

2I640HW

**Intel Elkhart Lake ATOM® x6413E / J6412 SoC CPU,
On Board LPDDR4, 2 x LAN /
eDP / LVDS / HDMI / USB / COM / M.2 / PCIe mini card**

All-In-One

**Intel Elkhart Lake ATOM® x6413E / J6412 SoC CPU
HDMI, eDP, LVDS, 1 x M.2, 1 x Mini PCIe, 2 x LAN, 1 x Nano SIM,
USB, 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. 2I640HW

Release date: OCT. 20. 2022

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User Manual edition 0.1, OCT. 2022

Warning !

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

* Hardware Notice Guide

1. Before linking power supply with the motherboard, please attach DC-in adapter to the motherboard first. Then plug the adapter power to AC outlet.
Always shut down the computer normally before you move the system unit or remove the power supply from the motherboard. Please unplug the DC-in adapter first and then unplug the adapter from the AC outlet.
Please refer photo 1 as standard procedures.
2. In case of using DIRECT DC-in (without adapter), please check the allowed range for voltage & current of cables. And make sure you have the safety protection for outer issues such as short / broken circuit, overvoltage, surge, lightning strike.
3. In case of using DC-out to an external device, please make sure its voltage and current comply with the motherboard specification.
4. The total power consumption is determined by various conditions (CPU / motherboard type, device, application, etc.). Be cautious to the power cable you use for the system, one with UL standard will be highly recommended.
5. It's highly possible to burn out the CPU if you change / modify any parts of the CPU cooler.
6. Please wear wrist strap and attach it to a metal part of the system unit before handling a component. You can also touch an object which is ground connected or attached with metal surface if you don't have wrist strap.
7. Please be careful to handle & don't touch the sharp-pointed components on the bottom of PCBA.
8. Remove or change any components 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.

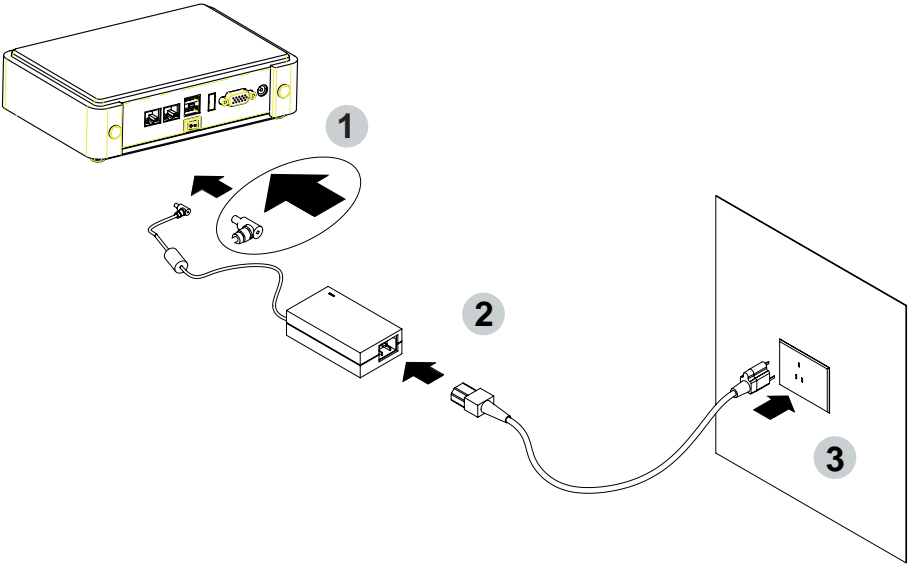
Remark 1:

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

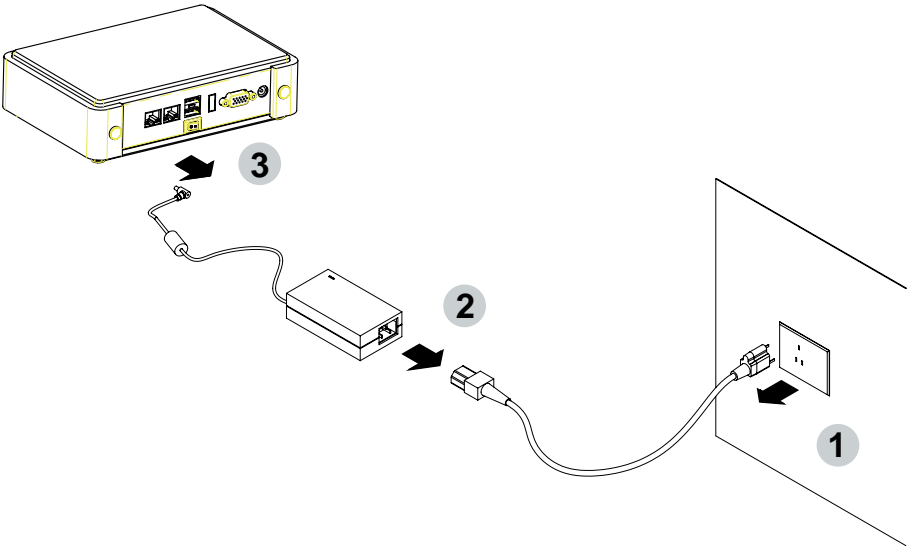
Moreover, erratic pull / push action might cause an unpredictable damage to the component & system unit.

Photo 1

Insert



Unplug



Chapter-1

General Information

The 2I640HW is a 2.5" (102 x 88 mm) motherboard powered with Intel Atom® x6000E series and Celeron® J (formerly Elkhart Lake) processor & offered the ideal platform for high performance applications. The ultra compact (102 x 88 mm) motherboard with wide range 9~36V DC power input & embeds multiple Intel 2.5GbE LAN, USBs, COM Ports and HDMI, LVDS, eDP display interface that offer the ideal platforms for high performance applications in Networking, Smart Automation, Machine Vision, In-vehicle, Industry 4.0 and any compact high-performance Internet of Things (IoT) applications

The 2I640HW supports high-speed data transfer interfaces such as PCIe gen3, USB 3.0, and SATA 6 Gb/s (SATA III) for SATA port and M.2 B-Key device, with LPDDR4 3200 MHz on board 8G memory and supports 4 serial ports, 1 port RS232 / RS485 / RS422 jumper free auto switch by BIOS. 3 port RS232 only. It supports 1 port of USB 3.0, 5 port of USB 2.0. The expandable interfaces include 1 mini card for PCIe and USB interface, and 1 M.2 B-Key for SATA and USB 3.0 / 2.0 interface.

The embedded motherboard 2I640HW is specially designed with Wide-Range Voltage DC in (9~36V) for widely varying input voltage requirement. All wafer IO design offers superb performance and PC specification in the industry using the specific housing. It supports with two 10 / 100 / 1000 / 2500 Mbps 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

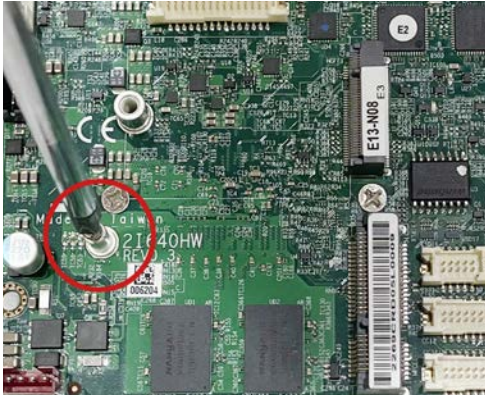
1. Intel® Atom x6413E Processor 1.5GHz / 2.7GHz (Quad Core),
Intel® Celeron Processor J6412 2.0GHz / 2.6GHz (Quad Core)
2. Intel® UHD Graphics for 10th Gen Intel® Atom x6413E 500MHz / 750MHz,
Intel® Celeron J6412 400MHz / 800MHz
3. Support HDMI 1.2 up to 1920 x 1080 at 60Hz, 24bits / 2 Channel LVDS up to
1920 x 1080 resolution and eDP 1.3 2 Lanes up to 1920 x 1080 at 60Hz.
4. Support USB Touch & backlight power control function
5. Onboard LPDDR4 4G / 8G
6. Support 2 x 2.5G Intel LAN port.
7. Support total 4 port RS232, 1 x RS232 selectable to RS485 / RS422 by BIOS
and 3 x RS232 only
8. 1 x USB 3.0 and 5 x USB 2.0
9. ALC888S HD Audio Specification 1.0 Two channel sound chipset with 2.1W audio AMP.
10. Support extended 1 x mini card PCIe / USB2.0 and 1 x M.2 B-Key for mSATA and
USB 3.0 / 2.0 interface with Nano SIM.
11. Hardware digital Input & Output, 4 x DI / 4 x DO, Hardware Watch Dog Timer,
0~255 sec programmable
12. Wide Range DC IN +9V~36V

1-2 Specification

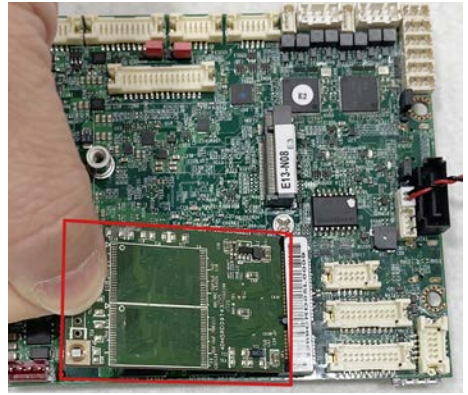
1. **SOC:** Intel® Atom x6413E Processor 1.5GHz / 2.7GHz (Quad Core),
Intel® Celeron Processor J6412 2.0GHz / 2.6GHz (Quad Core)
2. **Memory:** Onboard LPDDR4 4G / 8G
3. **Graphics:** Intel® UHD Graphics for 10th Gen Intel® Atom x6413E 500MHz / 750MHz,
Intel® Celeron J6412 400MHz / 800MHz, Support HDMI 1.2 up to 1920 x 1080 at 60Hz,
24bits / 2 Channel LVDS up to 1920 x 1080 resolution and eDP 1.3 2 Lanes up
to 1920 x 1080 at 60Hz.
4. **LAN:** 2 Intel I225-V LAN chipset with 2.5G chipset for PCIe Gen2 x 1 V3.1 interface.
5. **I/O Chip:** Switch chipset for 1 ports RS232 / RS422 / RS485 selected by BIOS,
3 port RS232 only.
6. **Sound:** Support line in, line out and MIC in, Two channel Class D Audio Amplifier
7. **USB:** 1 type C USB 3.0 (Lex design), 5 USB 2.0
8. **WDT / DIO:** Hardware digital Input & Output, 4 x DI / 4 x DO (Option) /
Hardware Watch Dog Timer, 0~255 sec programmable
9. **Expansion interface:** one mini card PCIe and USB interface,
one M.2 B-key for mSATA and USB 3.0 / 2.0 interface with Nano SIM
10. **BIOS:** Insyde UEFI BIOS
11. **Dimension:** 102 x 88 mm
12. **Power:** On board DC +9~36V

1-3 Installing the Mini PCI-e Card (Full Size)

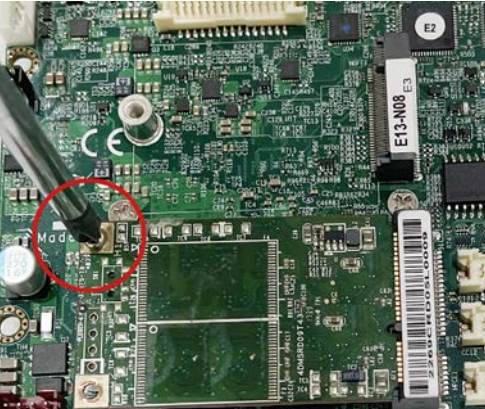
1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle

