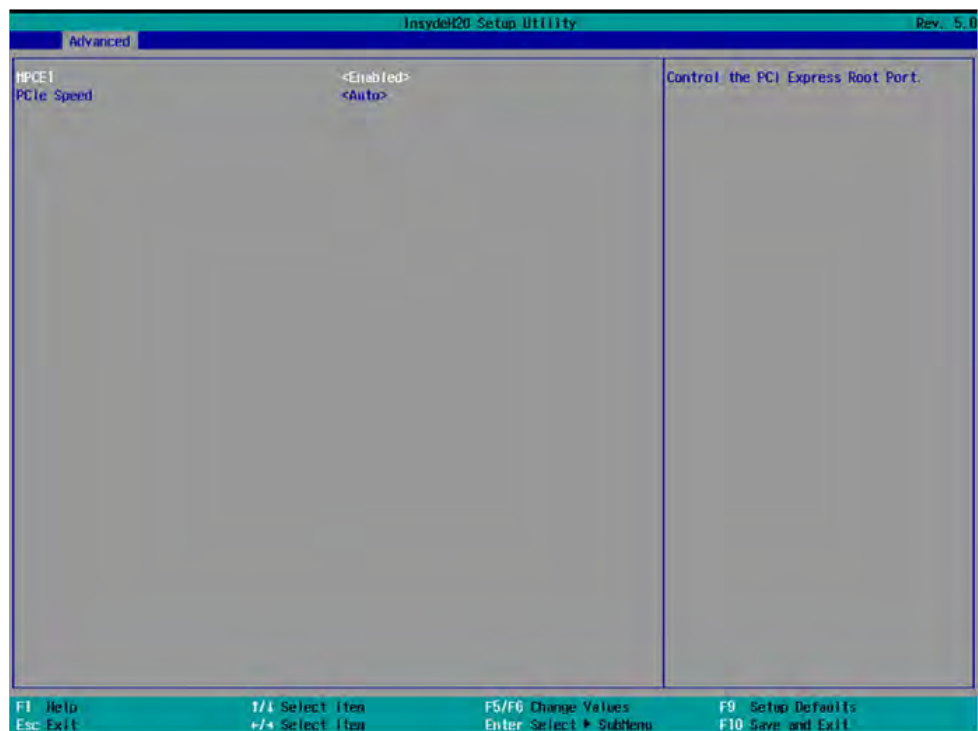
Please refer section 4-6-2-4-1

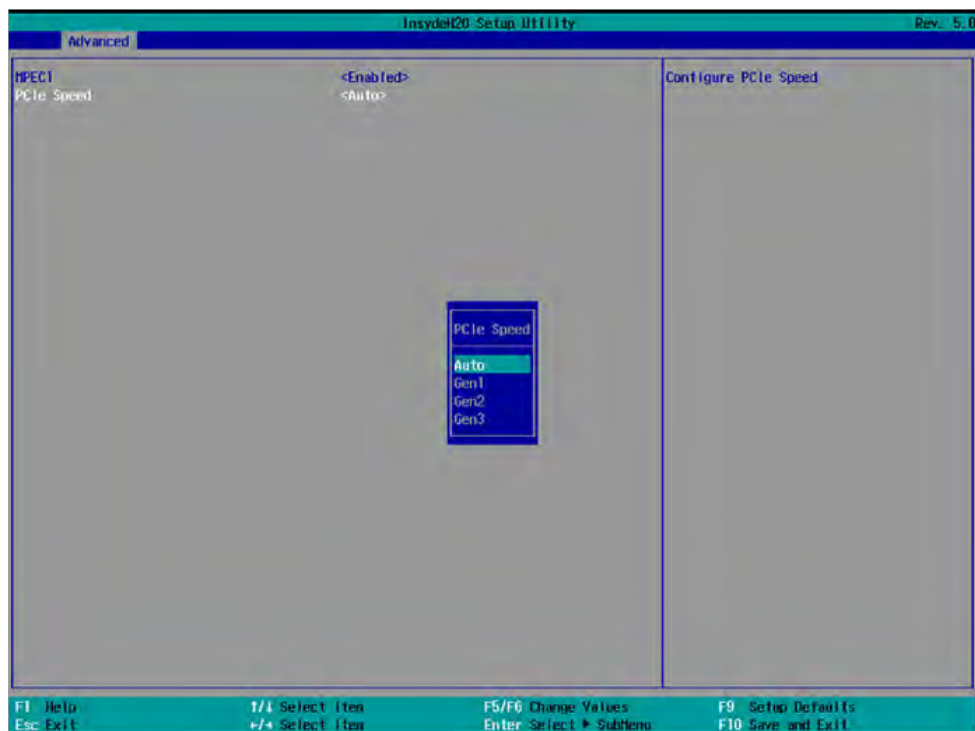
SATA Configuration

Please refer section 4-6-2-4-2

4-6-2-4-1 ► PCI Express Configuration

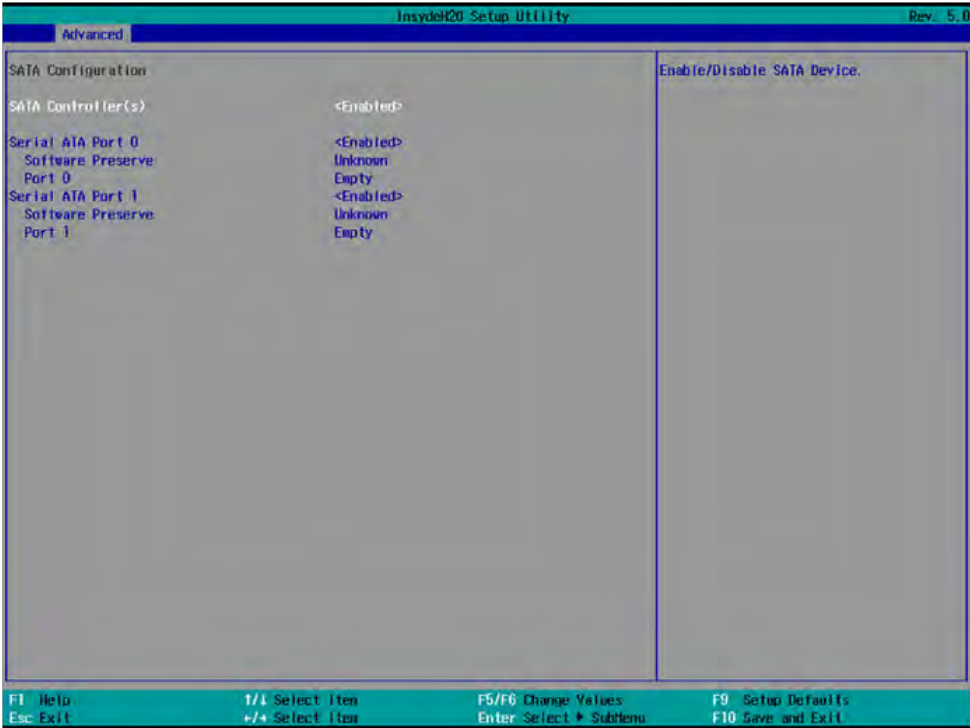






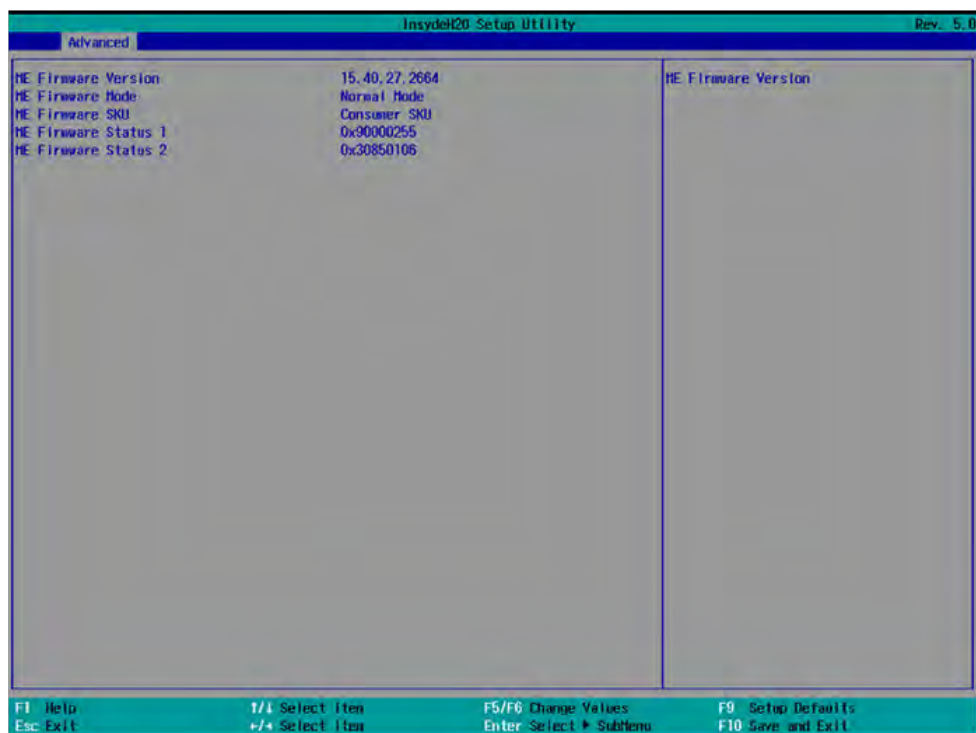
To select MPCE1 device enabled or not and to change the PCIe Speed, there are Auto, Gen1, Gen2, Gen3, default is Auto

4-6-2-4-2 ▶ SATA Configuration



To select SATA port & NGFF1 M.2 SATA device enabled or not.

