

IB839

**Intel® Atom® x7000RE
Intel® N Series Processors
3.5" Disk-Size SBC**

User's Manual

Version 1.0
(January 2025)

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Compliance



This product has passed CE Class B tests for environmental specifications and limits. This product is in accordance with the directives of the European Union (EU). In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.



This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

WEEE



This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE



This product complies with RoHS 2 restrictions, which prohibit the use of certain hazardous substances in electrical and electronic equipment. The following substances must not exceed the specified concentrations:

- Hexavalent chromium: 1,000 ppm
- Poly-brominated biphenyls (PBBs): 1,000 ppm
- Poly-brominated diphenyl ethers (PBDEs): 1,000 ppm
- Cadmium: 100 ppm
- Mercury: 1,000 ppm
- Lead: 1,000 ppm
- Bis(2-ethylhexyl) phthalate (DEHP): 1,000 ppm
- Butyl benzyl phthalate (BBP): 1,000 ppm
- Dibutyl phthalate (DBP): 1,000 ppm
- Diisobutyl phthalate (DIBP): 1,000 ppm

Important Safety Information

Environmental conditions:

- Use this product in environments with ambient temperatures between 0°C and 60°C.
- Do not leave this product in an environment where the storage temperature may be below -20° C or above 80° C. To prevent from damages, the product must be used in a controlled environment.

Care for your IBASE products:

- Before cleaning the PCB, unplug all cables and remove the battery.
- Clean the PCB with a circuit board cleaner or degreaser, or use cotton swabs and alcohol.
- Vacuum the dust with a computer vacuum cleaner to prevent the fan from being clogged.



WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do not place heavy objects on the top of this product.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static kit or mat.
- Hold the edges of PCB when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the PCB.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.



CAUTION

There is danger of explosion if the internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions or recycle them at a local recycling facility or battery collection point.

Warranty Policy

- **IBASE standard products:**

24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

- * PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative concerning problems that you may have encountered, please prepare the following information:
 - Product model name
 - Product serial number
 - Detailed description of the problem
 - The error messages in text or in screenshots if there is any
 - The arrangement of the peripherals
 - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, please visit the IBASE's website to read the warranty and RMA policy, before logging in to the eRMA System.

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Chapter 1

General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Block Diagram
- Board Pictures
- Board Dimensions

1.1 Introduction

The IB839 is an industrial-grade motherboard featuring Intel Atom x7000RE Series and Intel N-Series Processors for high efficiency and reliability. It supports up to 16GB DDR5-4800 memory, Type-C and DP++, eDP or LVDS displays, and offers extensive connectivity with 2x PCI-E 2.5G LAN, 4x COM ports, 4x USB 3.2 (1x Type-C + 3x Type-A), 2x USB 2.0, and 1x SATA III. Three M.2 sockets (M-Key, E-Key and B-Key) provide expansion flexibility, while +12V to +24V DC input and -40°C to 85°C operating temperature ensure durability in harsh conditions. Security and control are enhanced with dTPM, watchdog timer, and Digital I/O, making the IB839 ideal for demanding industrial applications.

1.2 Features

- Onboard Intel® Atom® Processors x7000RE Series or Intel® Atom® N Series Processors
- 1x DDR5-4800 SO-DIMM, Max. 16GB
- Supports Type-C & DP++ and eDP or LVDS
- 2x PCI-E 2.5G LAN, 4x COM ports
- 4x USB 3.2 (1x Type-C + 3x Type-A), 2x USB 2.0, 1x SATA III
- 3x M.2 sockets (M-Key, E-Key & B-Key)
- +12V~+24V DC wide-range power input
- Supports wide-range operating temperature from -20°C to 85°C
- Supports dTPM, watchdog timer, Digital I/O



1.3 Packing List

Your IB839 package should include the items listed below. If any of the items below is missing, contact the distributor or dealer from whom you purchased the product.