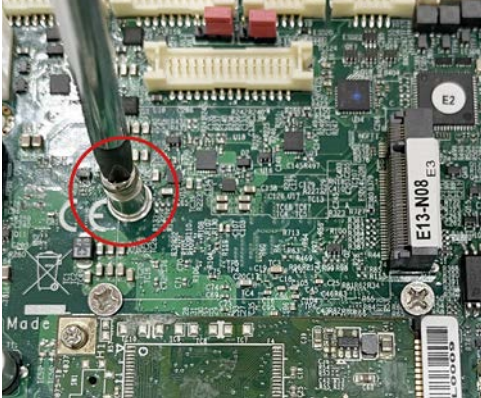


3. Gently push down the Mini Card and screw the screw back.



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

1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle

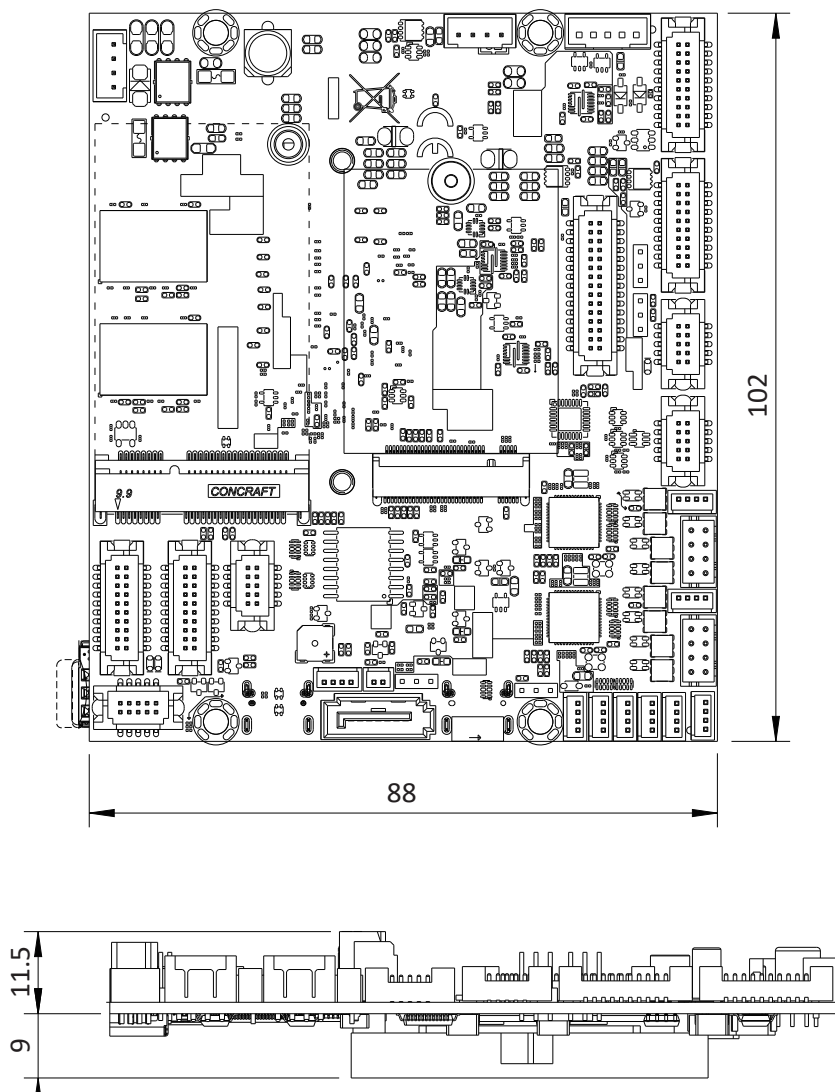


3. Gently push down the Mini Card and screw the screw back.



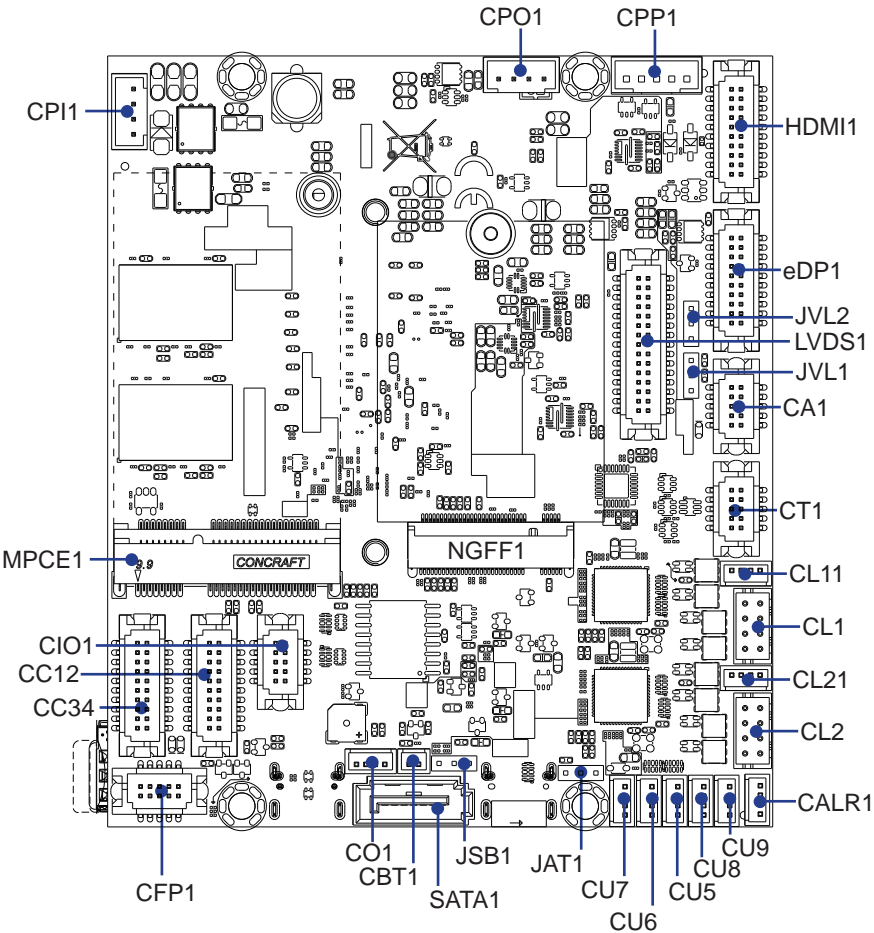
Chapter-2

2-1 Dimension-2I640HW



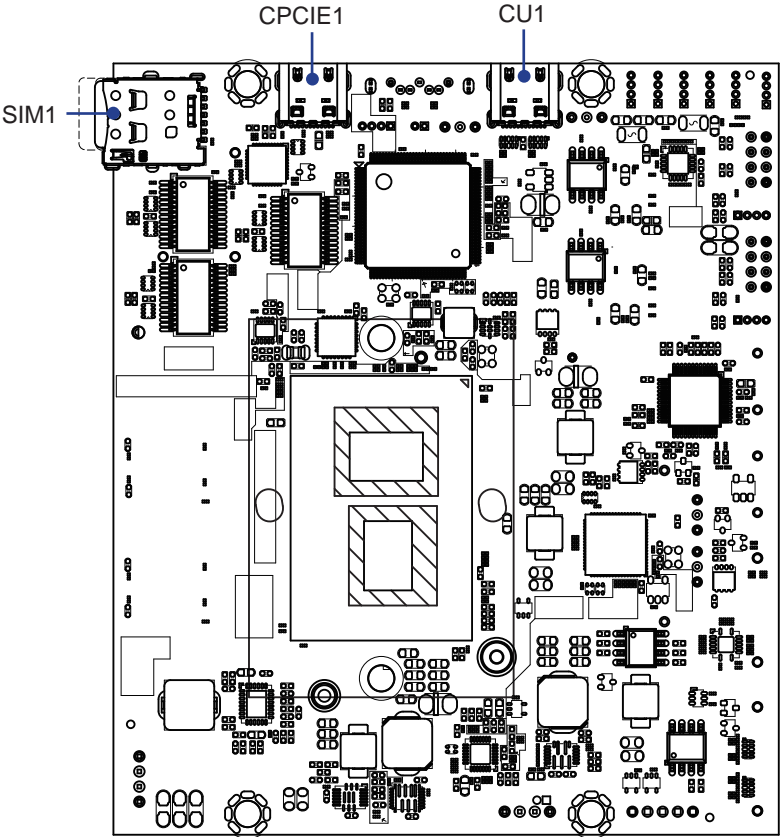
2-2 Layout-2I640HW-Connector and Jumper

TOP



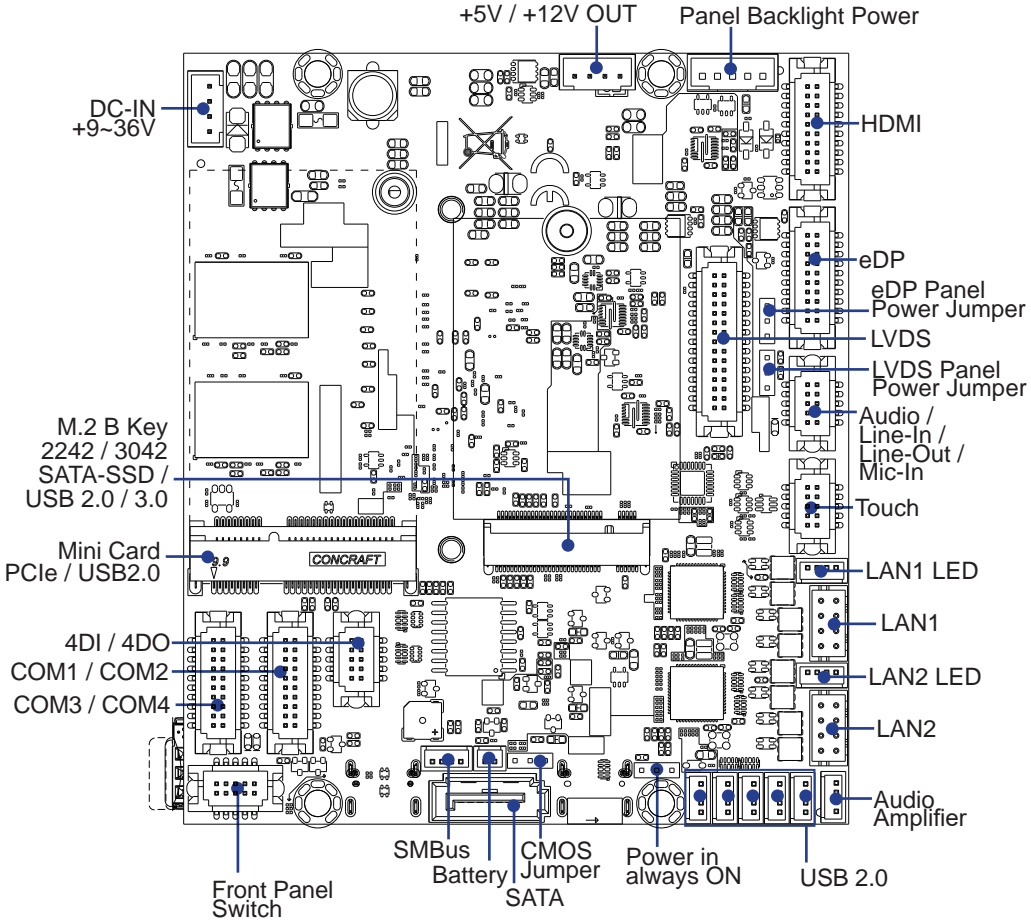
2-2-1 Layout-2I640HW-Connector and Jumper Bottom

BOT



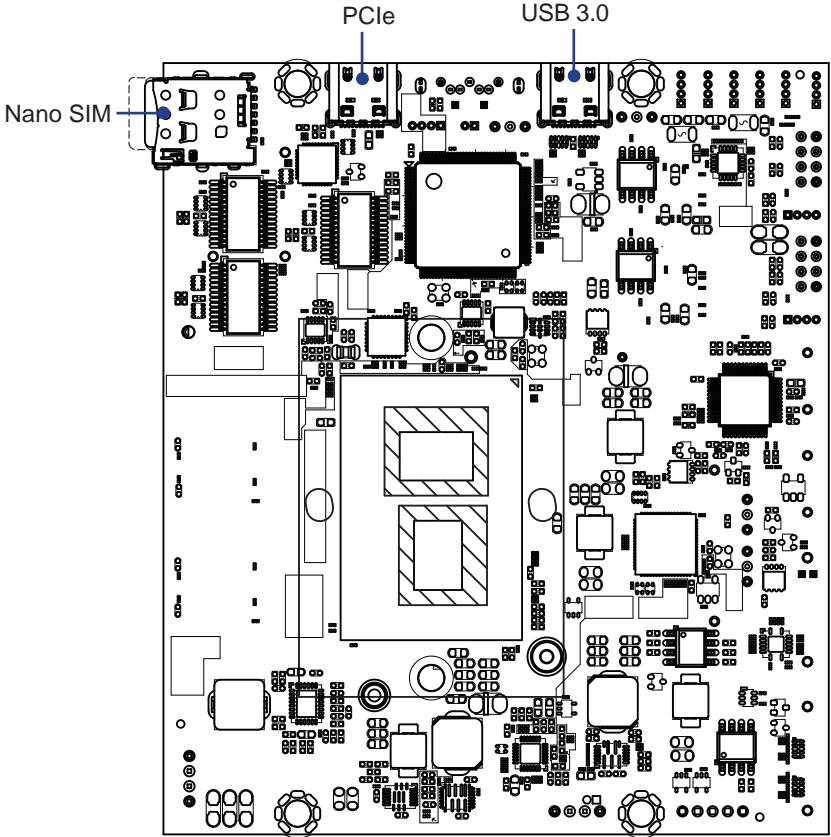
2-3 Layout-2I640HW-Function MAP

TOP



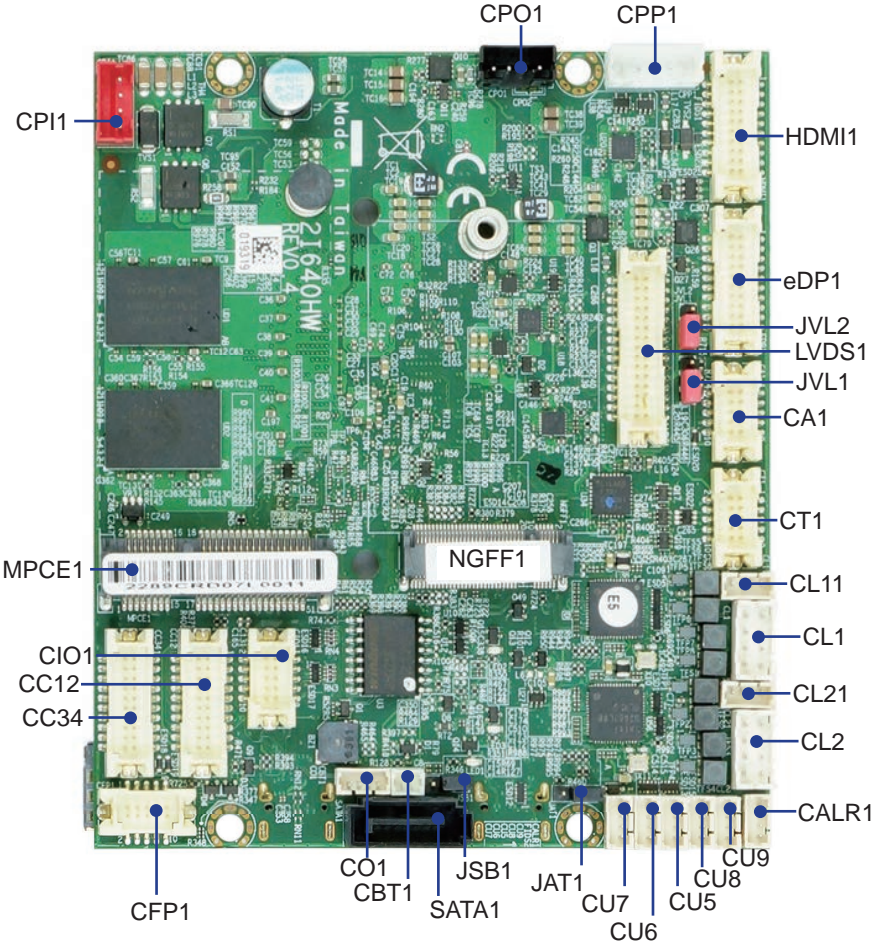
2-3-1 Layout-2I640HW-Function MAP

BOT



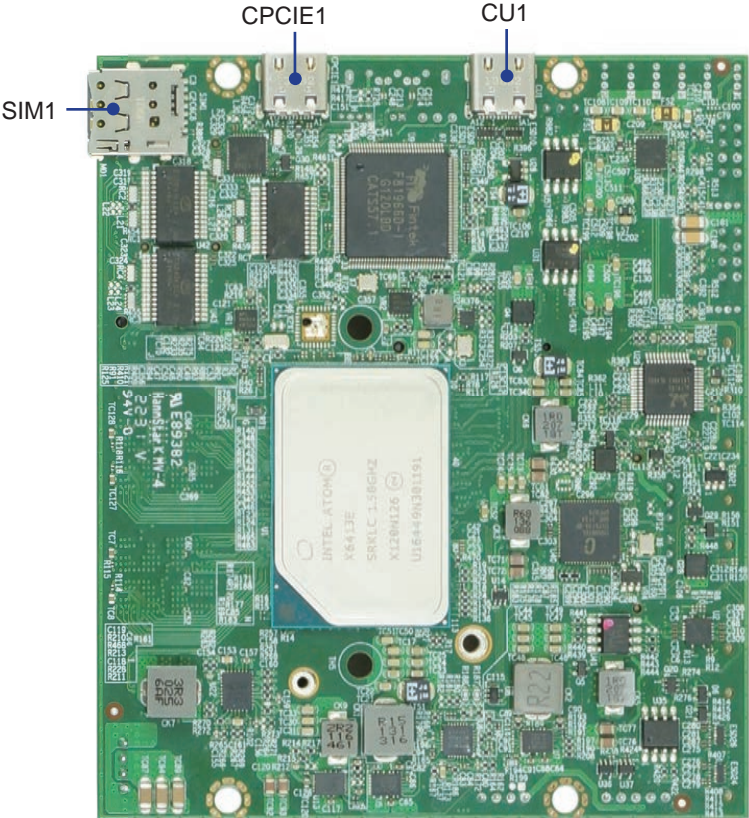
2-4 Diagram- 2I640HW

TOP



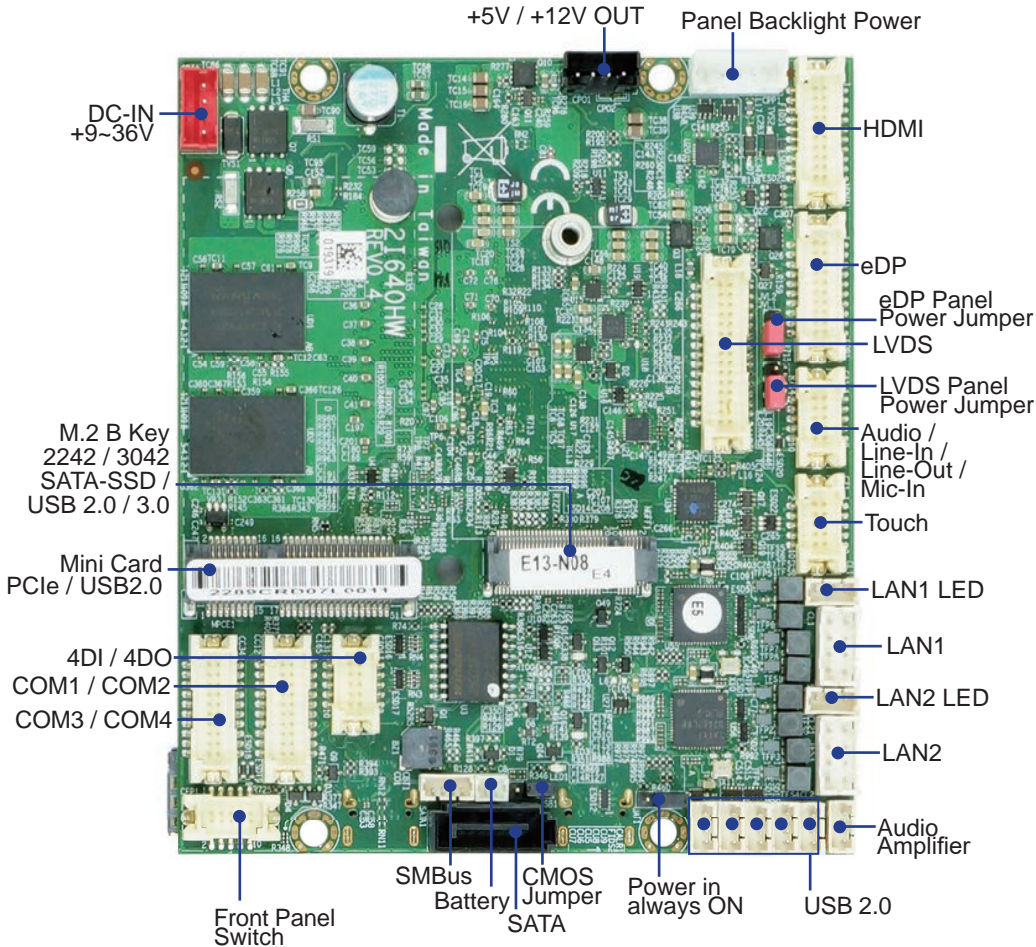
2-4-1 Diagram- 2I640HW

BOT



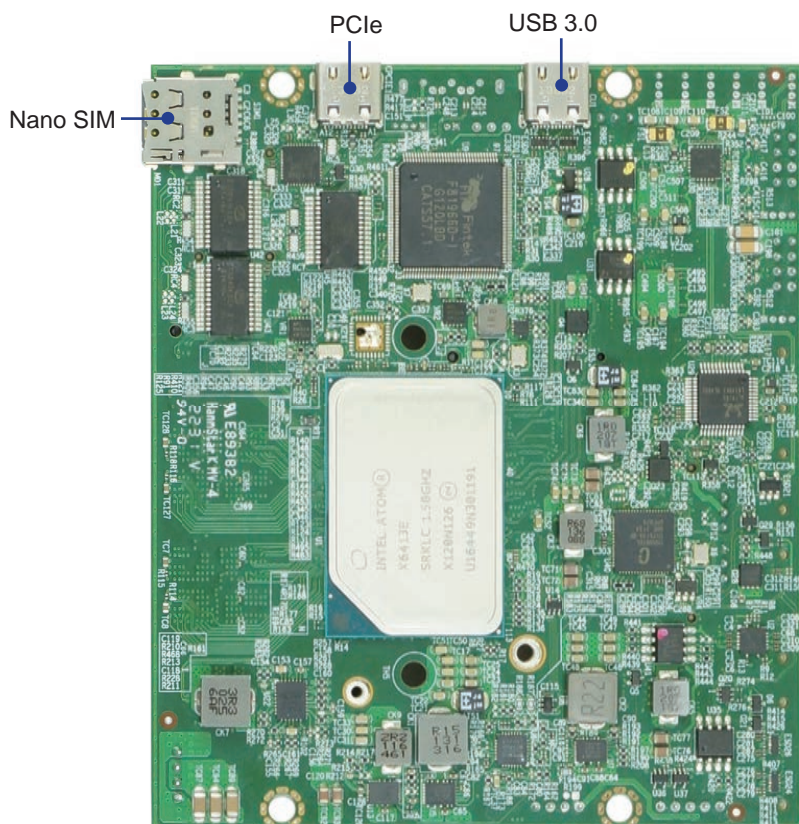
2-5 Function MAP- 2I640HW

TOP



BOT

BOT



2-6 List of Jumpers

JSB1: CMOS DATA Clear

JAT1: Power in always ON function

JVL1: LVDS panel power select

JVL2: 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.

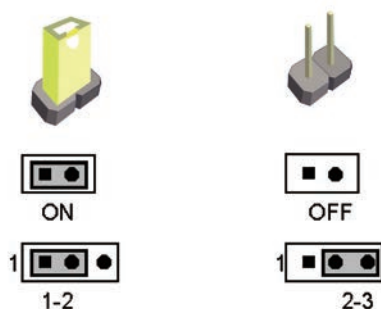


Figure 2.2

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.

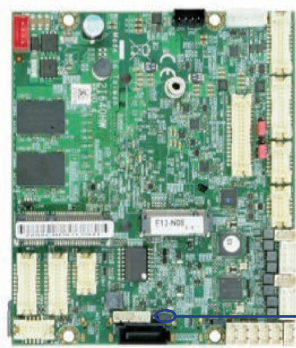
To clear the CMOS, follow the procedures below:

- 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**



JSB1



3 2 1

*Normal



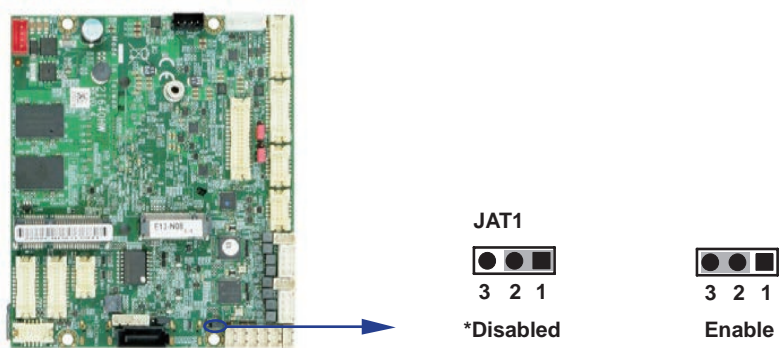
3 2 1

CMOS

2-9 JAT1: Power in always ON function

| JAT1 | DESCRIPTION |
|------|-------------|
| *1-2 | Disabled |
| 2-3 | Enable |

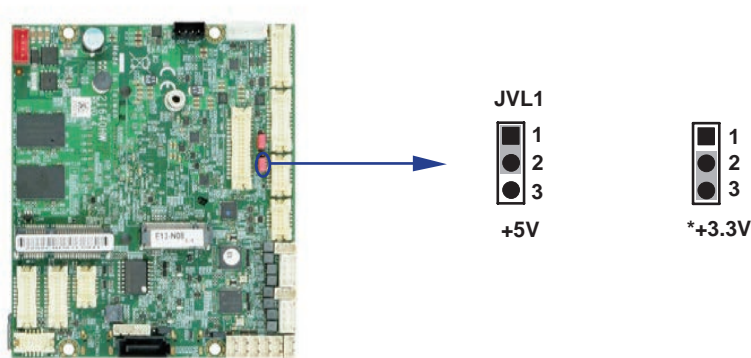
NOTE: Power always on function default is disabled.