4-6-2-5 ► PCH-FW Configuration



4-6-3 SIO F81804



UART Port 1 Configuration

Please refer section 4-6-3-1

UART Port 2 Configuration

Please refer section 4-6-3-2

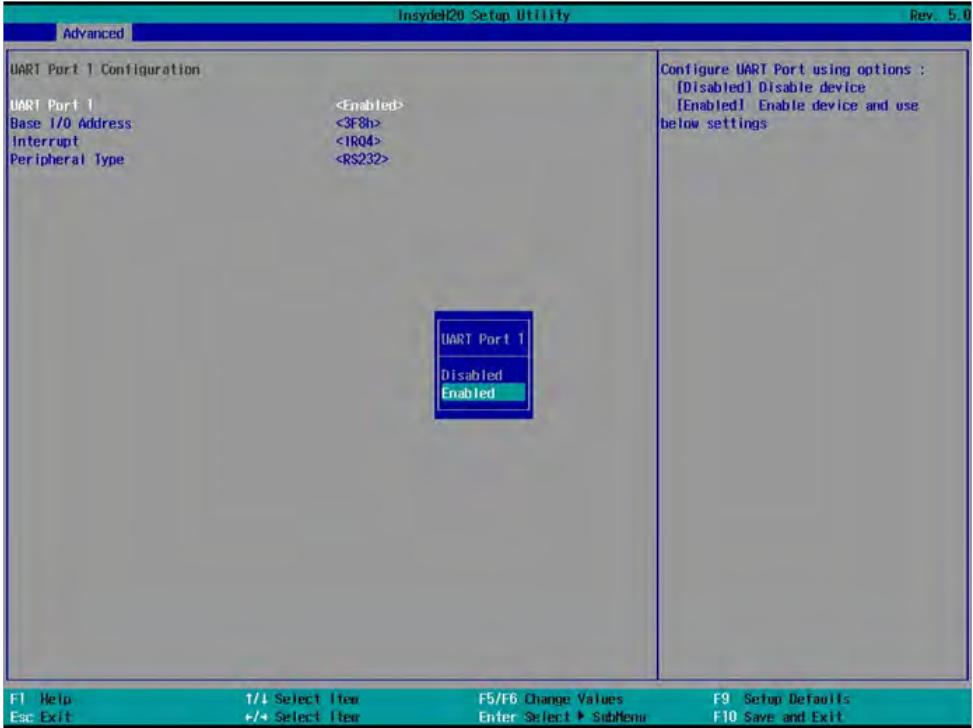
Hardware Monitor

Please refer section 4-6-3-3

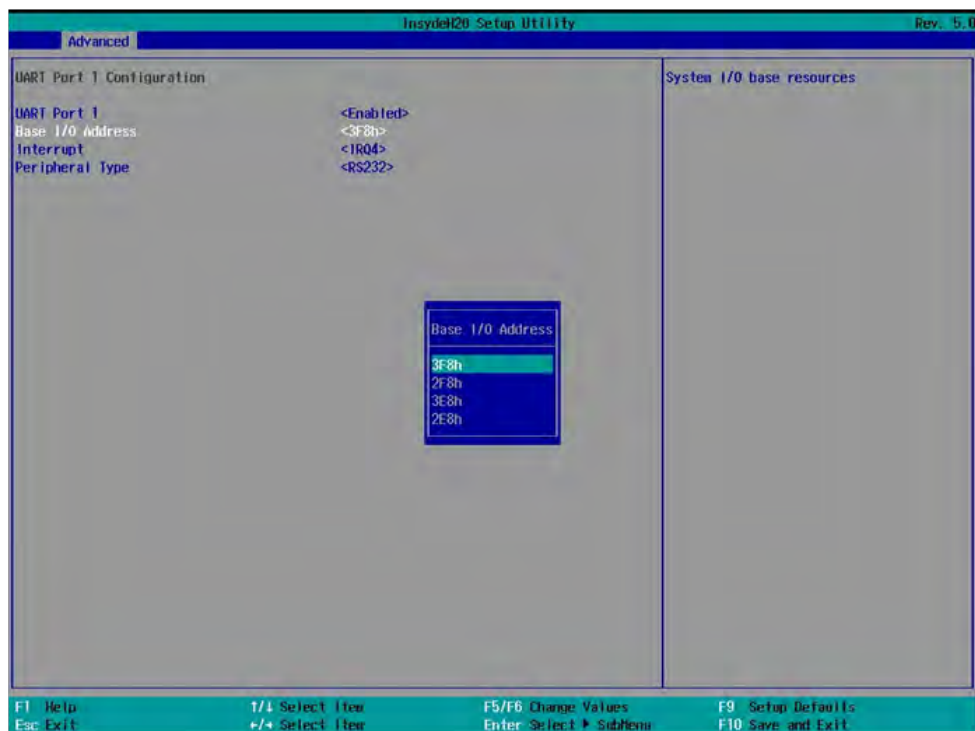
Restore on Power Loss

Please refer section 4-6-3-4

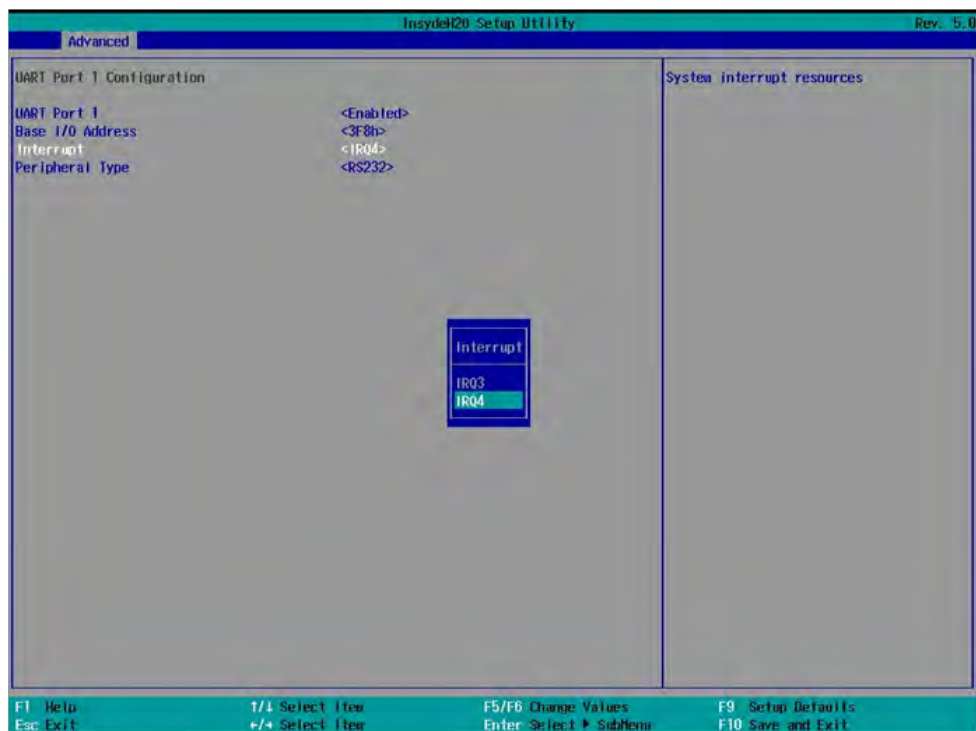
4-6-3-1 ► UART Port 1 Configuration



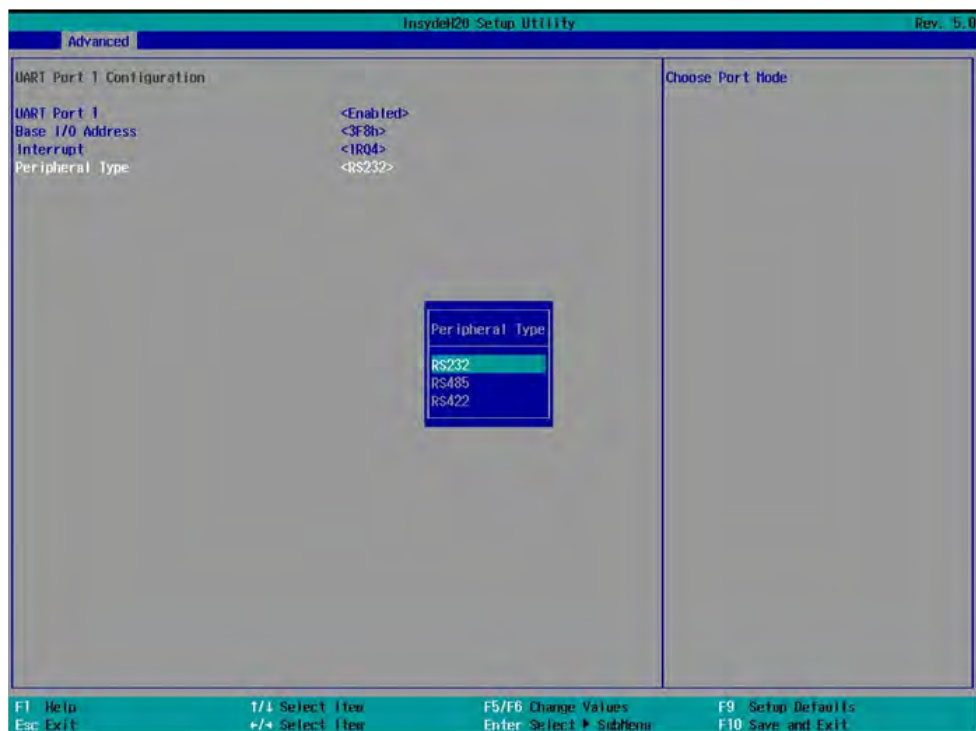
To Enable Serial port or not, default is Enabled.