- IB839 SBC x 1

1.4 Optional Accessories

IBASE provides the following optional accessories:

- Cable Kit (IB76A-2)
Including:
DC-In power cable (PW592) x 1
COM ports cable (PK1H) x 1
SATA & HDD power cable (SATA-53A) x 1
USB 2.0 cable (USB29) x 1
- Heat spreader (HSIB838-1)
- Heat sink (HSIB838-A) ** For Dual-Core Atom® & Quad-Core N series processor
- Heat sink (HSIB838-C) ** For Quad-Core Atom® processor

1.5 Specifications

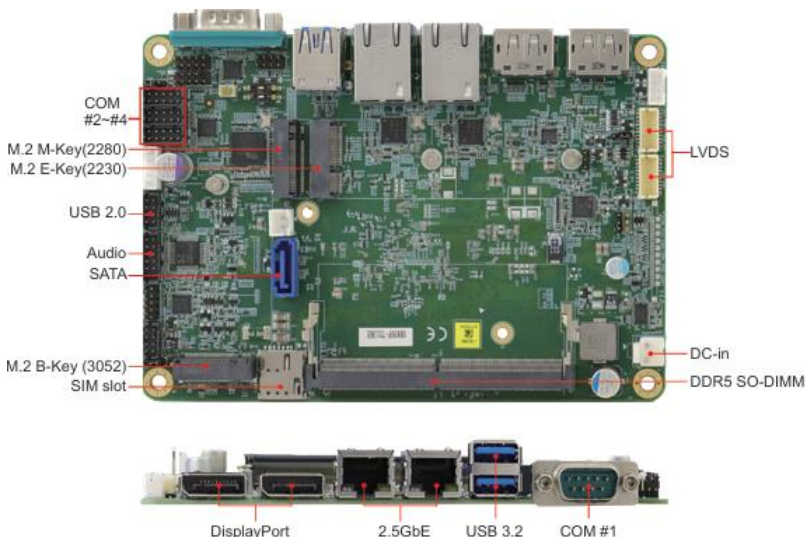
| Model Name | Description |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| IB839F-7211RE | Intel® Atom® x7211RE SoC on board 3.5-inch SBC, w/ 2x 2.5GbE LAN, 2x DP, LVDS, 4x COM, 3x M.2, TPM, EuP/ErP, +12V~24V DC-in |
| IB839FE-N97 | Intel® N97 SoC on board 3.5-inch SBC, w/ 2x 2.5GbE LAN, 2x DP, eDP, 4x COM, 3x M.2, TPM, EuP/ErP, +12V~24V DC-in |
| IB839F-7211RE | Intel® Atom® x7211RE SoC on board 3.5-inch SBC, w/ 2x 2.5GbE LAN, 2x DP, LVDS, 4x COM, 3x M.2, TPM, EuP/ErP, +12V~24V DC-in |
| IB839F-N97 | Intel® N97 SoC on board 3.5-inch SBC, w/ 2x 2.5GbE LAN, 2x DP, LVDS, 4x COM, 3x M.2, TPM, EuP/ErP, +12V~24V DC-in |
| IB839FE-N97R | Intel® N97 SoC on board 3.5-inch SBC, w/ 2x 2.5GbE LAN, 2x DP, eDP, 4x COM, 3x M.2, TPM, EuP/ErP, +12V~24V DC-in, Right-angle type PWR connector |

| Specifications | |
|---------------------|-------------------------------------------------------------------------------------------------------------------------|
| Form Factor | 3.5" disk-size SBC |
| CPU | Intel® Atom® x7211RE (Dual-Core) Intel® Atom® x7433RE (Quad -Core) Intel® Processor N97 (Quad -Core) |
| Memory | 1x DDR5 SO-DIMM, Max. 16GB |
| Storage | 1x M.2 M2280 (SATA) |
| Graphics | Intel® SoC integrated Graphics |
| Video Output | 2x DisplayPorts & eDP or LVDS |
| Ethernet | 2x Intel® PCI-E 2.5G LAN Dual I226iT 2.5G LAN for Atom x7000RE series Dual I226LM 2.5G LAN for Processor N series |
| BIOS | AMI BIOS |
| Super I/O | Fintek F81966AB-I |
| Audio | Built-in HD audio + ALC888S codec |
| Serial Port | 1x RS232/422/485 (jumperless selection) + 3x RS232 |
| USB 2.0 | 4x USB 2.0 (pin header) |
| USB 3.X | 2x Type-A |
| Serial ATA | 1x SATA III |
| Digital IO | 4-In & 4-Out |
| TPM | Infineon SLB9672 series |
| Power | +12V ~ +24V DC-in |
| H/W Monitor | Yes |