2-10 JVL1: LVDS panel power select

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

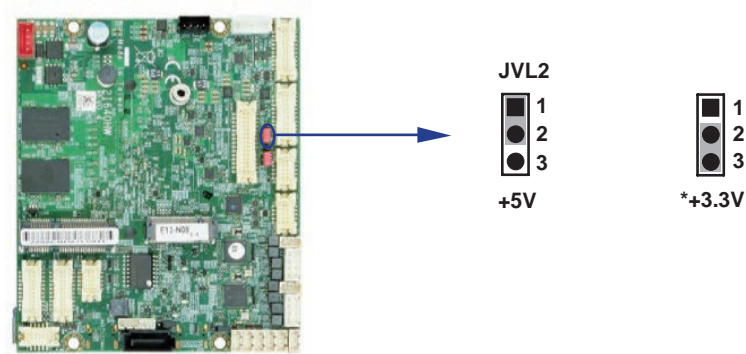
Note: Attention! Check Device Power in spec



2-11 JVL2: eDP panel power select

| JVL2 | 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

| | |
|--------|--|
| CBT1: | CMOS Battery in 1x2 pin (1.25mm) wafer |
| CU1: | USB 3.0 type C connector |
| CU5: | USB 2.0 port 1x4 pin (1.25mm) wafer |
| CU6: | USB 2.0 port 1x4 pin (1.25mm) wafer |
| 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 |
| CL1: | LAN port 2x4 pin (2.0mm) wafer |
| CL2: | LAN port 2x4 pin (2.0mm) wafer |
| CL11: | LAN LED indication 1x4 pin (1.25mm) wafer |
| CL21: | LAN LED indication 1x4 pin (1.25mm) wafer |
| CC12: | COM1 / COM2 2x10 pin (1.25mm) wafer |
| CC34: | COM3 / COM4 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 1x4 pin (2.0mm) Red wafer |
| CPO1: | +12V / +5V output 1x4 pin (2.0mm) Black wafer |
| EDP1: | eDP 2x10 pin (1.25mm) wafer |
| LVDS1: | LVDS 2CH 2x15 pin (1.25mm) wafer |
| HDMI1: | HDMI 2x10 pin (1.25mm) wafer |
| CPP1: | LVDS Panel Backlight power 1x5 pin (2.0mm) wafer |
| SIM1: | Nano SIM card socket |
| CT1: | Touch 2x5 pin (1.25mm) wafer |
| MPCE1: | Full size mini card sockets 52pin |
| NGFF1: | M.2 B key 2242 / 3042 H=8.5 sockets 75pin |

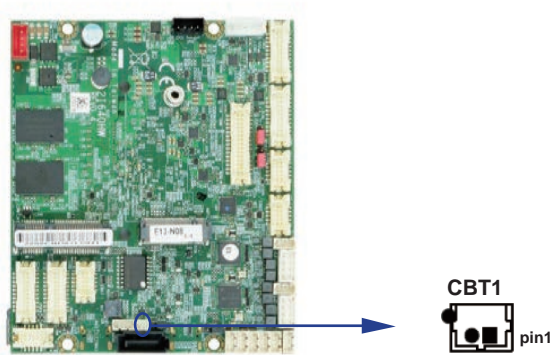
- CA1: Audio in and Mic out 2x5 pin (1.25mm) wafer
- CALR1: Audio Amplifier 1x4 pin (1.25mm) wafer
- SATA1: SATA connector 7 pin
- CIO1: 4DI / 4DO 2x5 pin (1.25mm) wafer
- CPCIE1: PCIe type C connector

3-2 CMOS battery connector

- CBT1: CMOS Battery in 1x2 pin (1.25mm) wafer

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

NOTE: CBT1 for external connector can extend battery capacity.

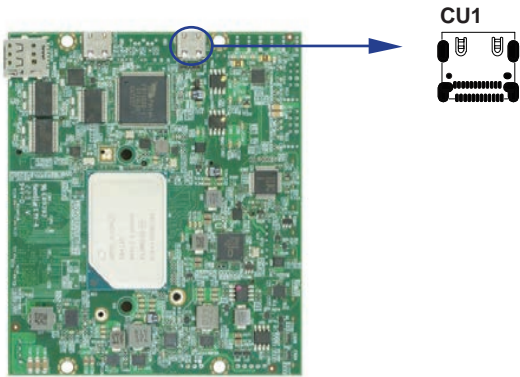


3-3 USB Interface

• CU1: USB 3.0 / 2.0 Type C connector

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|--------------|---------|--------------|
| A1 | GND | B12 | GND |
| A2 | USB3.0 A_TX+ | B11 | USB3.0 B_RX+ |
| A3 | USB3.0 A_TX- | B10 | USB3.0 B_RX- |
| A4 | +5V | B9 | +5V |
| A5 | NC | B8 | NC |
| A6 | USB2_A_DP | B7 | USB2_B_DN |
| A7 | USB2_A_DN | B6 | USB2_B_DP |
| A8 | NC | B5 | NC |
| A9 | +5V | B4 | +5V |
| A10 | USB3.0 A_RX- | B3 | USB3.0 B_TX- |
| A11 | USB3.0 A_RX+ | B2 | USB3.0 B_TX+ |
| A12 | GND | B1 | GND |

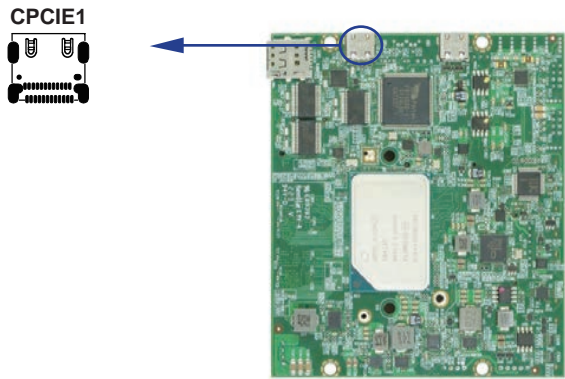
NOTE: Type C pin define for LEX.



3-4 CPCIE1: PCIe x2 Type C connector

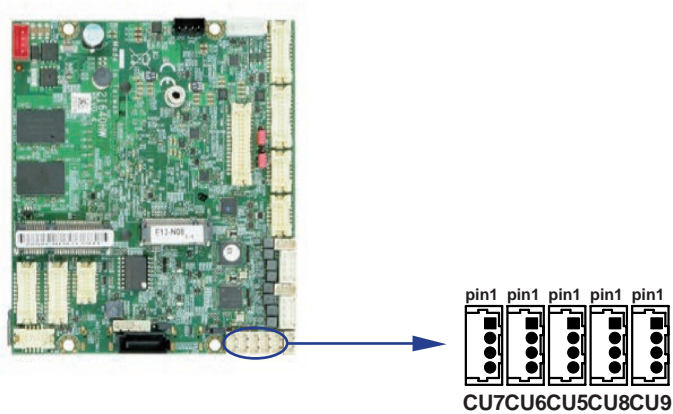
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| A1 | GND | B12 | GND |
| A2 | PCIE0_TX_DP | B11 | PCIE1_RX_DP |
| A3 | PCIE0_TX_DN | B10 | PCIE1_RX_DN |
| A4 | +3.3V | B9 | +3.3V |
| A5 | PERST | B8 | NC |
| A6 | CLKOUT_P | B7 | NC |
| A7 | CLKOUT_N | B6 | NC |
| A8 | NC | B5 | NC |
| A9 | +3.3V | B4 | +3.3V |
| A10 | PCIE0_RX_DN | B3 | PCIE1_TX_DN |
| A11 | PCIE0_RX_DP | B2 | PCIE1_TX_DP |
| A12 | GND | B1 | GND |

NOTE: PCIe x2 Type C pin define for LEX.



3-5 CU5.CU6.CU7.CU8.CU9: USB 2.0 1x4 pin (1.25mm) wafer

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



3-6 LAN Interface

• **CL1 / CL2: LAN signal out 2x4 pin (2.0mm) wafer**

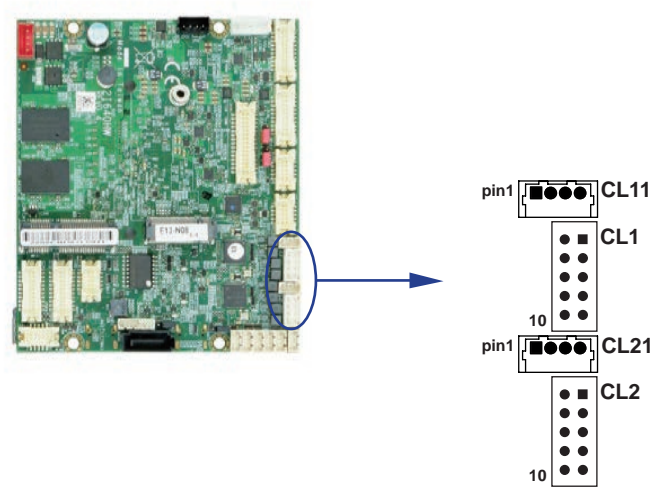
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | TR0- | 2 | TR0+ |
| 3 | TR2+ | 4 | TR1+ |
| 5 | TR1- | 6 | TR2- |
| 7 | TR3- | 8 | TR3+ |

Note: Can use CL001 connector Board to RJ45.

• **CL11 / CL21: LAN LED indicator 1x4 pin (1.25mm) wafer**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | VCC | 2 | Speed 100M |
| 3 | Speed 1G | 4 | Speed 2.5G |

Note: Can use CL001 connector Board to RJ45.



3-7 COM interface

CC12: COM1 / COM2 2x10 pin (1.25mm) wafer

• (RS232 Mode)

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| COM1 | | COM2 | |
| 1 | +5V | 2 | +5V |
| 3 | DCD | 4 | DCD |
| 5 | DSR | 6 | DSR |
| 7 | RXD | 8 | RXD |
| 9 | RTS | 10 | RTS |
| 11 | TXD | 12 | TXD |
| 13 | CTS | 14 | CTS |
| 15 | DTR | 16 | DTR |
| 17 | RI | 18 | RI |
| 19 | GND | 20 | GND |

Note:

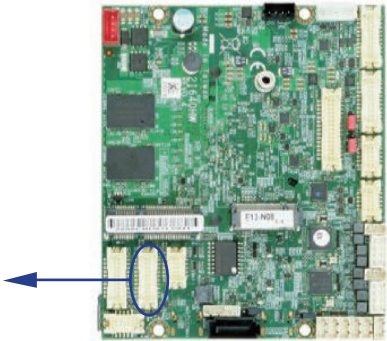
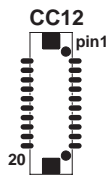
1. COM 1 Default RS232, RS485 / RS422 by BIOS control.
2. COM 1 & COM 2 The pin9 RI can be modify to Power to supply device.
The power voltage can be set +12V or +5V.
The RI change Voltage function set by BOM control. Default is RI signal.
3. COM 1 & COM 2 Pin 10 provides +5V for external device.
4. COM 2 only support RS232.

• (RS485 Mode)

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| COM1 | | | |
| 1 | +5V | | |
| 3 | DATA- | | |
| 5 | NC | | |
| 7 | DATA+ | | |
| 9 | NC | | |
| 11 | NC | | |
| 13 | NC | | |
| 15 | NC | | |
| 17 | RI | | |
| 19 | GND | | |

● (RS422 Mode)

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| COM1 | | | |
| 1 | +5V | | |
| 3 | TX- | | |
| 5 | NC | | |
| 7 | TX+ | | |
| 9 | NC | | |
| 11 | RX+ | | |
| 13 | NC | | |
| 15 | RX- | | |
| 17 | RI | | |
| 19 | GND | | |



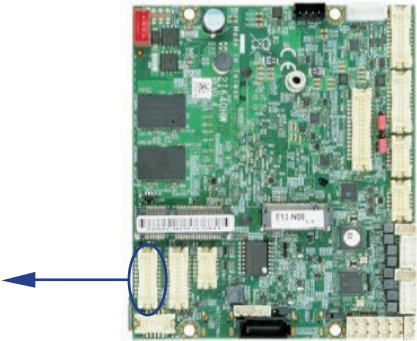
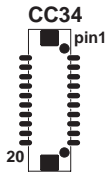
CC34: COM3 / COM4 2x10 pin (1.25mm) wafer

• (RS232 Mode)

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| COM3 | | COM4 | |
| 1 | +5V | 2 | +5V |
| 3 | DCD | 4 | DCD |
| 5 | DSR | 6 | DSR |
| 7 | RXD | 8 | RXD |
| 9 | RTS | 10 | RTS |
| 11 | TXD | 12 | TXD |
| 13 | CTS | 14 | CTS |
| 15 | DTR | 16 | DTR |
| 17 | RI | 18 | RI |
| 19 | GND | 20 | GND |

Note:

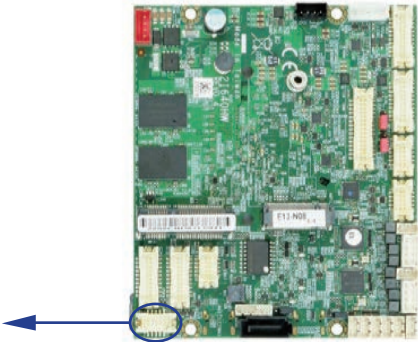
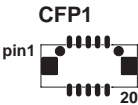
- 1. COM 3 & COM 4 The pin9 RI can be modify to Power to supply device.
The power voltage can be set +12V or +5V.
The RI change Voltage function set by BOM control. Default is RI signal.
- 3. COM 3 & COM 4 Pin 10 provides +5V for external device.
- 4. COM 3 & COM 4 only support RS232.



3-8 Front Panel Pin Header

● 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+ |

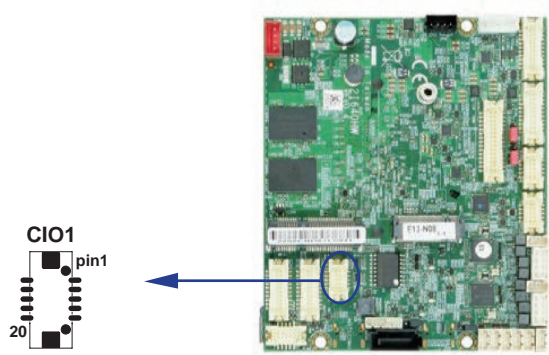


3-9 DIO Interface

● 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-I.



● WDT For F81966D-I watch dog timer device:

DC spec:

Input low Voltage (VIL): +0.8 Max

Input High Voltage(VIH): +2V Min

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

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

Watch Dog Time value 0~255 sec

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

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

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

3-9-1 IO Device: F81966 DIO under Windows

The Sample code source you can download from

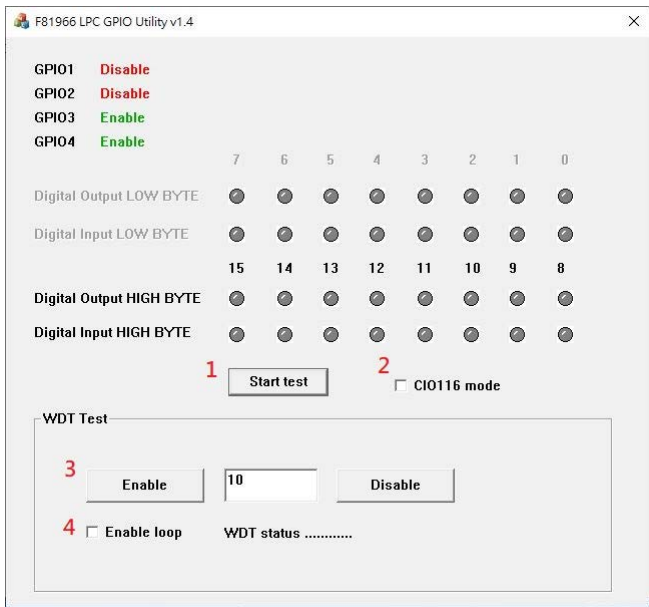
http://tprd.info/lexwiki/index.php/IO_Device:F81966_LPC_DIO_under_Windows

Source file: F81966_LPC_GPIO_Utility_Src_v1.5.zip

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

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

Introduction F81966 DIO



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

F81966_DLL Function

```

F81966_DLL_API bool F81966_LPC_Init(pF81966_status status);

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

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

```

Digital Input / Output test

Note when using the following boards: 2I640HW

CIO1 needs to be controlled by CIO3

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

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

sample code

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

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

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

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

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

Watch Dog test sample code

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

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

3-9-2 IO Device: F81966 DIO under Linux console

The Sample code source you can download from

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

Source file: F81966_DIO_v1.1_Src_L.tar.gz

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

F81966 Library: F81966_LIB_v1.1_x64_L.tar.gz F81966_LIB_v1.1_x32_L.tar.gz

Introduction F81966 DIO

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

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

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

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

F81966_DLL Function

```
bool F81966_OPEN();

void F81966_Init();

void F81966_LPC_Write(BYTE LDNData, BYTE reg, BYTE value);

BYTE F81966_LPC_Read(BYTE LDNData, BYTE reg);

void F81966_LPC_Digital_Write_LOW(BYTE byteValue);

void F81966_LPC_Digital_Write_HIGH(BYTE byteValue);

BYTE F81966_LPC_Digital_Read_LOW();

BYTE F81966_LPC_Digital_Read_HIGH();

void F81966_LPC_Set_WDT_Enable(BYTE byteValue);

void F81966_LPC_Set_WDT_Disable();

void EntryLPC();

void ExitLPC();
```

Digital Input / Output test

Note when using the following boards: 2I640HW
CIO1 needs to be controlled by CIO3

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

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

sample code

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

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

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

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

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

Watch Dog test

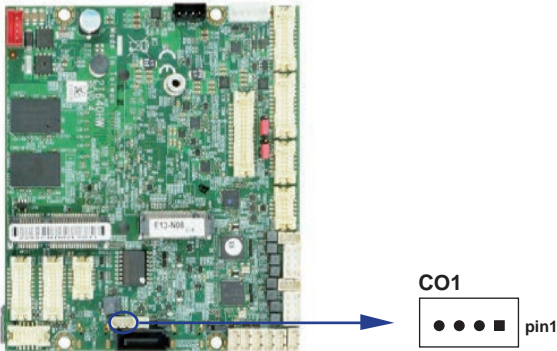
sample code

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

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

3-10 CO1: SMBus 1x4 pin (1.25mm) wafer

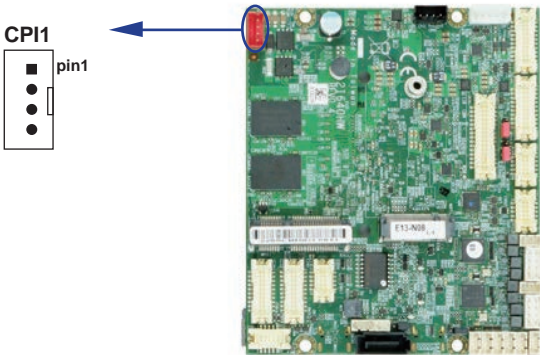
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | +3.3V | 2 | GND |
| 3 | SMB-Clock | 4 | SMB-Data |



3-11 CPI1: DC Power input 1x4 pin (2.0mm) wafer (RED)

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1,4 | GND |
| 2,3 | DC-IN |

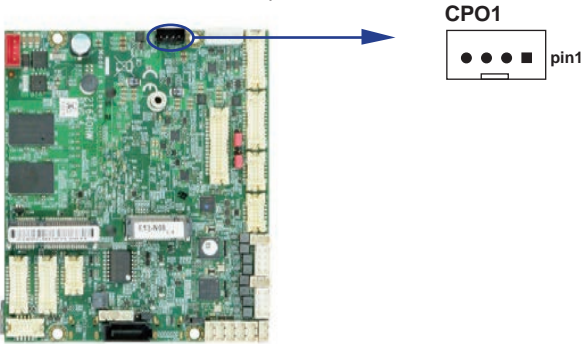
Note: Very important check DC-in Voltage.



3-12 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 |

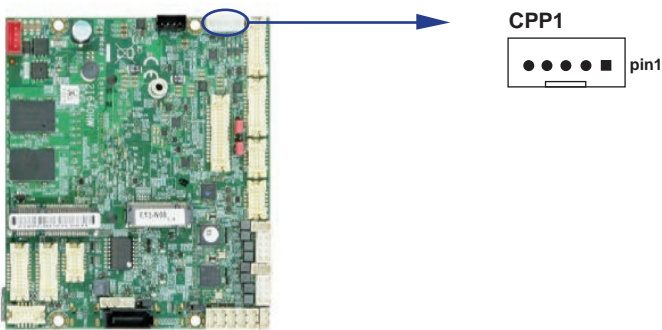
Note: Attention! Check Device Power in spec.



3-13 CPP1: LVDS Panel backlight power
1x5 pin (2.0mm) wafer

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|--------------|---------|--------------|
| 1 | +12V | 2 | GND |
| 3 | PWM dimming | 4 | ENBKL (3.3V) |
| 5 | ENBKL (5V) | | |

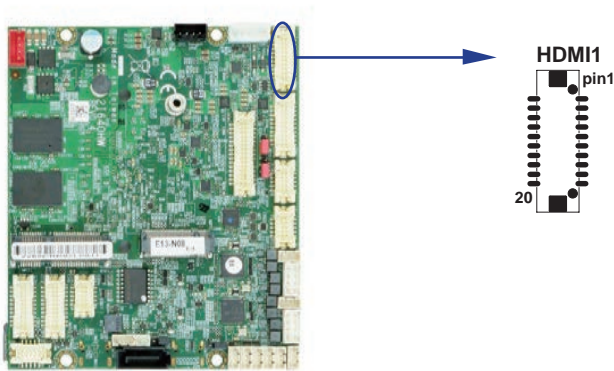
Note: CPP1 PIN 3 and LVDS1 PIN1 is same signal.