Base I/O Address, default is 3F8h.

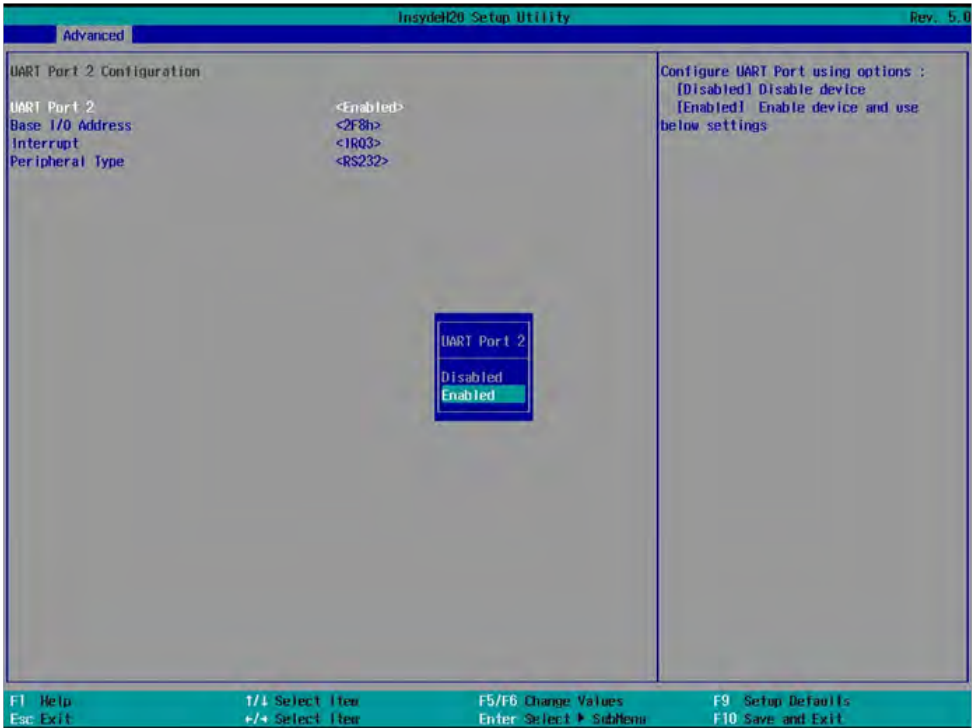


Interrupt, default is IRQ4.

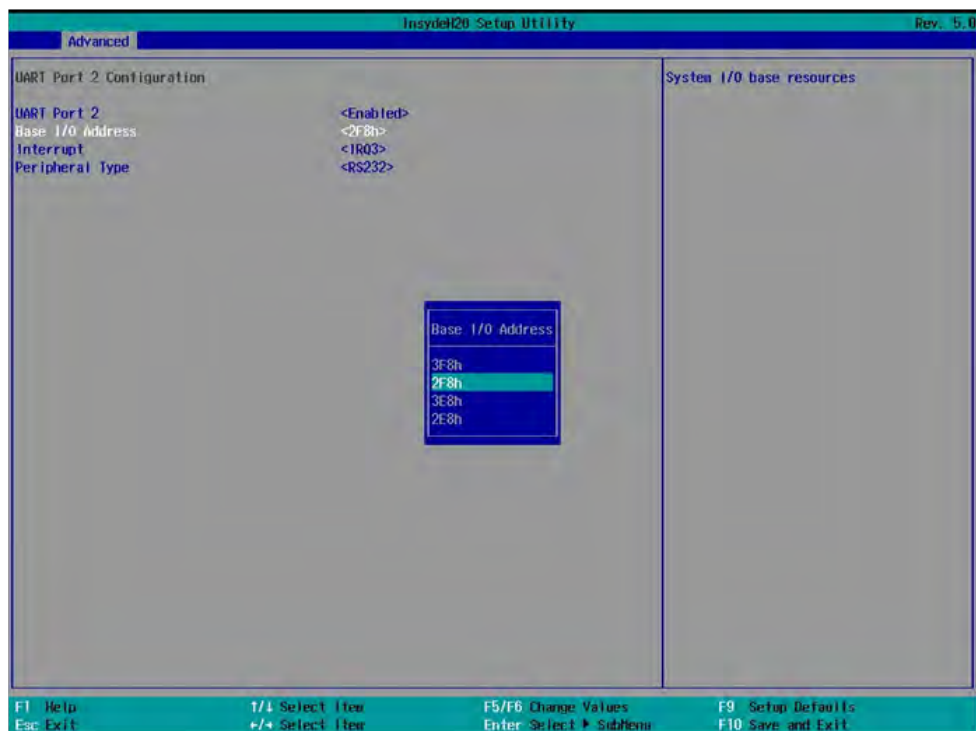


Peripheral, to select the Serial port to RS232 / RS422 / RS485, default is RS232.