3-14 Display Interface

● HDMI1: HDMI 2x10 pin (1.25mm) wafer

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-----------------|
| 1 | TMDS DATA2- | 2 | NC |
| 3 | TMDS DATA2+ | 4 | NC |
| 5 | TMDS DATA1- | 6 | GND |
| 7 | TMDS DATA1+ | 8 | GND |
| 9 | TMDS DATA0- | 10 | GND |
| 11 | TMDS DATA0+ | 12 | GND |
| 13 | TMDS CLK- | 14 | +5V |
| 15 | TMDS CLK+ | 16 | +5V |
| 17 | DDC CLOCK | 18 | +5V |
| 19 | DDC DATA | 20 | Hot Plug Detect |

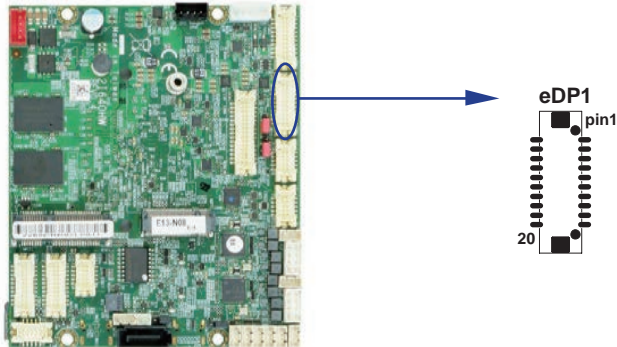


• **EDP1: eDP interface 2x10 pin (1.25mm) wafer**

| 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:

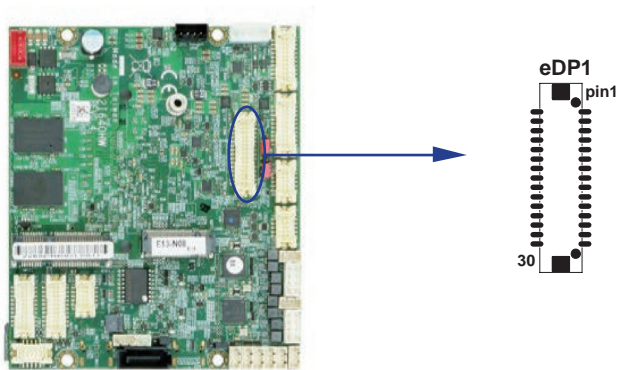
1. eDP interface support 2 lanes.
2. JVL2: eDP panel +5V / +3.3V (default) Voltage select.
3. PIN 9 for panel backlight enable. +3.3V Level.
4. PIN 11 for panel backlight dimming control.



3-15 LVDS1: LVDS interface 2x15 pin (1.25mm) wafer

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|------------------|---------|------------------|
| 1 | PWM dimming | 2 | +5V |
| 3 | +LCD(5V or 3.3V) | 4 | +LCD(5V or 3.3V) |
| 5 | Channel-1-DATA3+ | 6 | Channel-0-DATA3+ |
| 7 | Channel-1-DATA3- | 8 | Channel-0-DATA3- |
| 9 | Channel-0-DATA2+ | 10 | Channel-0-CLK+ |
| 11 | Channel-0-DATA2- | 12 | Channel-0-CLK- |
| 13 | GND | 14 | GND |
| 15 | Channel-0-DATA1+ | 16 | Channel-0-DATA0+ |
| 17 | Channel-0-DATA1- | 18 | Channel-0-DATA0- |
| 19 | GND | 20 | GND |
| 21 | +LCD(5V or 3.3V) | 22 | +LCD(5V or 3.3V) |
| 23 | Channel-1-DATA2+ | 24 | Channel-1-CLK+ |
| 25 | Channel-1-DATA2- | 26 | Channel-1-CLK- |
| 27 | Channel-1-DATA1+ | 28 | Channel-1-DATA0+ |
| 30 | Channel-1-DATA1- | 30 | Channel-1-DATA0- |

- Note:
- 1. LVDS interface supports 18 / 24 bits two channel.
 - 2. JVL1: LVDS panel +5V / +3.3V (default) Voltage select.
 - 3. LVDS1 PIN 1 for panel backlight dimming control.



• LVDS Panel resolution table list

| Item | Resolution | Channel | bits |
|------|-------------|---------|------|
| 1 | 640 x 480 | 1 | 18 |
| 2 | 800 x 600 | 1 | 18 |
| 3 | 1024 x 768 | 1 | 18 |
| 4 | 800 x 480 | 1 | 18 |
| 5 | 1024 x 600 | 1 | 18 |
| 6 | 1280 x 800 | 1 | 18 |
| 7 | 1366 x 768 | 1 | 18 |
| 8 | 800 x 600 | 1 | 24 |
| 9 | 1024 x 768 | 1 | 24 |
| 10 | 1280 x 800 | 1 | 24 |
| 11 | 1366 x 768 | 1 | 24 |
| 12 | 1280 x 1024 | 2 | 24 |
| 13 | 1440 x 900 | 2 | 24 |
| 14 | 1600 x 1200 | 2 | 24 |
| 15 | 1920 x 1080 | 2 | 24 |

Note: The item 3 is default resolution.

3-16 CT1: Touch screen 2x5 pin (1.25mm) USB interface

• For 8-wire type pin define

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|--------------|
| 1 | Bottom | 2 | Bottom Sense |
| 3 | Top Sense | 4 | Top |
| 5 | Right | 6 | Right Sense |
| 7 | Left | 8 | Left Sense |
| 9 | GND | 10 | NC |

Note: For eight wire type cable Pin 3 and Pin 4 need short.

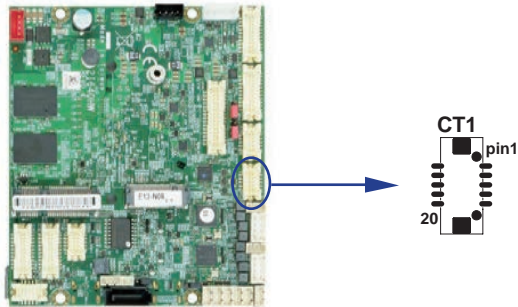
• For 4-wire type pin define

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | Bottom | 2 | N/A |
| 3 | N/A | 4 | Top |
| 5 | Right | 6 | N/A |
| 7 | Left | 8 | N/A |
| 9 | GND | 10 | NC |

Note: For four wire type cable Pin 3 and Pin 4 need short.

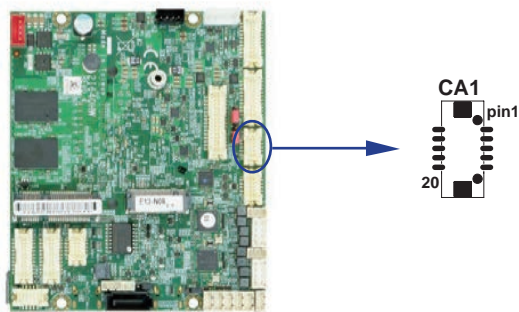
• For 5-wire type pin define

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | UR(H) | 2 | N/A |
| 3 | Sense | 4 | UL(Y) |
| 5 | LR(X) | 6 | N/A |
| 7 | LL(L) | 8 | N/A |
| 9 | GND | 10 | NC |



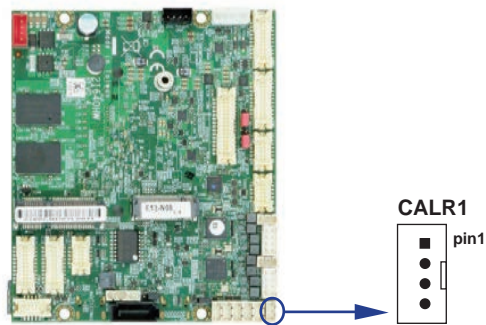
3-17 CA1: Line-out / Line-in / MIC-in 2x5 pin (1.25mm) wafer

| 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 |



3-18 CALR1: Amplifier Line-out Right & Left channel 1x4 pin (1.25mm) wafer

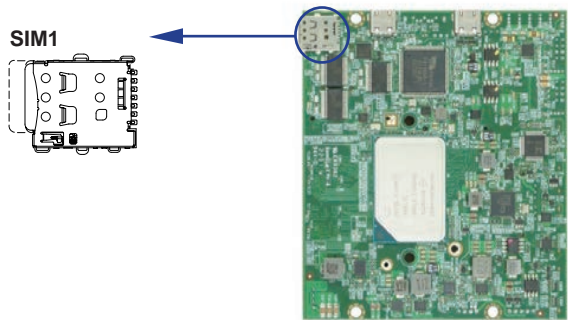
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | Left + | 2 | Left - |
| 3 | Right - | 4 | Right + |



3-19 SIM1: Nano SIM Card Push-Push

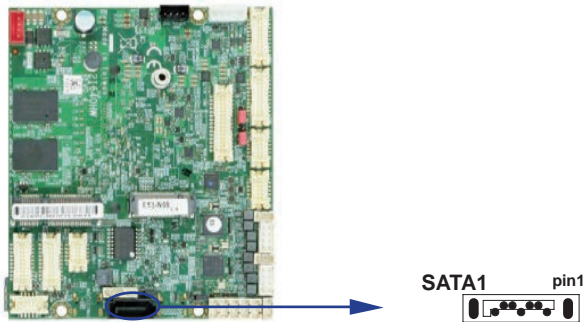
● Follow ISO 7816-2 Smart Card Standard.

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



3-20 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 | | |

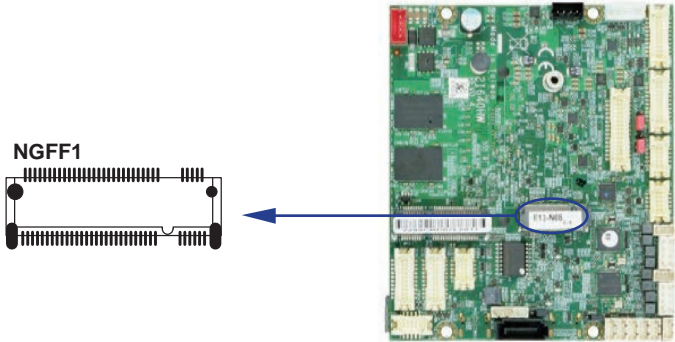


3-21 NGFF1: PCI Express M.2 B key 2242 H=8.5 sockets 75pin

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|-------------|-----------------------|---------|---------------|
| 1 | SATA/USB3.0 PW config | 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 | SIM_RST_M2 |
| 39 | GND | 40 | NC |
| 41 | SATA-RX+ | 42 | NC |
| 43 | SATA-RX- | 44 | 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 |

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|---------------|
| 61 | NC | 62 | NC |
| 63 | NC | 64 | NC |
| 65 | NC | 66 | SIM_DET |
| 67 | MD_RESET_N | 68 | NC |
| 69 | NC | 70 | +3.3V / +3.7V |
| 71 | GND | 72 | +3.3V / +3.7V |
| 73 | GND | 74 | +3.3V / +3.7V |
| 75 | NC | | |

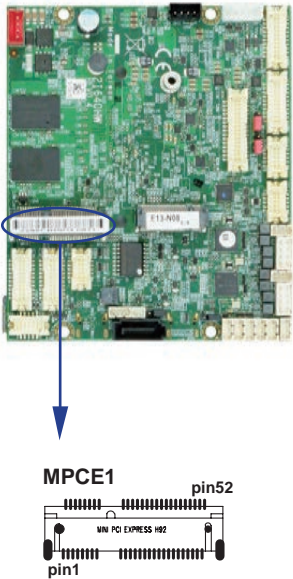
Note:
1. 4G LTE device VCC voltage is +3.7V.
2. Support USB 3.0 / USB 2.0 & SATA signal.



3-22 MPCE1 PCI Express mini card

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

Note: Support USB 2.0 & PCIe signal.



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.

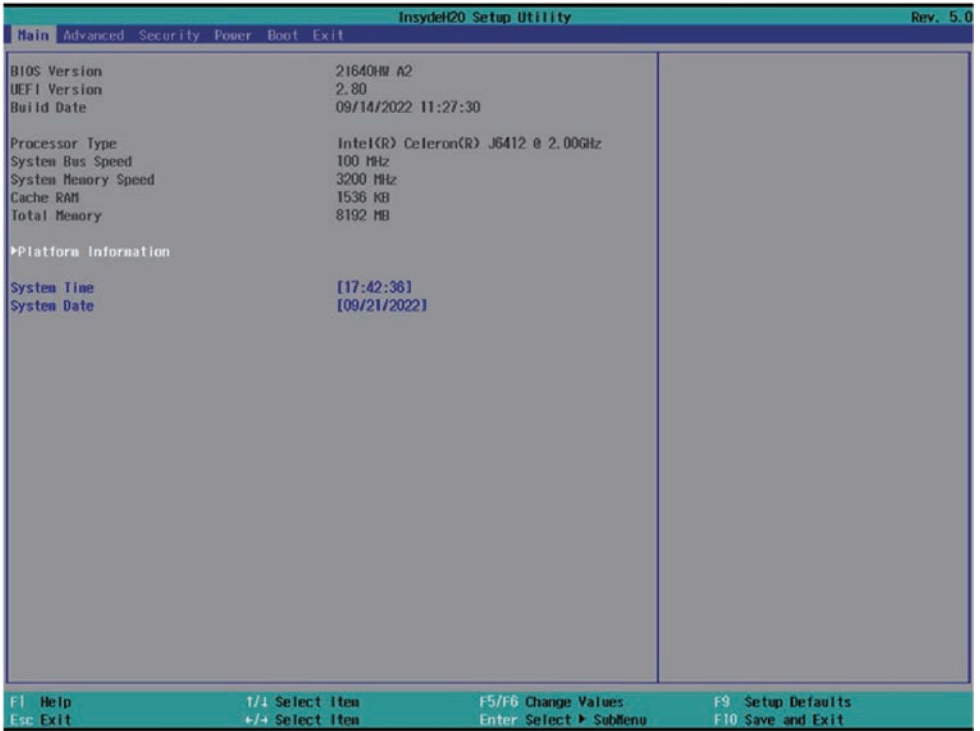
Press Page Up / Page Down or +/- keys to modify the BIOS parameters for the active option.

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>.

4-2 BIOS Menu Screen & Function Keys

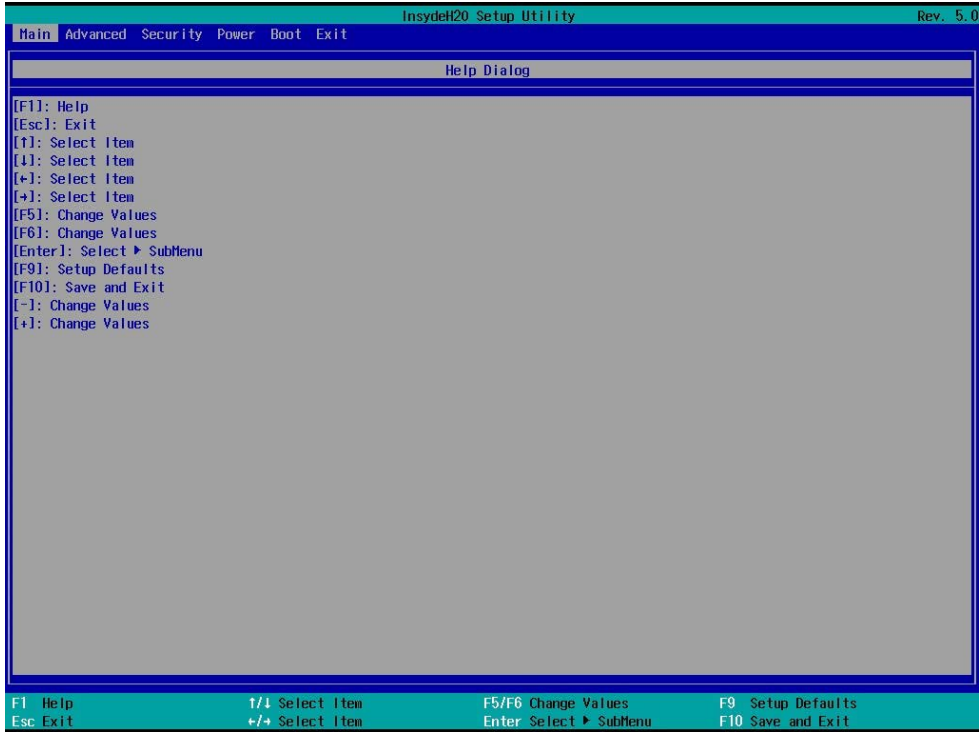


In the above BIOS Setup main menu of, you can see several options.

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>.

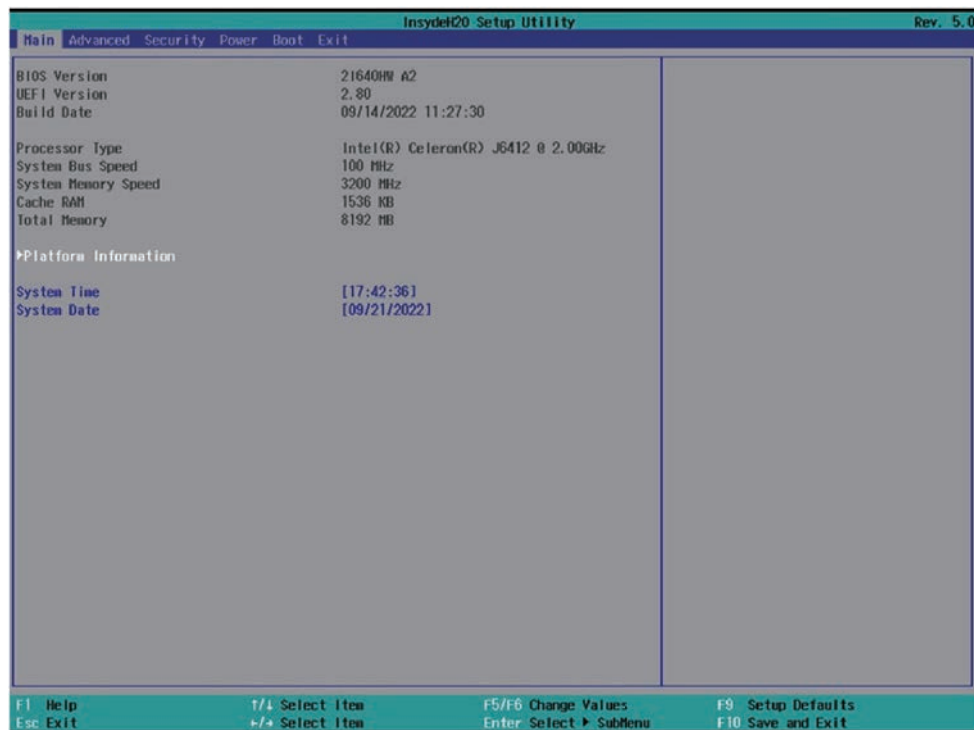
4-4 Menu Bars

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

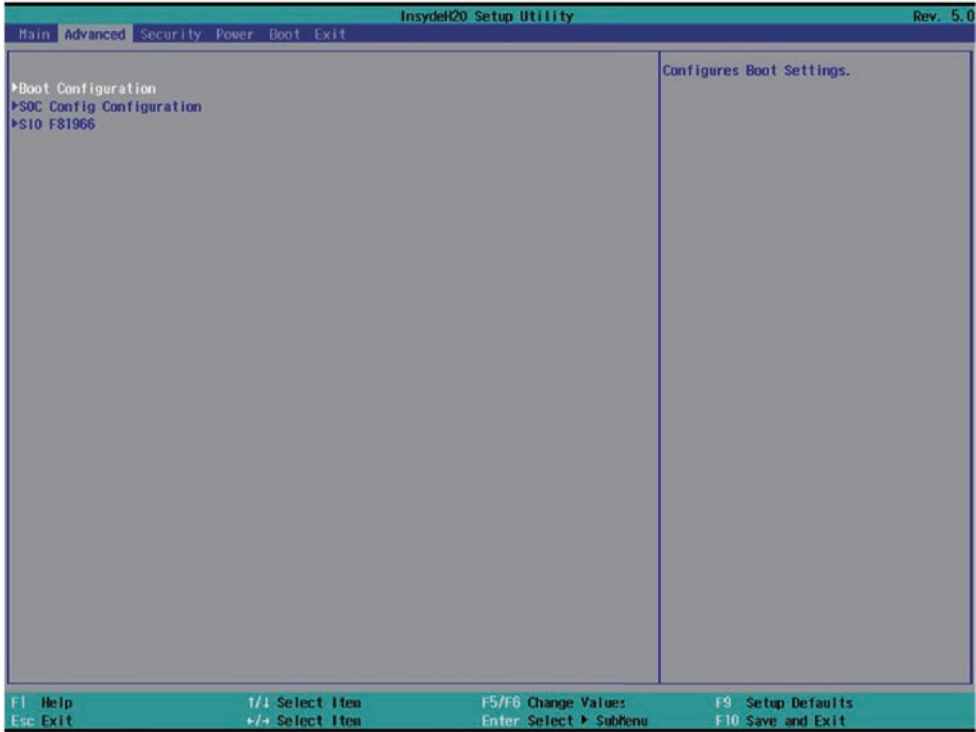
Set the Time. Please use [Tab] to switch between data elements.

Platform Information

Shows the detail information of CPU & PCH

| InsydeH20 Setup Utility | | Rev. 5.0 | | | | | | | | |
|--|---------------------------|------------------------|-------------------|-----------------|---------------------|-------------------|----------|-----------------|------------------------|-------------------|
| Main | | | | | | | | | | |
| Platform Information | | | | | | | | | | |
| Reference SIC Version | 1.6.0 | | | | | | | | | |
| FSP Information | | | | | | | | | | |
| FSP version | 09.04.25.11 | | | | | | | | | |
| RC version | 09.04.25.11 | | | | | | | | | |
| Build Date | 09/08/2022 09:43 | | | | | | | | | |
| FSP Mode | API Mode | | | | | | | | | |
| Compute Die Information | | | | | | | | | | |
| CPUID: | 0x90661 (ElkhartLake ULT) | | | | | | | | | |
| CPU Speed: | 2000 Mhz | | | | | | | | | |
| CPU Stepping: | B0 Stepping | | | | | | | | | |
| CPU SKU: | Ehl Sku 1A 10.0W (0x02) | | | | | | | | | |
| Number Of Processors: | 4 Core(s) / 4 Thread(s) | | | | | | | | | |
| Microcode Rev: | 00000016 | | | | | | | | | |
| GT Info: | GT2 (0x4555) | | | | | | | | | |
| L1 Data Cache: | 32 KB x 4 | | | | | | | | | |
| L1 Instruction Cache: | 32 KB x 4 | | | | | | | | | |
| L2 Cache: | 1536 KB x 4 | | | | | | | | | |
| L3 Cache: | 4096 KB | | | | | | | | | |
| IGFX GOP Version | 18.0.1031 | | | | | | | | | |
| Memory RC Version | 0.0.4.111 | | | | | | | | | |
| PCH Information | | | | | | | | | | |
| Name | EHL PCH | | | | | | | | | |
| PCH SKU | MCC SKU 0 | | | | | | | | | |
| Stepping | B1 | | | | | | | | | |
| ChipsetInit Revision | A.0 (B0v10) | | | | | | | | | |
| Intel ME Version / SKU | 15.40.27.2664 / CONSUMER | | | | | | | | | |
| PHC Firmware Version | 154.1.10.1026 | | | | | | | | | |
| <table border="0"> <tr> <td>F1 Help</td> <td>T/1 Select Item</td> <td>F5/F6 Change Values</td> <td>F9 Setup Defaults</td> </tr> <tr> <td>Esc Exit</td> <td>+/- Select Item</td> <td>Enter Select > SubMenu</td> <td>F10 Save and Exit</td> </tr> </table> | | | F1 Help | T/1 Select Item | F5/F6 Change Values | F9 Setup Defaults | Esc Exit | +/- Select Item | Enter Select > SubMenu | F10 Save and Exit |
| F1 Help | T/1 Select Item | F5/F6 Change Values | F9 Setup Defaults | | | | | | | |
| Esc Exit | +/- Select Item | Enter Select > SubMenu | F10 Save and Exit | | | | | | | |

4-6 Advanced



Boot Configuration

Please refer section 4-6-1

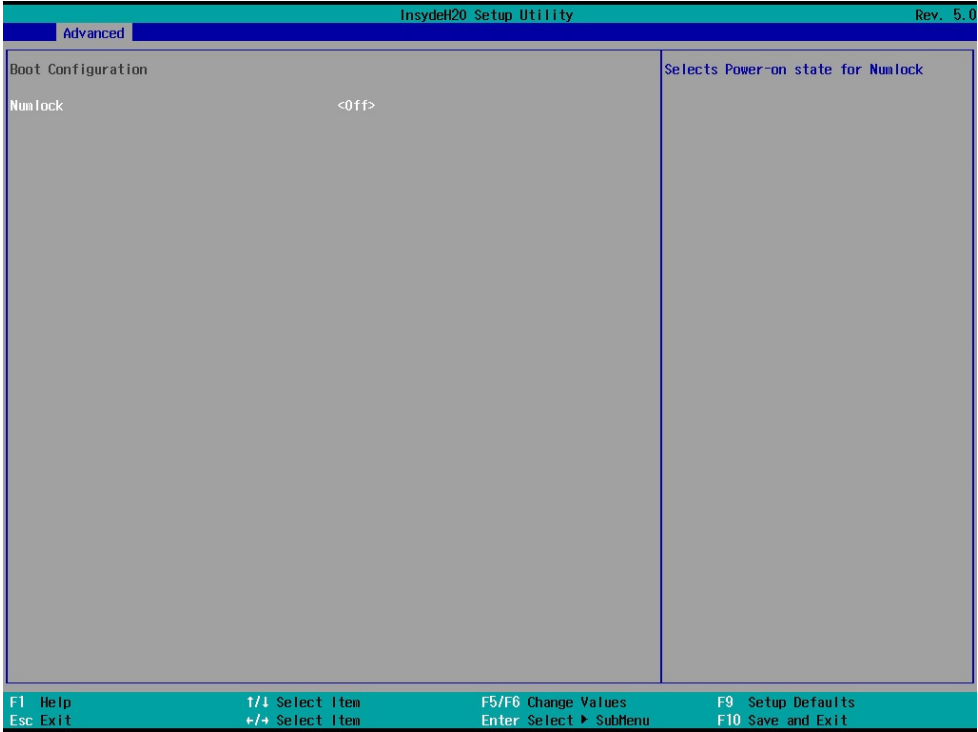
SOC Config Configuration

Please refer section 4-6-2

SIO F81966

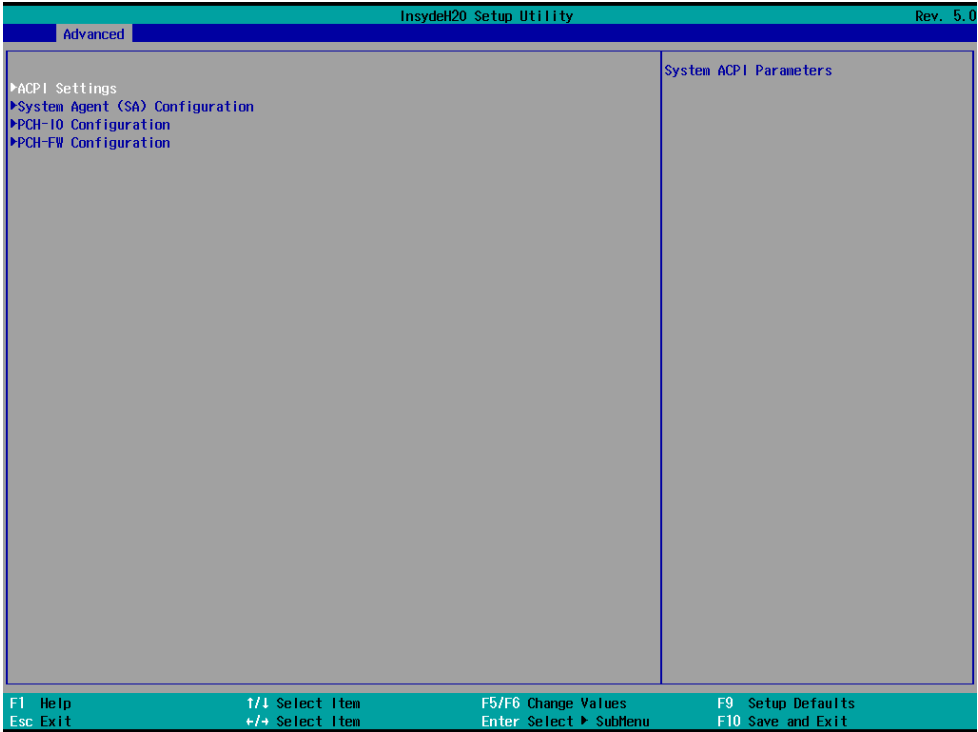
Please refer section 4-6-3

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

System Agent (SA) Configuration

Please refer section 4-6-2-2

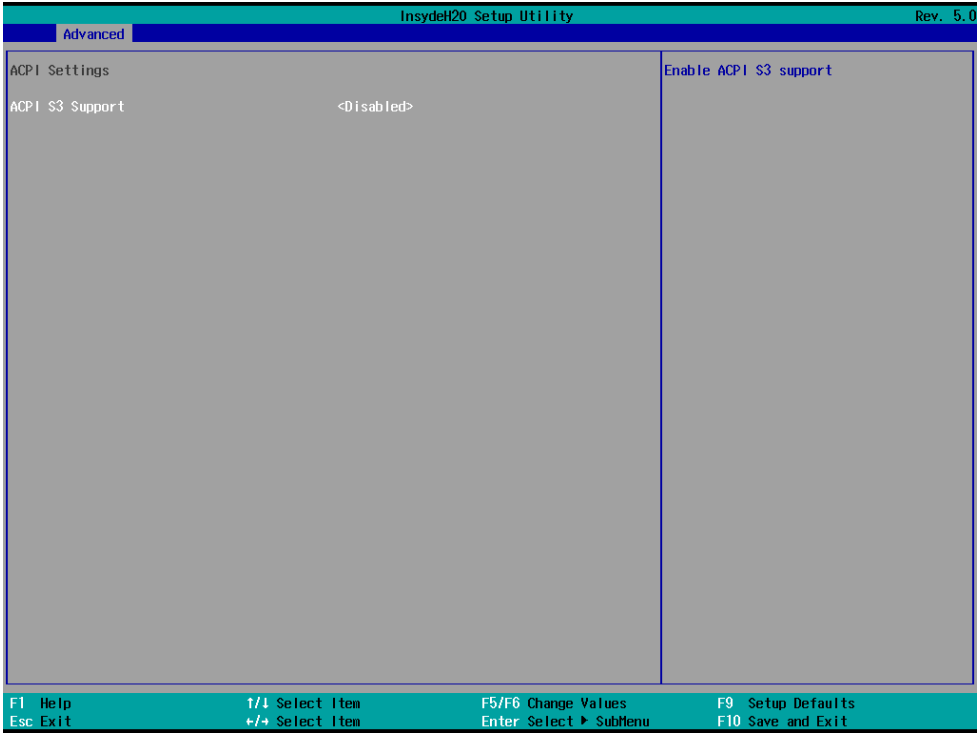
PCH-IO Configuration

Please refer section 4-6-2-3

PCH-FW Configuration

Please refer section 4-6-2-4

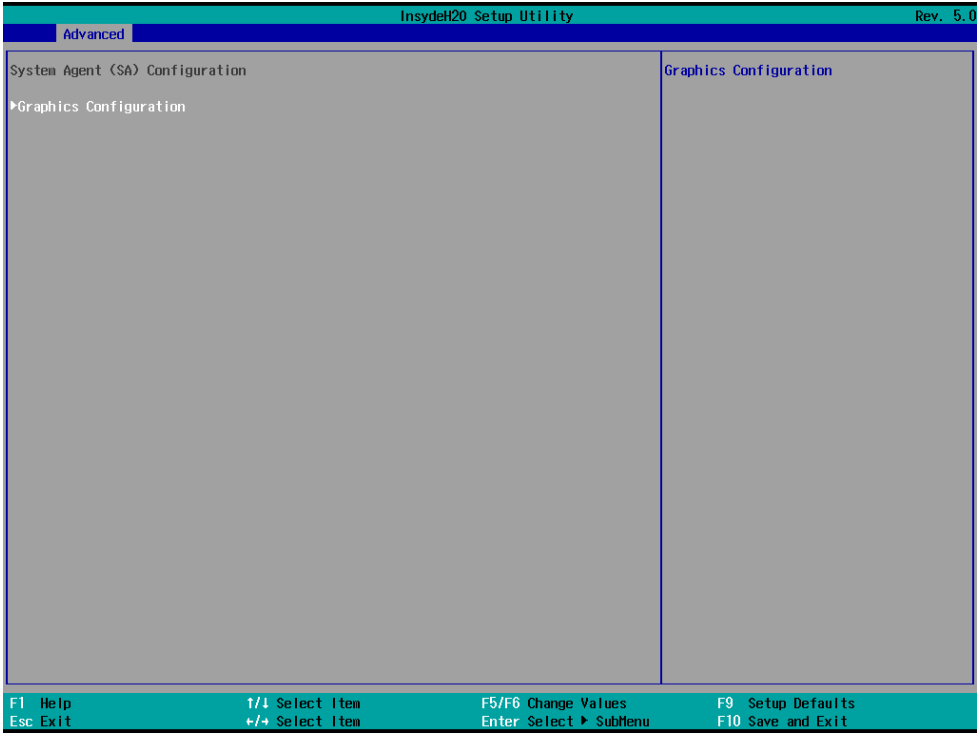
4-6-2-1 ► ACPI Settings

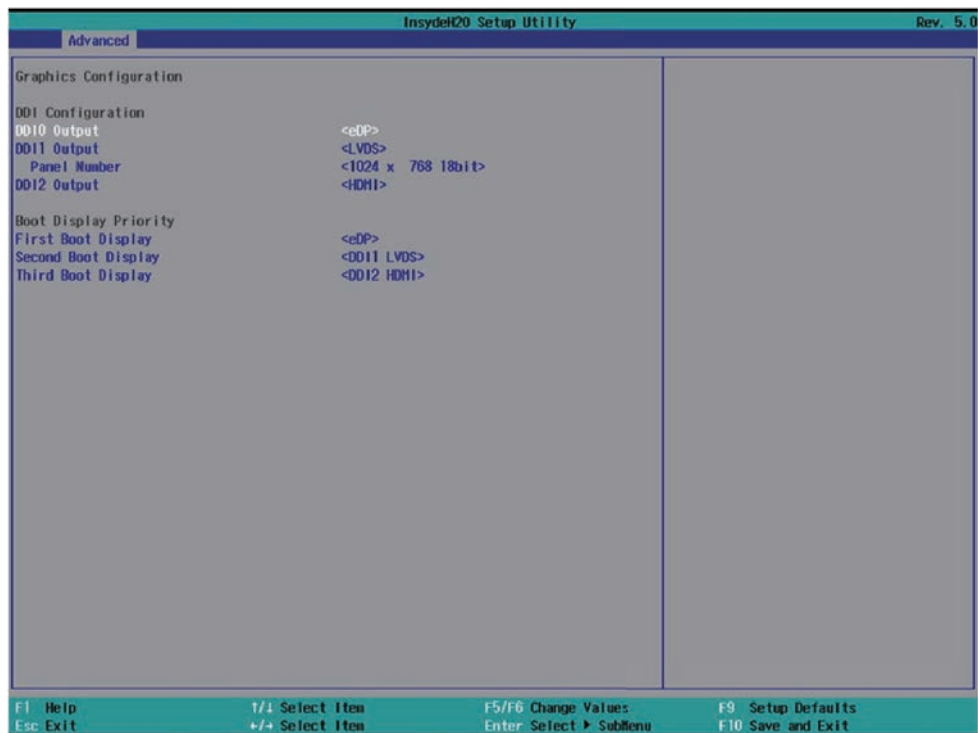


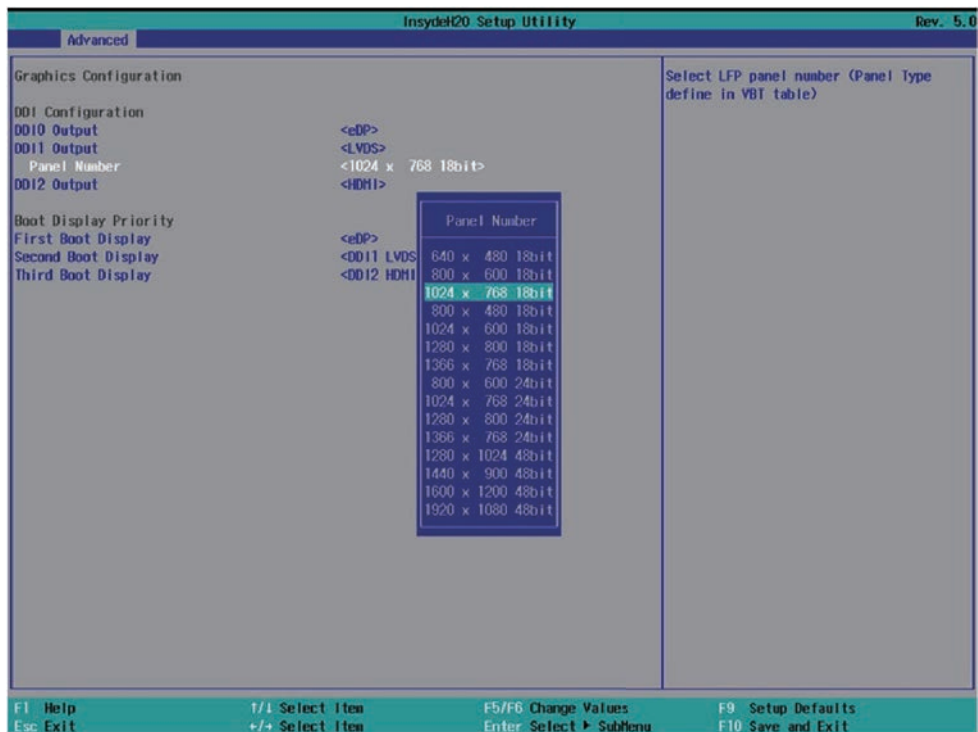
ACPI S3 Support

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

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



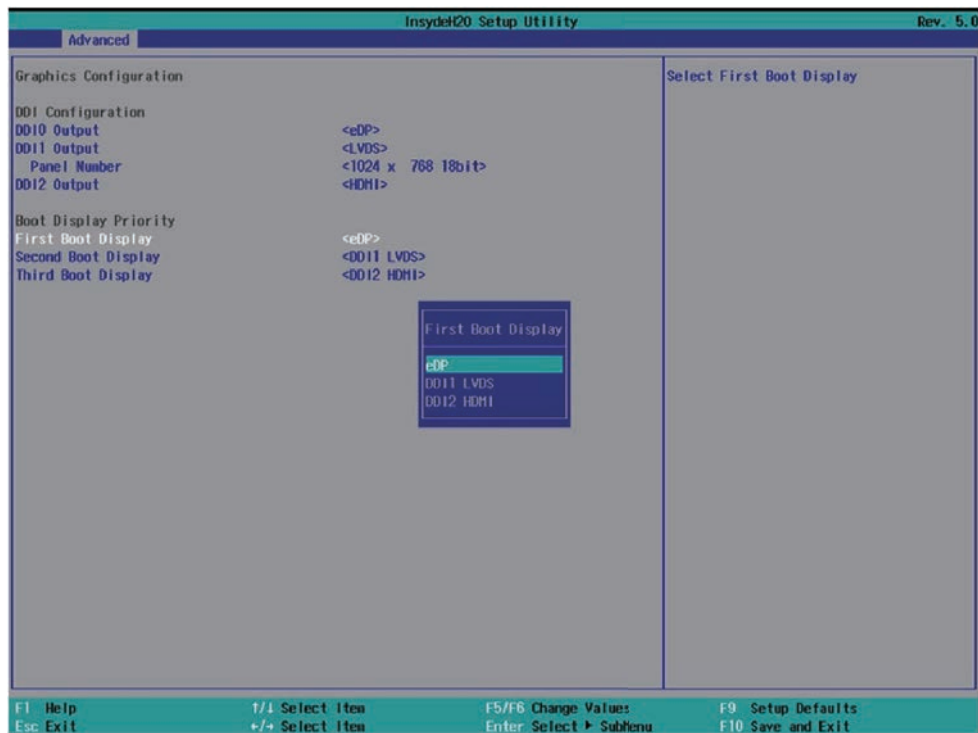




Graphic Configuration

DDI Configuration

To enable or disable which DDI output for Display and to change the LVDS resolution.