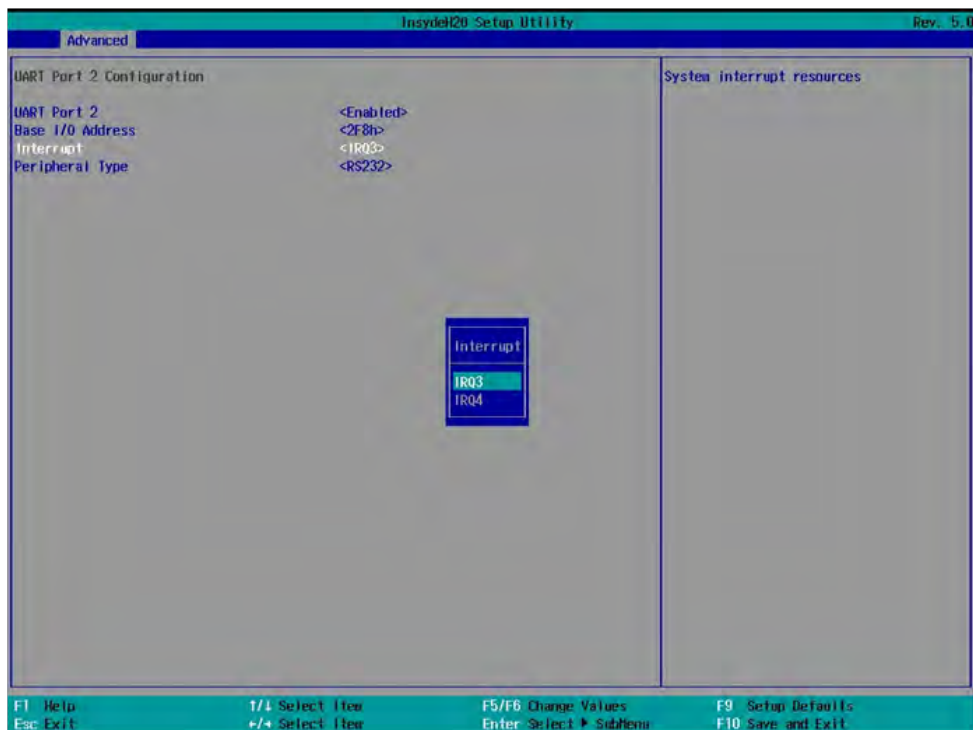
4-6-3-2 ► UART Port 2 Configuration



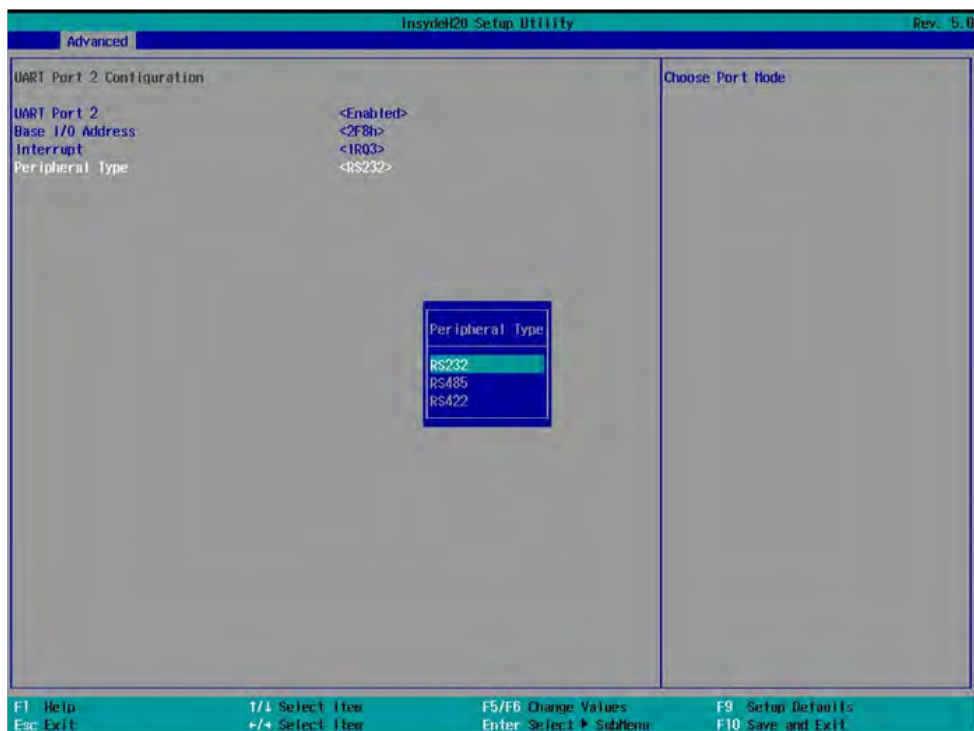
To Enable Serial port or not, default is Enabled.



Base I/O Address, default is 2F8h.



Interrupt, default is IRQ3.



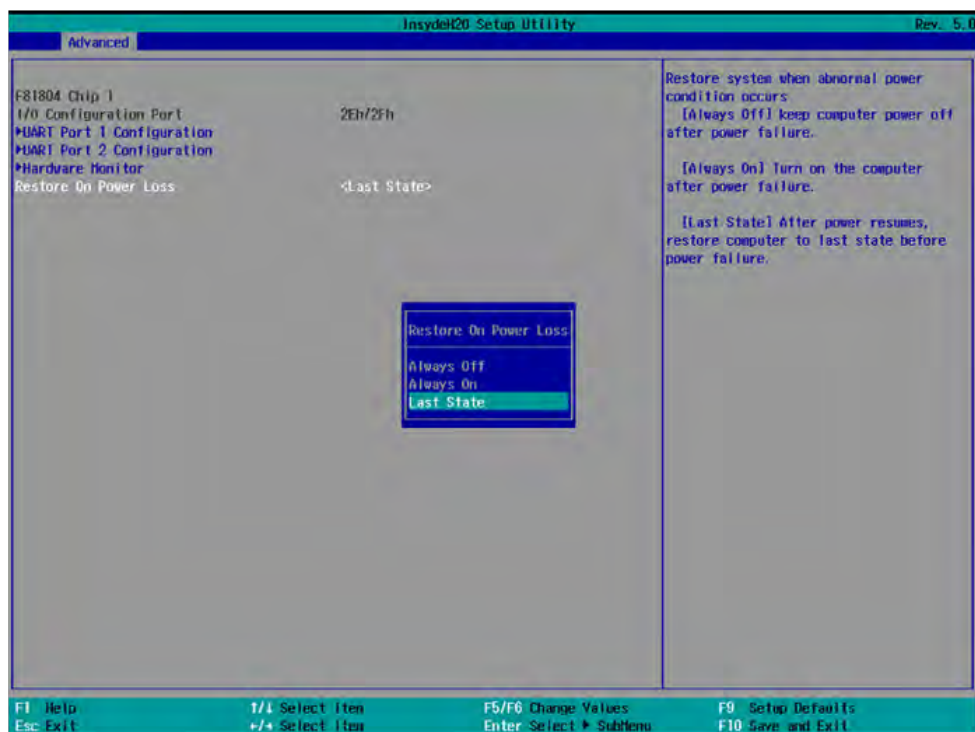
Peripheral, to select the Serial port to RS232 / RS422 / RS485, default is RS232.