Boot Display Priority

First Boot Display

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

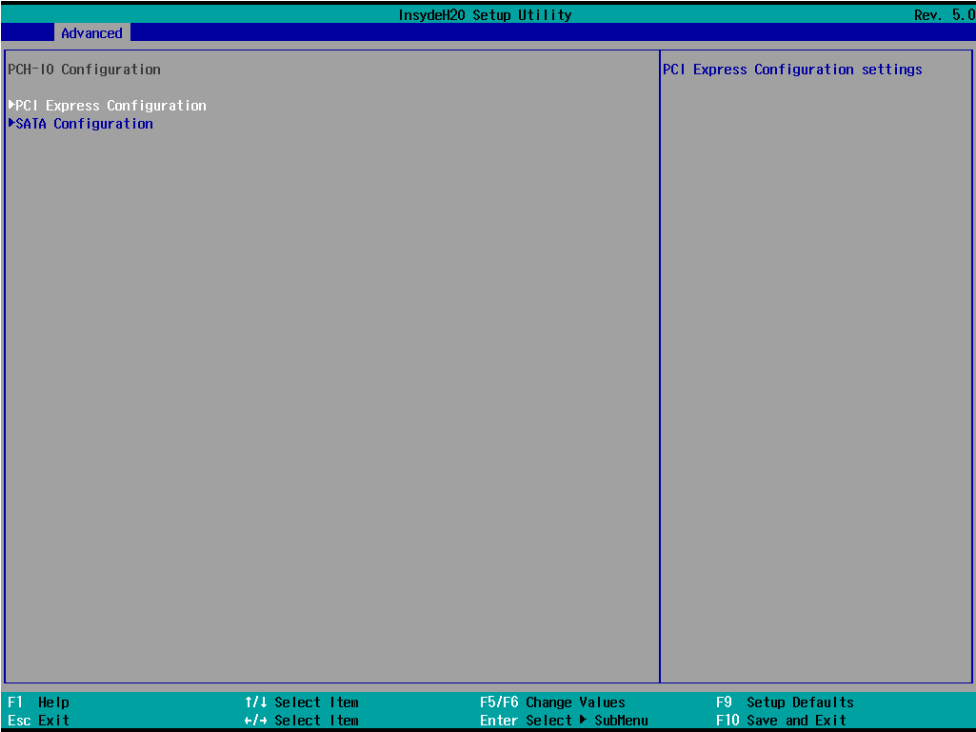
Second Boot Display

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

Third Boot Display

To select First Boot Display priority, there is DDI2 HDMI

4-6-2-3 ► PCH-IO Configuration



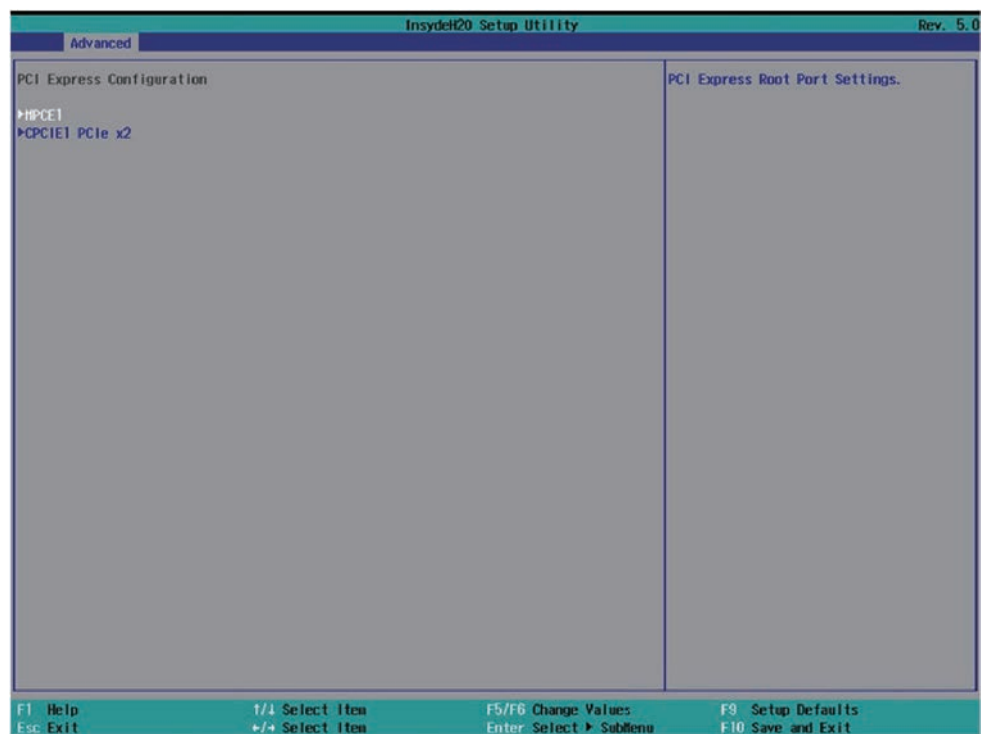
PCI Express Configuration

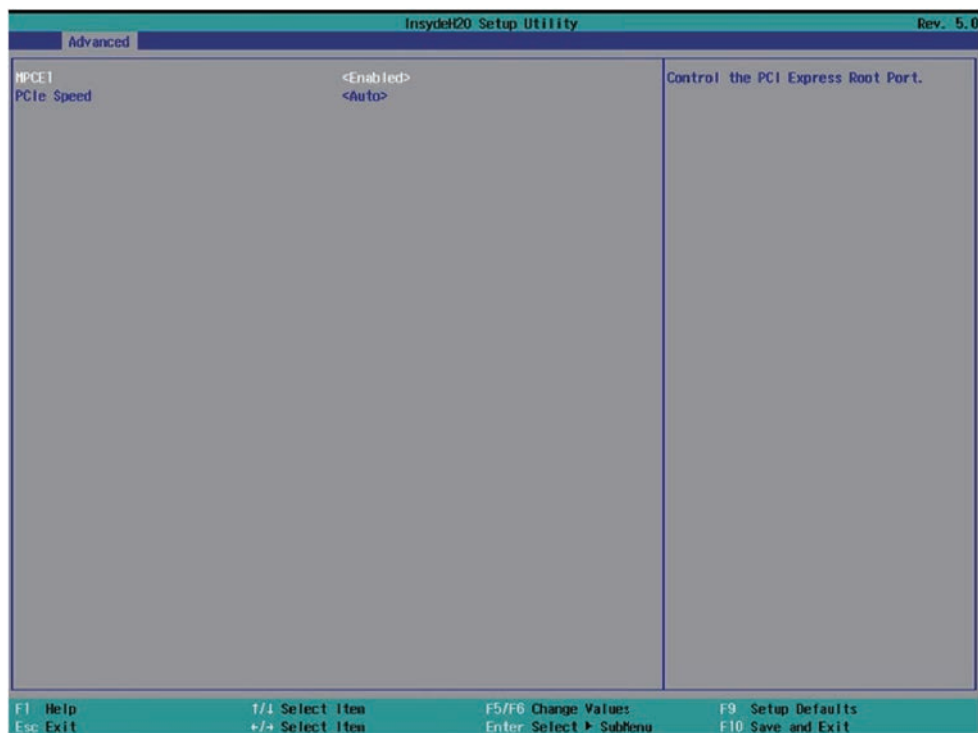
Please refer section 4-6-2-3-1

SATA Configuration

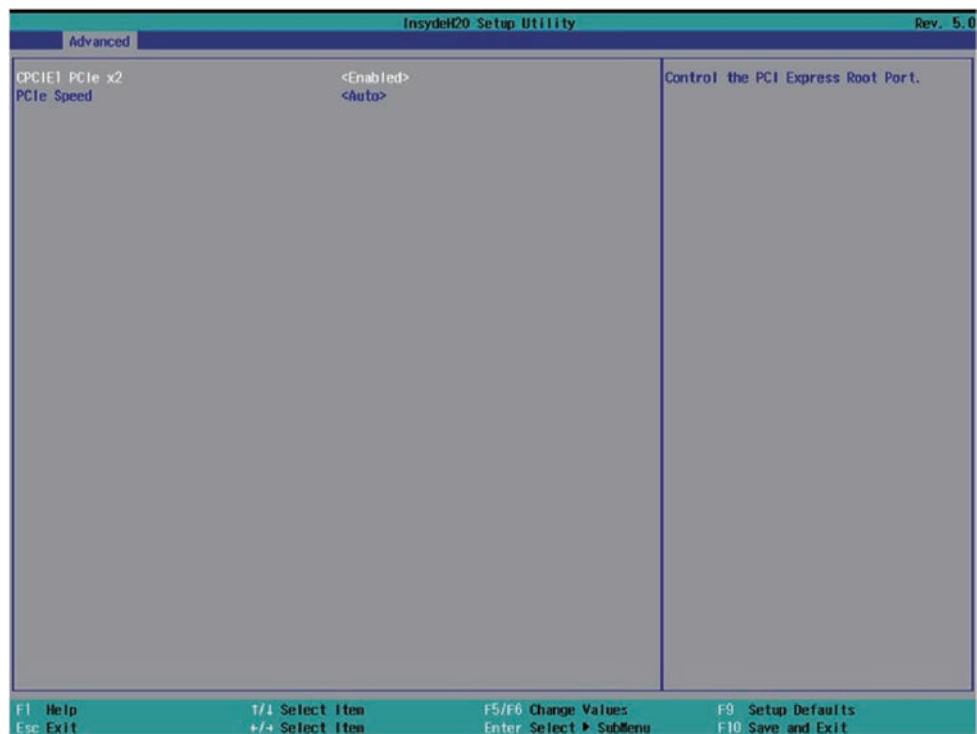
Please refer section 4-6-2-3-2

4-6-2-3-1 ► 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



To select CPCI1 (Type C) device enabled or not and to change the PCIe Speed, there are Auto, Gen1, Gen2, Gen3, default is Auto

4-6-2-3-2 ► SATA Configuration

| InsydeH20 Setup Utility | | Rev. 5.0 |
|-----------------------------|------------------------|-------------------|
| Advanced | | |
| SATA Configuration | | |
| SATA Controller(s) | <Enabled> | |
| Serial ATA Port 0 | <Enabled> | |
| Software Preserve | Unknown | |
| Port 0 | Empty | |
| Serial ATA Port 1 | <Enabled> | |
| Software Preserve | Unknown | |
| Port 1 | Empty | |
| Enable/Disable SATA Device. | | |
| F1 Help | F5/F6 Change Values: | F9 Setup Defaults |
| Esc Exit | Enter Select ► Submenu | F10 Save and Exit |

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

InsydeH20 Setup Utility Rev. 5.0

Advanced

| | | |
|----------------------|---------------|---------------------|
| ME Firmware Version | 15.40.27.2664 | ME Firmware Version |
| ME Firmware Mode | Normal Mode | |
| ME Firmware SKU | Consumer SKU | |
| ME Firmware Status 1 | 0x90000255 | |
| ME Firmware Status 2 | 0x39850106 | |

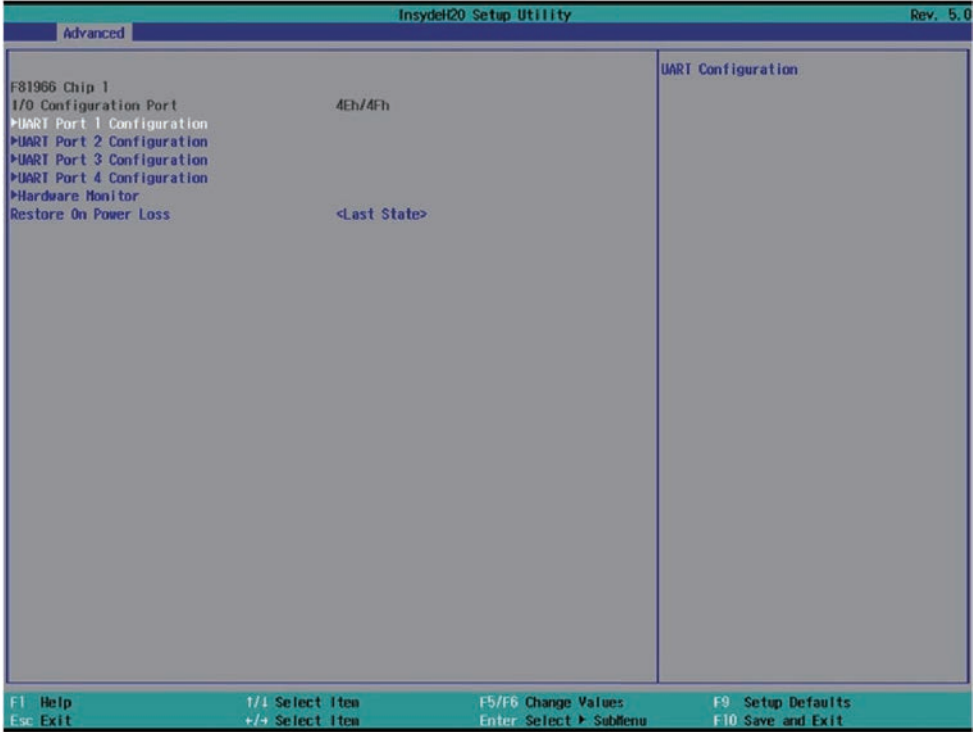
F1 Help
Esc Exit

T/↓ Select Item
↑/→ Select Item

F5/F6 Change Values
Enter Select > SubMenu

F9 Setup Defaults
F10 Save and Exit

4-6-3 SIO F81966



UART Port 1 Configuration

Please refer section 4-6-3-1

UART Port 2 Configuration

Please refer section 4-6-3-2

UART Port 3 Configuration

Please refer section 4-6-3-3

UART Port 4 Configuration

Please refer section 4-6-3-4

Hardware Monitor

Please refer section 4-6-3-5

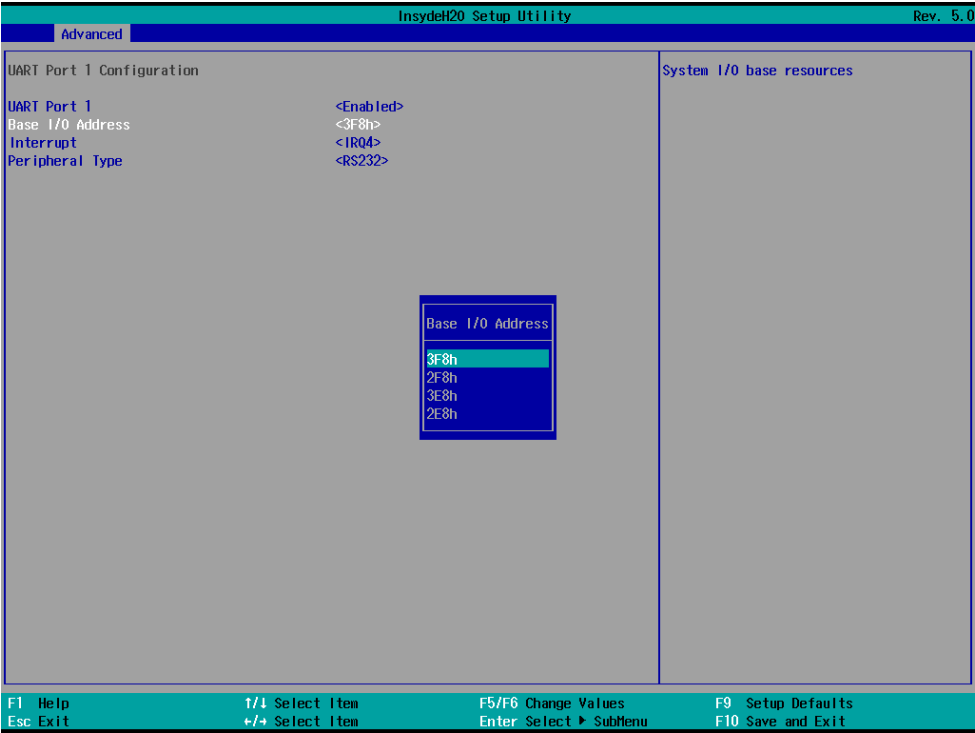
Restore on Power Loss

Please refer section 4-6-3-6

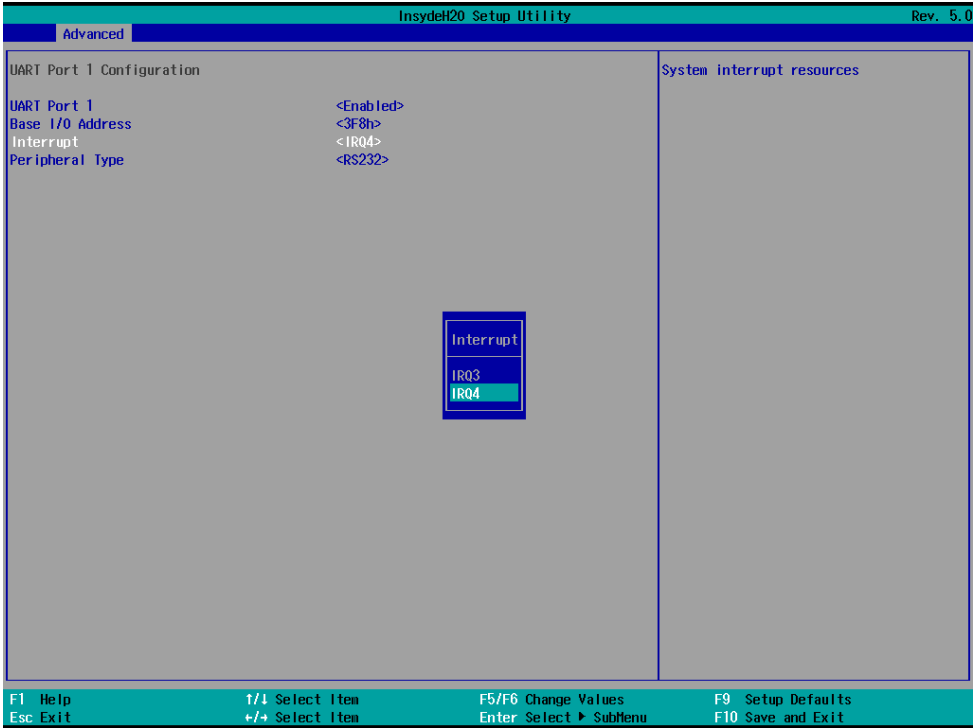
4-6-3-1 ► UART Port 1 Configuration

| InsydeH20 Setup Utility | | Rev. 5.0 |
|---|------------------------|--|
| Advanced | | |
| UART Port 1 Configuration | | Configure UART Port using options : [Disabled] Disable device [Enabled] Enable device and use below settings |
| UART Port 1 | <Enabled> | |
| Base I/O Address | <3F8h> | |
| Interrupt | <IRQ4> | |
| Peripheral Type | <RS232> | |
| <div>UART Port 1 Disabled Enabled</div> | | |
| F1 Help | F5/F6 Change Values | F9 Setup Defaults |
| Esc Exit | Enter Select ► SubMenu | F10 Save and Exit |

To Enable Serial port or not, default is Enabled.



Base I/O Address, default is 3F8h.

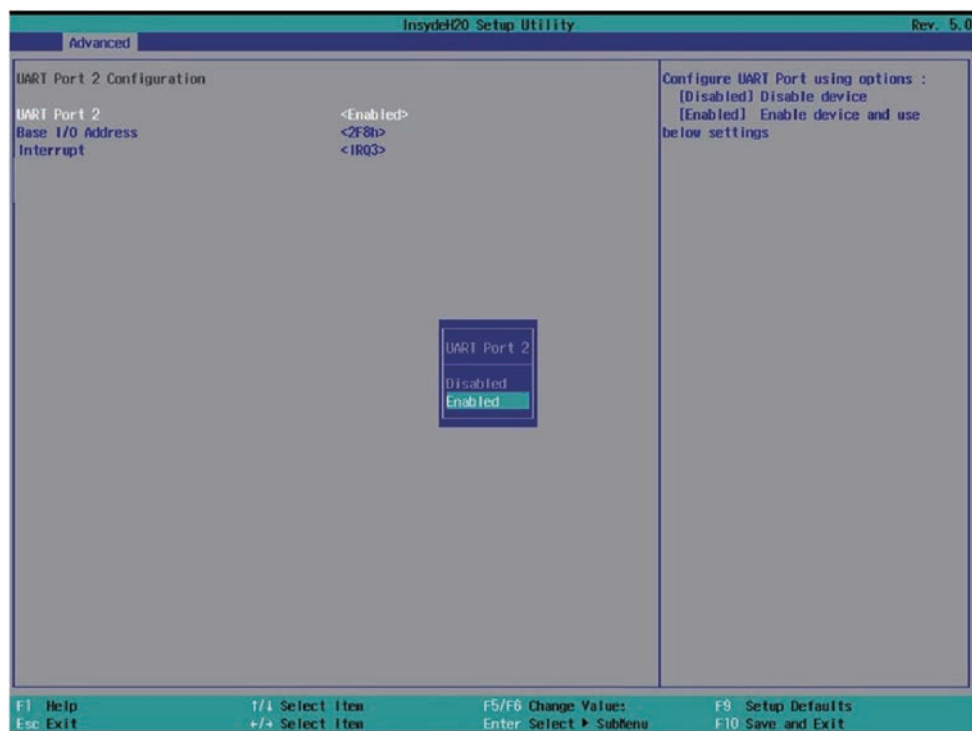


Interrupt, default is IRQ4.

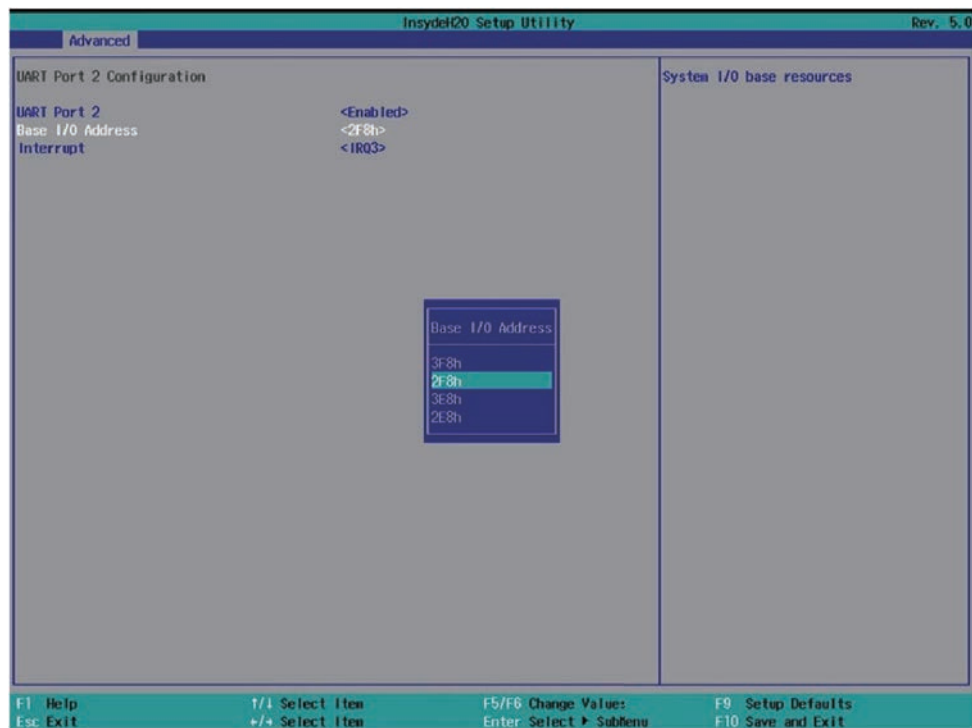


Peripheral, to select the Serial port to RS232 / RS422 / RS485, default is RS232.

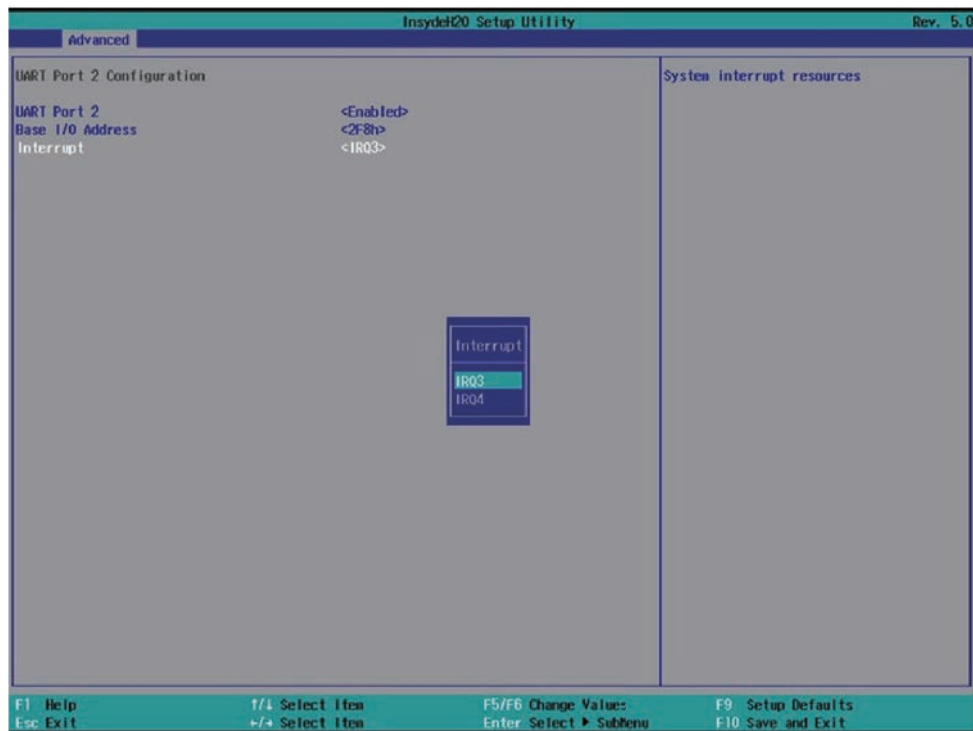
4-6-3-2 ► UART Port 2 Configuration



To Enable Serial port or not, default is Enabled.

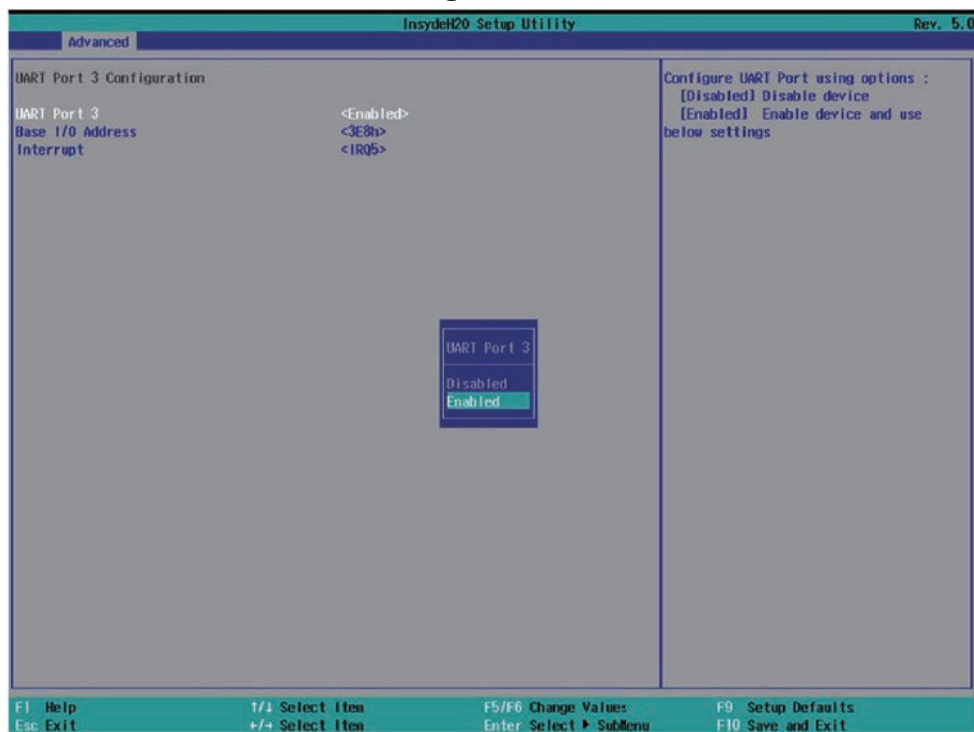


Base I/O Address, default is 2F8h.

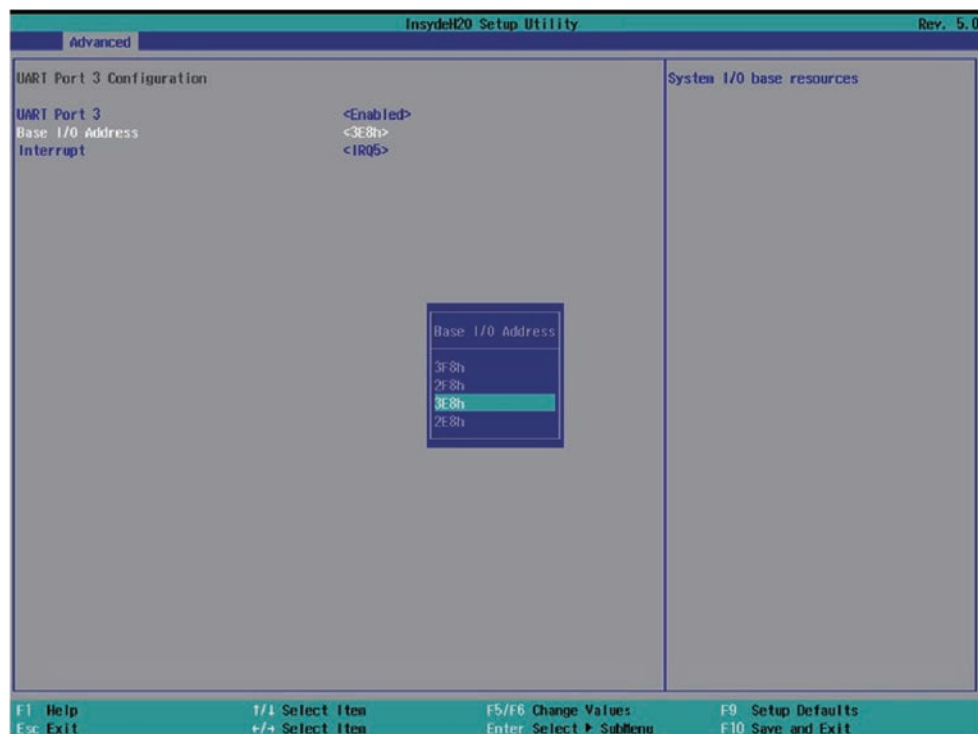


Interrupt, default is IRQ3.

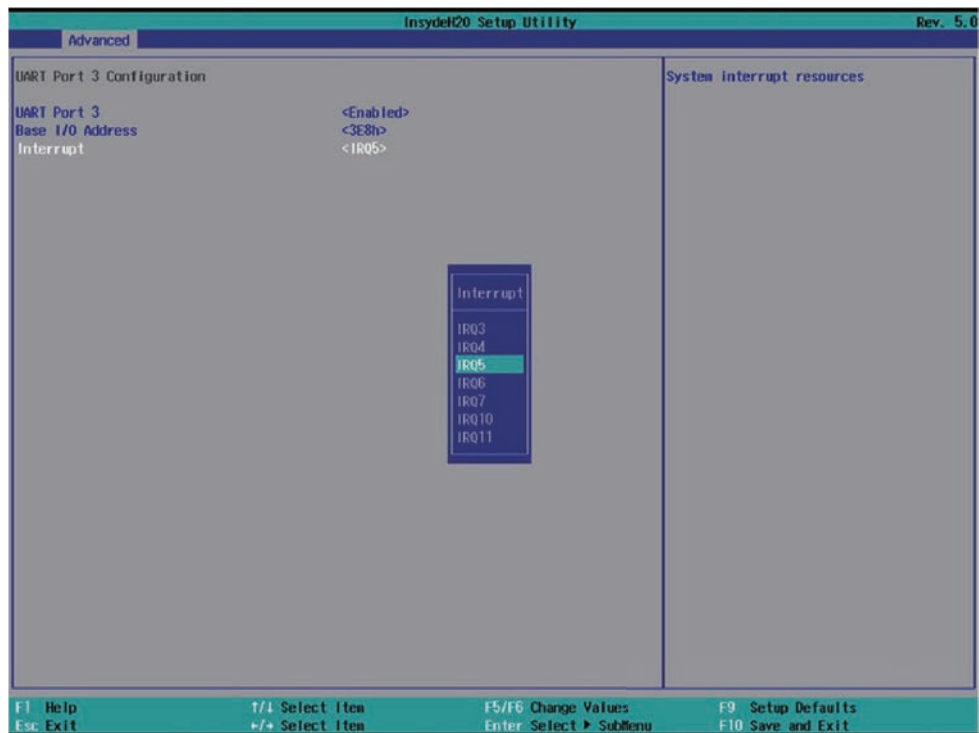
4-6-3-3 ► UART Port 3 Configuration



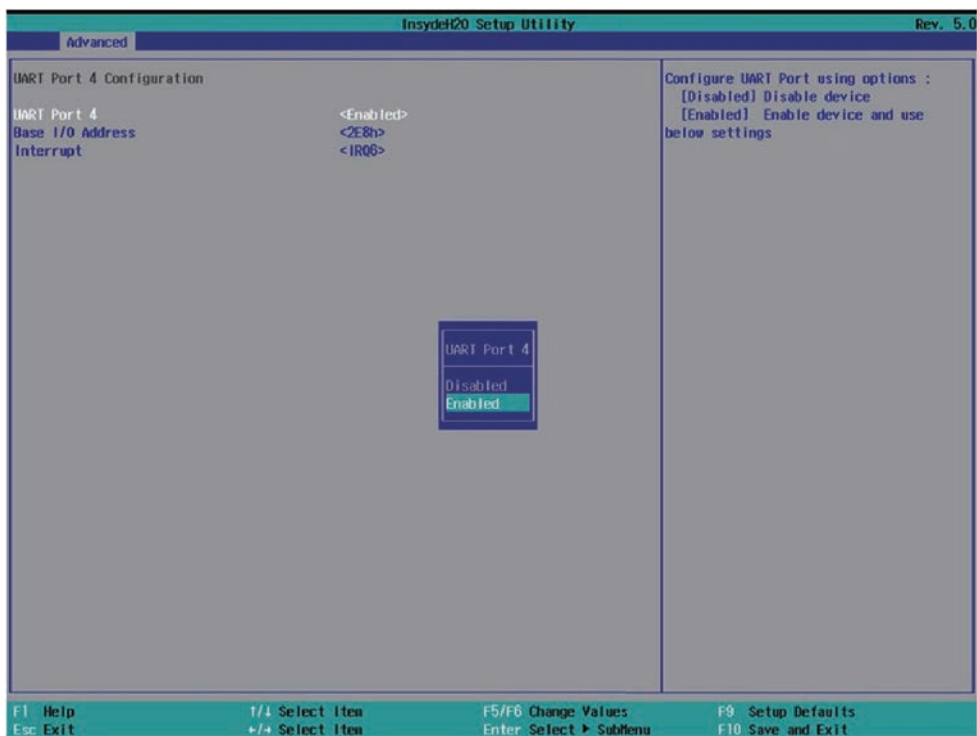
To Enable Serial port or not, default is Enabled.



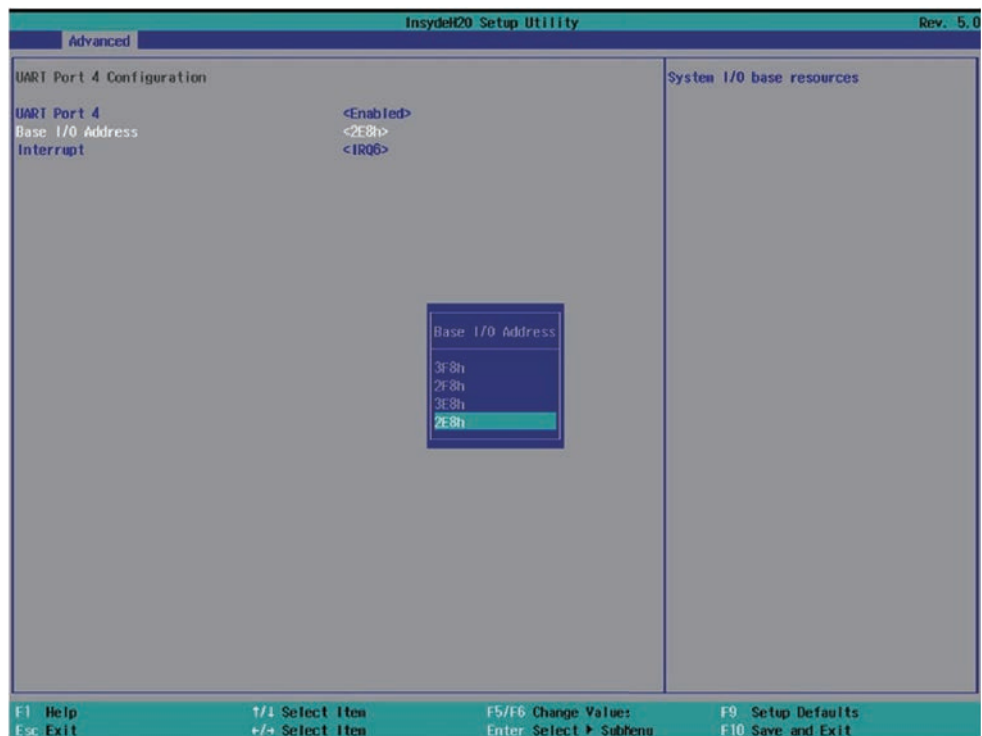
Base I/O Address, default is 3E8h.