4-6-3-3 ► Hardware Monitor



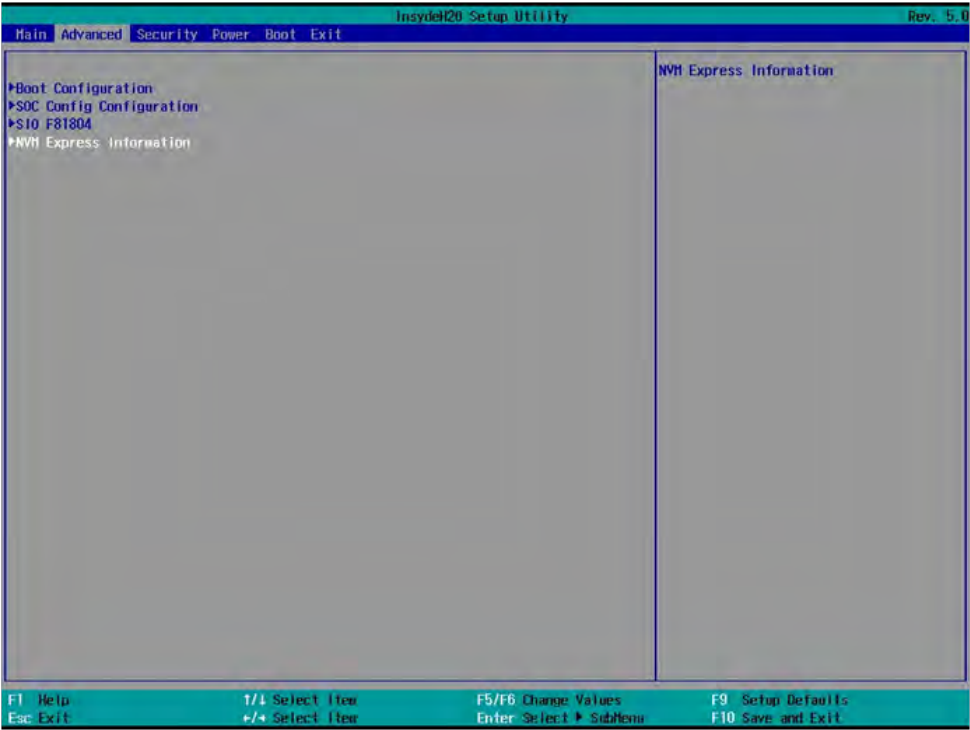
Press [Enter] to view PC health status.
This section shows the status of your CPU, Fan, and overall system.
This is only available when there is Hardware Monitor function onboard.

4-6-3-4 Restore On Power Loss



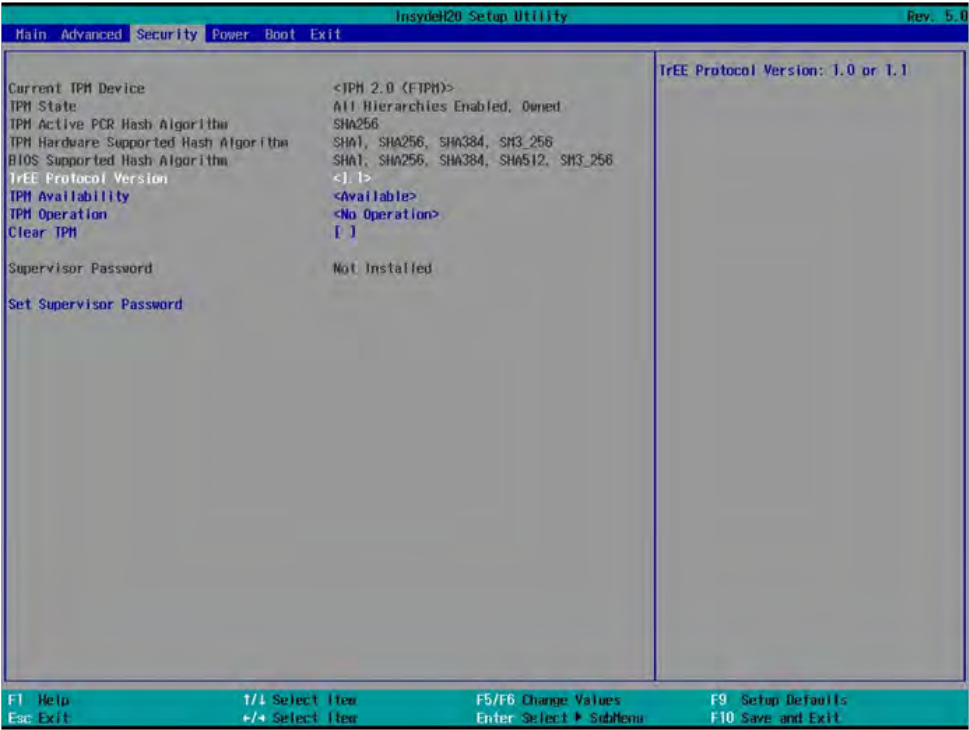
To select the power behavior after power fail, default is last state.

4-6-4 NVM Express Information



Press [Enter] to view the NVMe storage devices information.