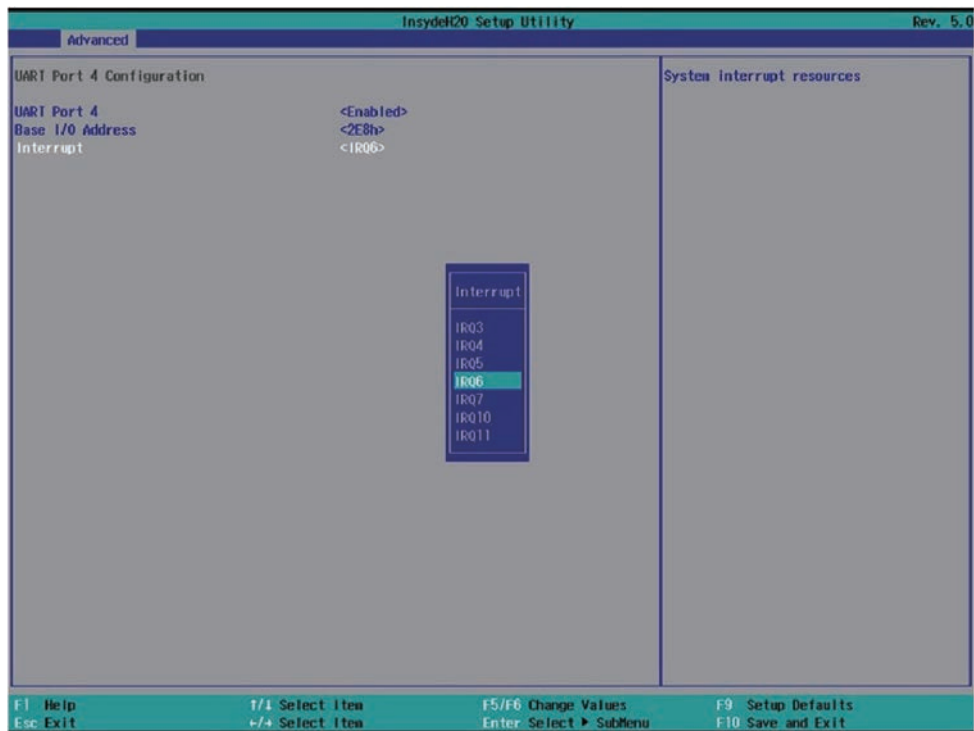
4-6-3-4 UART Port 4 Configuration



To Enable Serial port or not, default is Enabled.

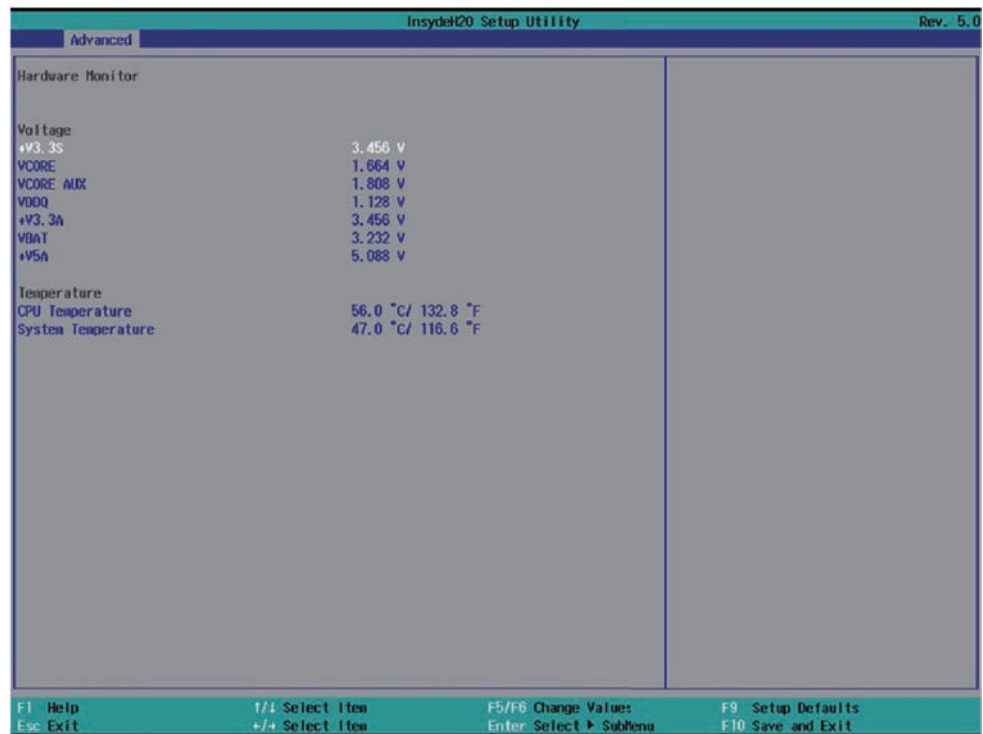


Base I/O Address, default is 2F8h.



Interrupt, default is IRQ3.

4-6-3-5 ► Hardware Monitor

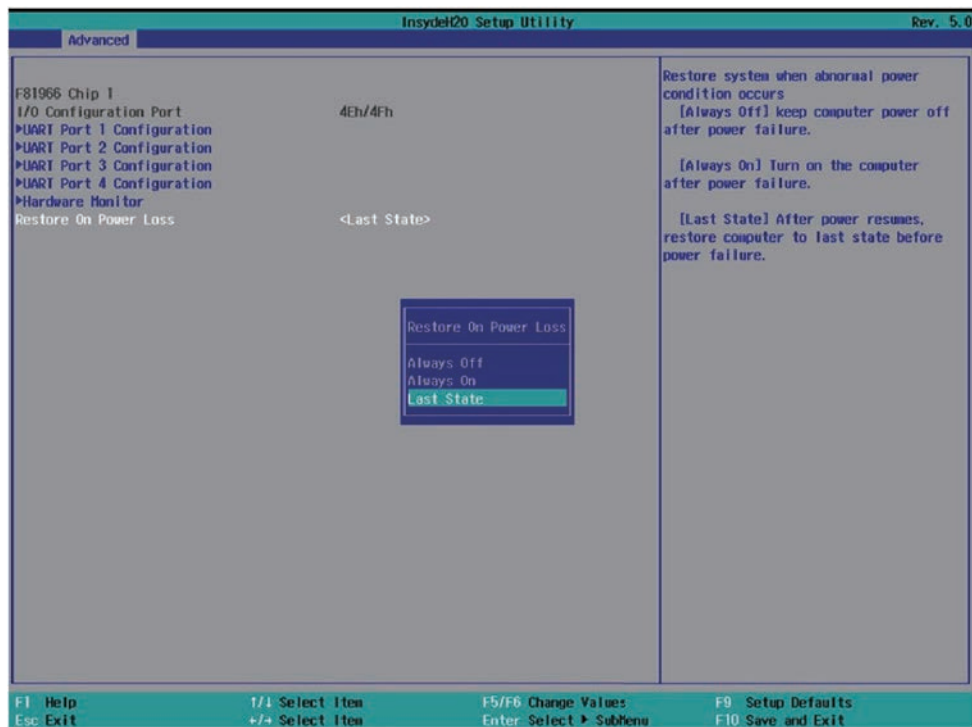


Press [Enter] to view PC health status.

This section shows the status of your CPU, Fan, and overall system.

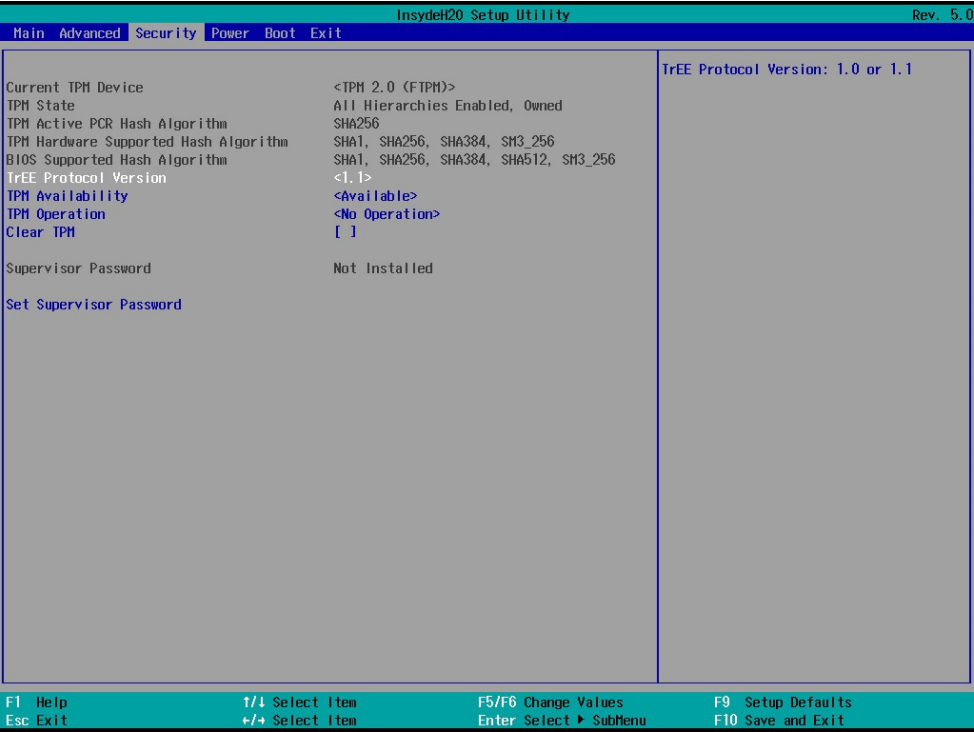
This is only available when there is Hardware Monitor function onboard.

4-6-3-6 Restore On Power Loss



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

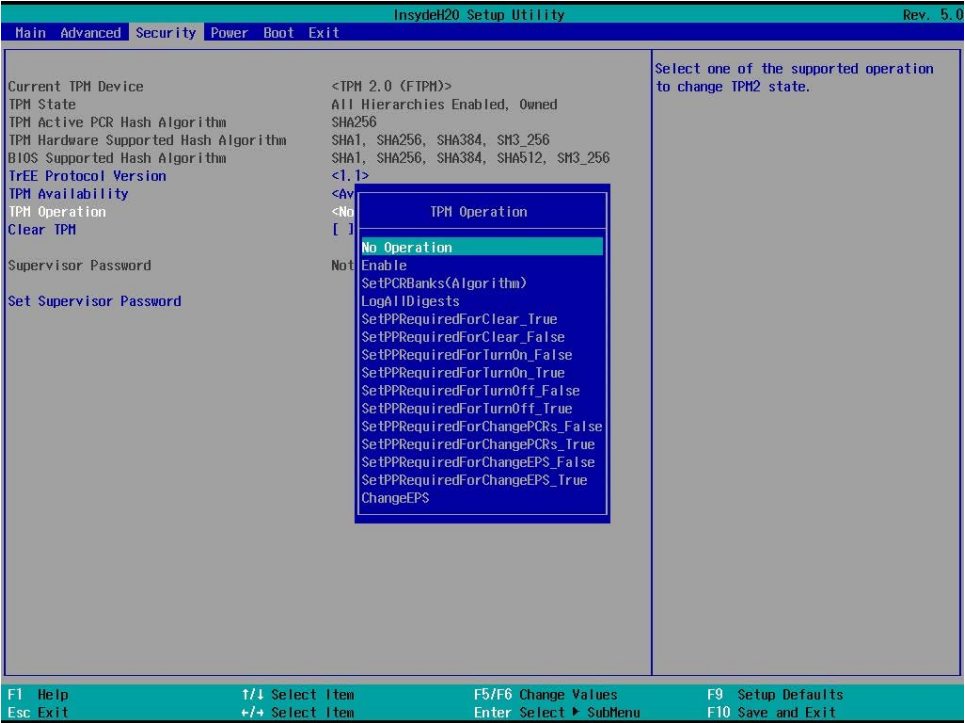
4-7 Security



TrEE Protocol Version
There are 1.0 and 1.1 versions.

TPM Availability
To select TPM available or hidden

TPM Operation



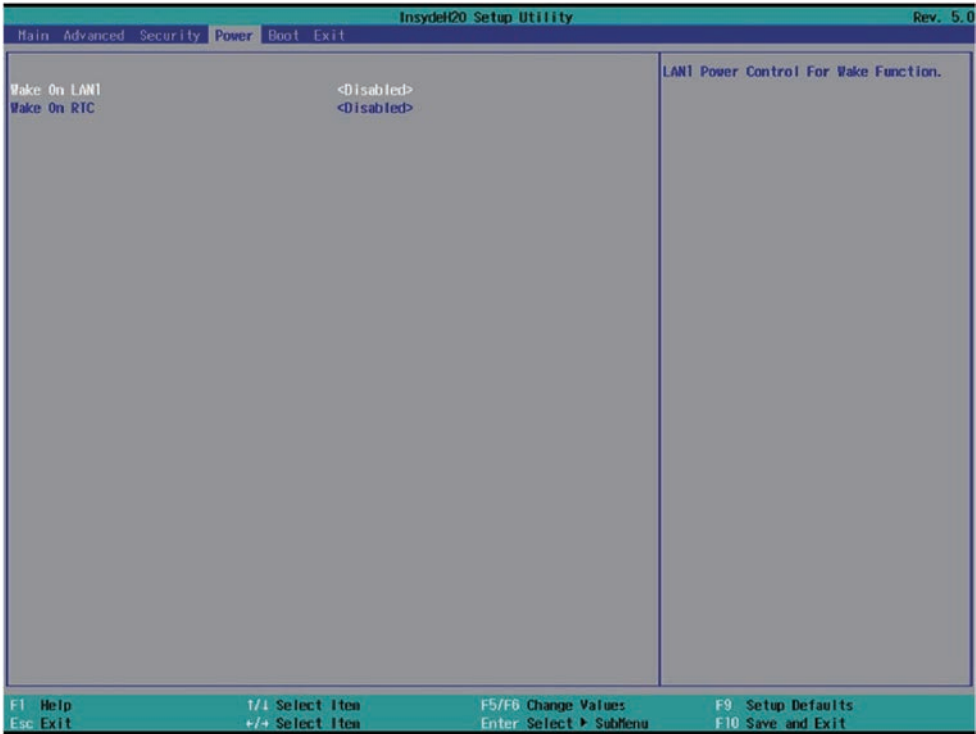
To select TPM operations
Set Supervisor Password

| InsydeH20 Setup Utility | | Rev. 5.0 |
|--|---|---|
| Main Advanced Security Power Boot Exit | | |
| Current TPM Device | <TPM 2.0 (fTPM)> | Install or Change the password and the length of password must be greater than one character. |
| TPM State | All Hierarchies Enabled, Owned | |
| TPM Active PCR Hash Algorithm | SHA256 | |
| TPM Hardware Supported Hash Algorithm | SHA1, SHA256, SHA384, SM3_256 | |
| BIOS Supported Hash Algorithm | SHA1, SHA256, SHA384, SHA512, SM3_256 | |
| TrEE Protocol Version | <1.1> | |
| TPM Availability | <Available> | |
| TPM Operation | <No Operation> | |
| Clear TPM | [] | |
| Supervisor Password | Not Installed | |
| Set Supervisor Password | <div><div>Set Supervisor Password</div><div>Enter New Password: <input type="password"/></div><div>Enter New Password Again: <input type="password"/></div></div> | |

| | | | |
|----------|-----------------|------------------------|-------------------|
| F1 Help | T/1 Select Item | F5/F6 Change Values | F9 Setup Defaults |
| Esc Exit | +/- Select Item | Enter Select ► SubMenu | F10 Save and Exit |

To set up an Supervisor password

4-8 Power



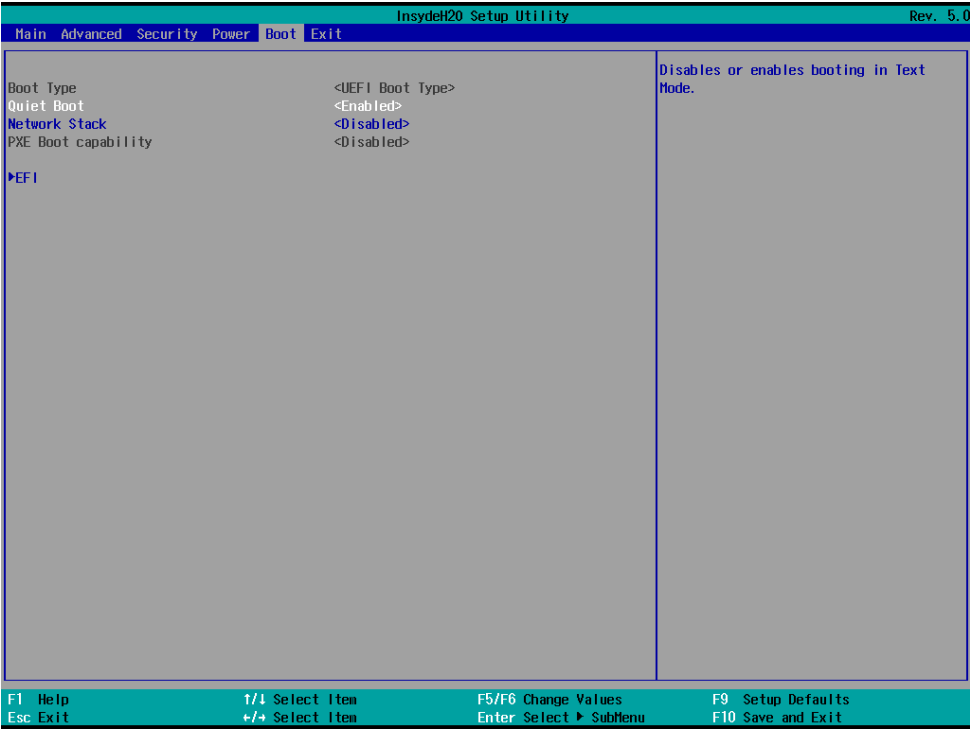
Wake On LAN1

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

Wake On RTC

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

4-9 Boot



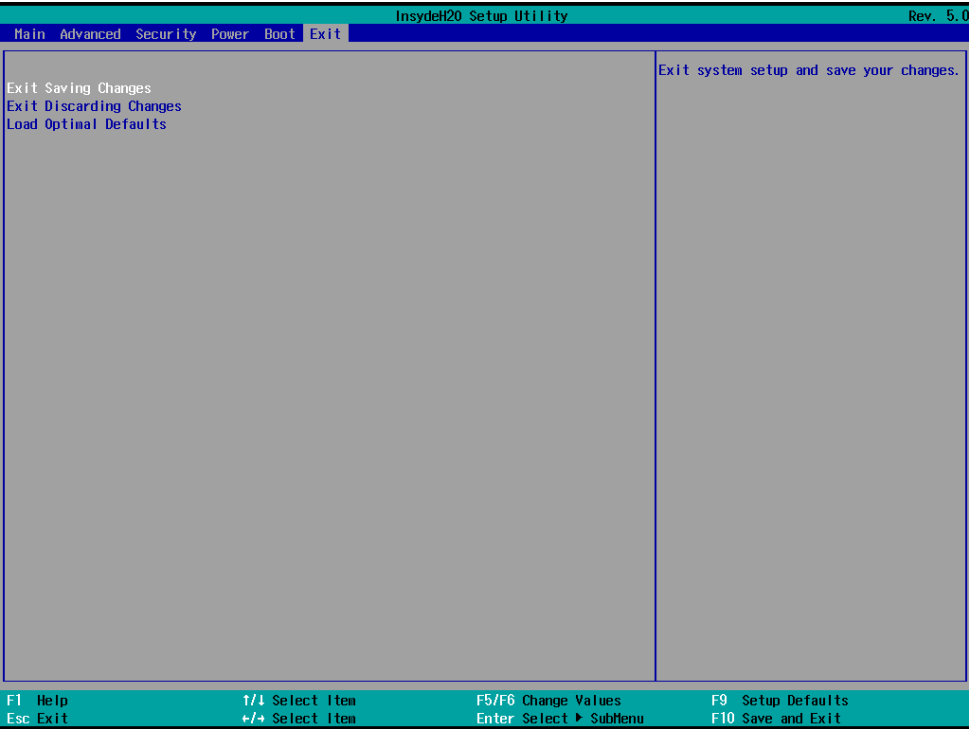
Quiet Boot

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

Network Stack

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

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 2I640HW 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 2I640HWA2.ROM -BIOS -ALL

2I640HWA2.ROM is the file name of the latest BIOS.

It may be 2I640HWA1.ROM or 2I640HWA2.ROM, etc.

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

By Bay Trail series mainboard, please type

X:\: H2OFFT-D.EXE 2I640HWA2.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) |