4-7 Security



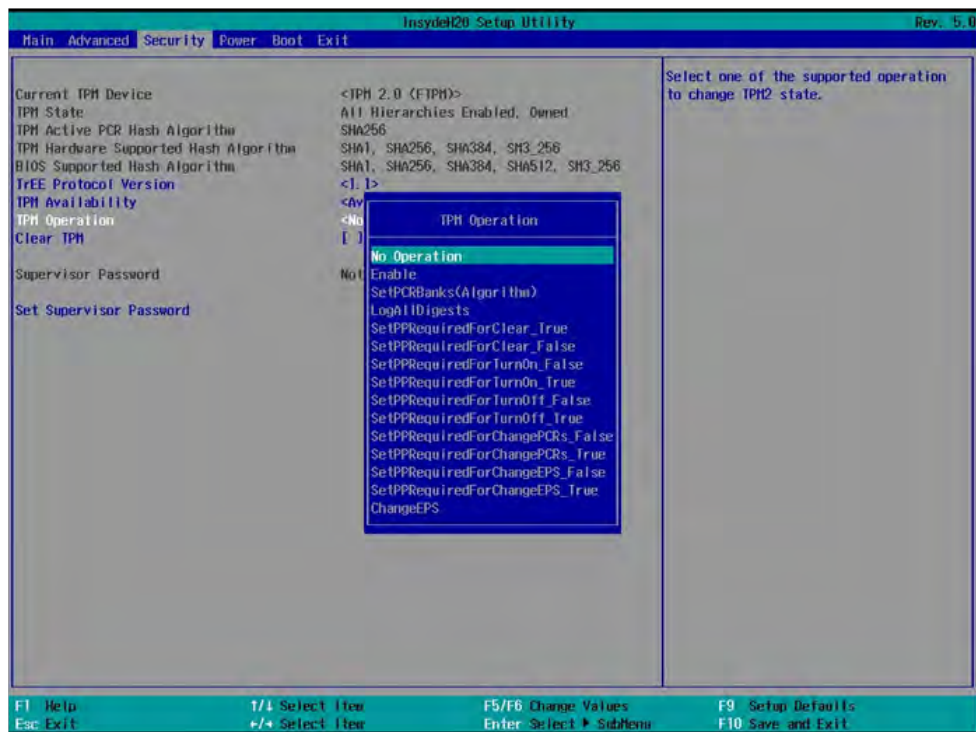
TrEE Protocol Version

There are 1.0 and 1.1 versions.

TPM Availability

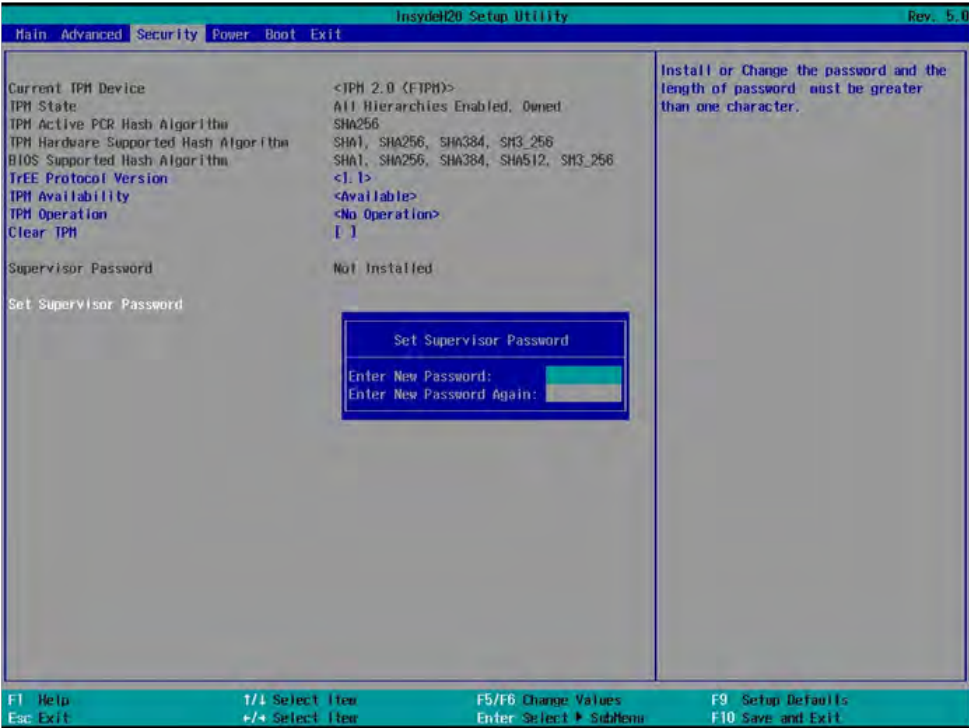
To select TPM available or hidden

TPM Operation



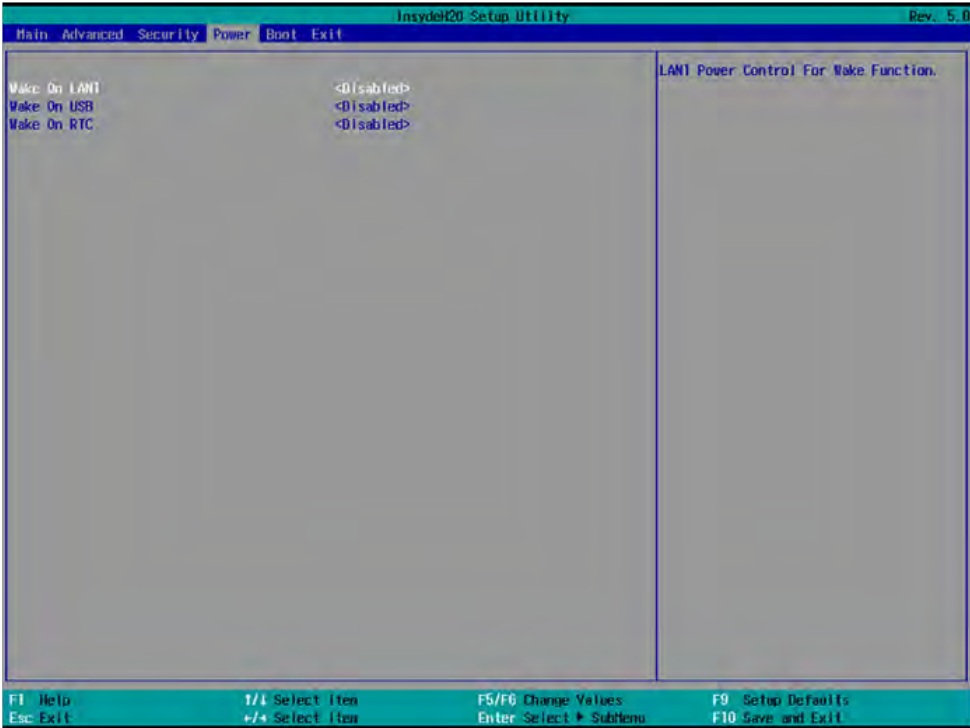
To select TPM operations

Set Supervisor Password



To set up an Supervisor password

4-8 Power

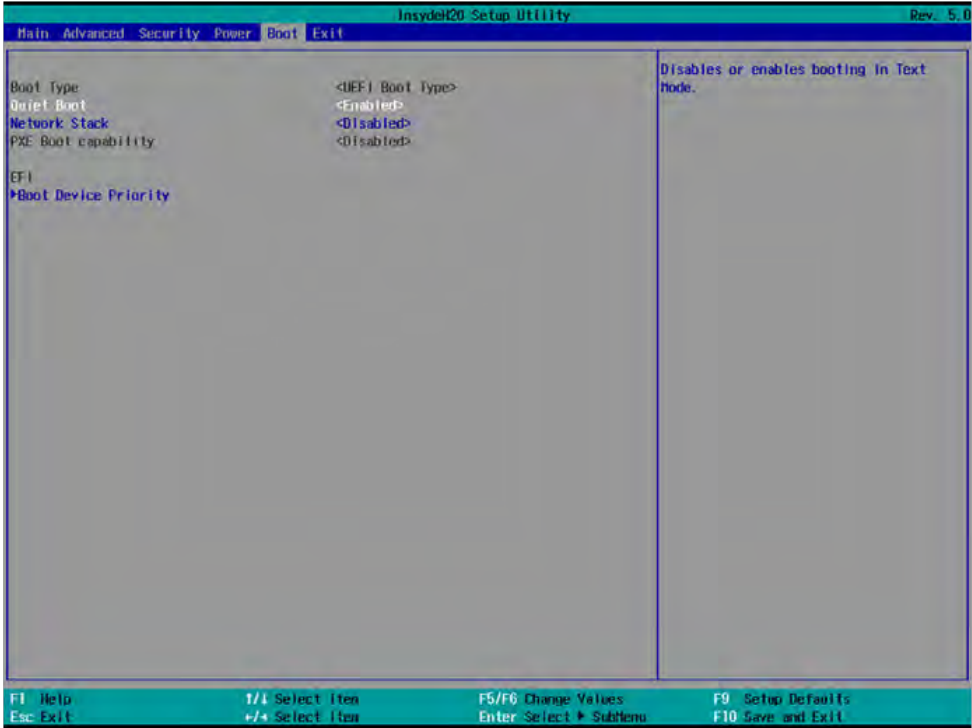


Wake On LAN1
To select S3, S5 or S3/S5 wake on LAN1, default is Disabled.

Wake On USB
To select S3 wake on USB, default is Disabled.

Wake On RTC
The optional settings are: Disabled(default), By every day, By day of month.

4-9 Boot



Quiet Boot

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

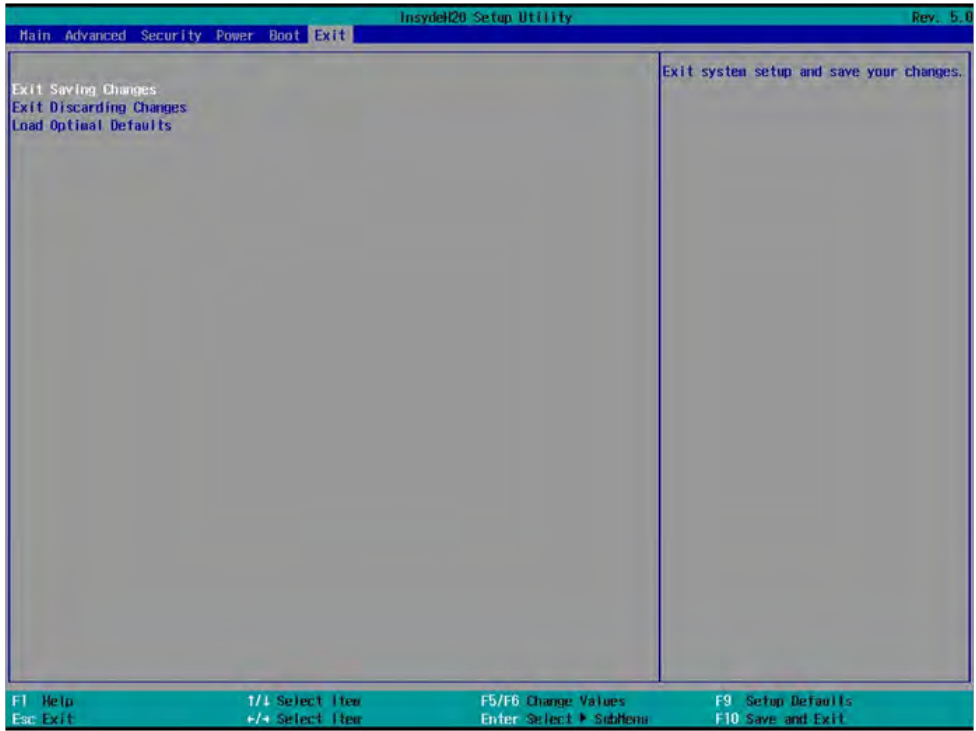
Network Stack

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

EFI Boot Device Priority

Determine which EFI storage device for booting, this item will not show on this page if there is no any storage device found.

4-10 Save & Exit



Exit Saving Changes

Save configuration and reset

Exit Discarding Changes

Reset without saving the changes

Load Optimal 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 3I640DW 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 3I640DW.ROM -BIOS -ALL

3I640DW.ROM is the file name of the latest BIOS.

It may be 3I640DW.ROM or 3I640DW.ROM, etc.

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

By Bay Trail series mainboard, please type

X:\: H2OFFT-D.EXE 3I640DW.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)