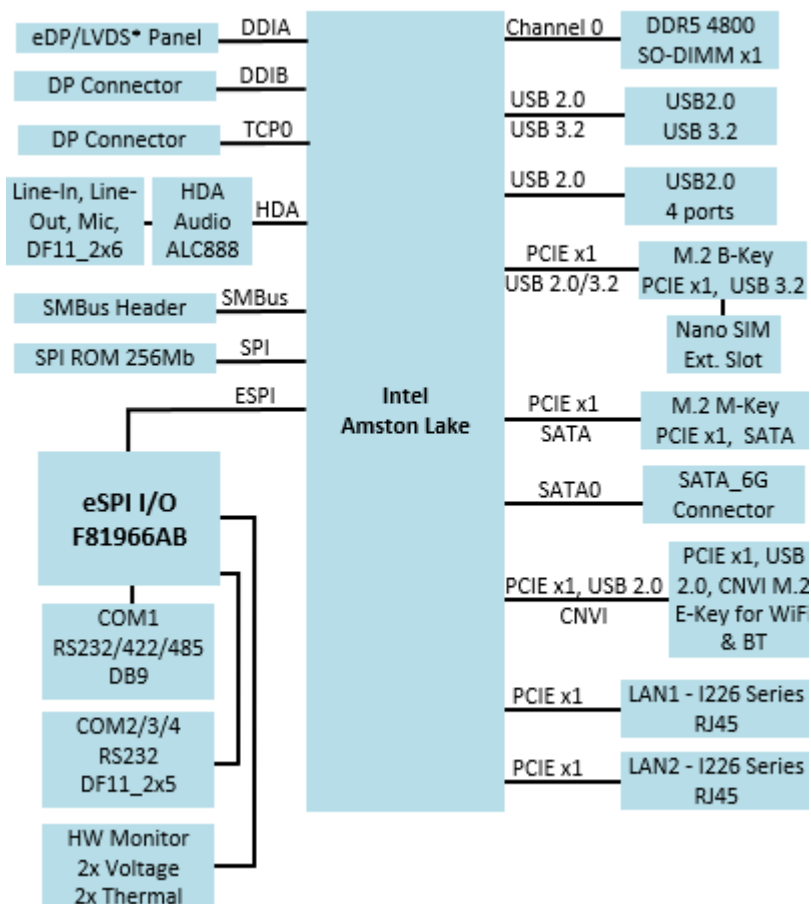
| | |
|-----------------------|---------------------------------------------|
| Watchdog Timer | Yes (256 segments, 0, 1, 2...255 sec / min) |
| Others | EuP/ErP |
| Dimensions | 102mm x 147mm (4" x 5.8") |

| Environment | |
|------------------------------|--------------------------------------------------------------------------------------------------------------|
| Operating Temperature | 0°C ~ +60°C (+32°F ~+140°F) for Processor N -40°C~+80°C (-40°F ~+176°F) for Atom x7000RE- processor |
| Storage Temperature | -40°C~85°C (-40°F ~+185°F) |
| Relative Humidity | 10% ~ 90 % (non-condensing) |

All specifications are subject to change without prior notice.

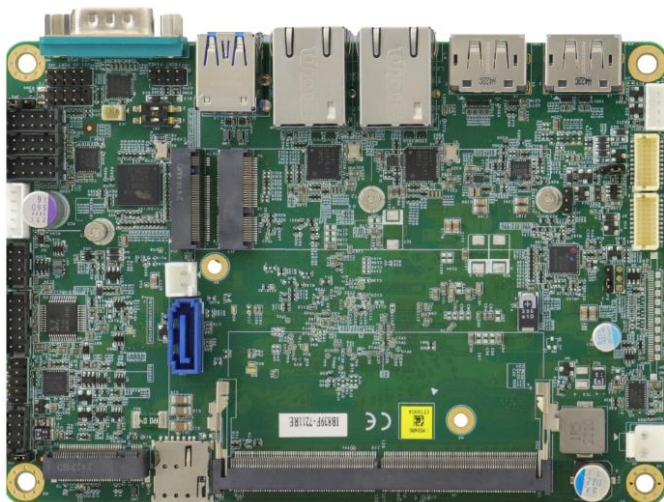


Block Diagram

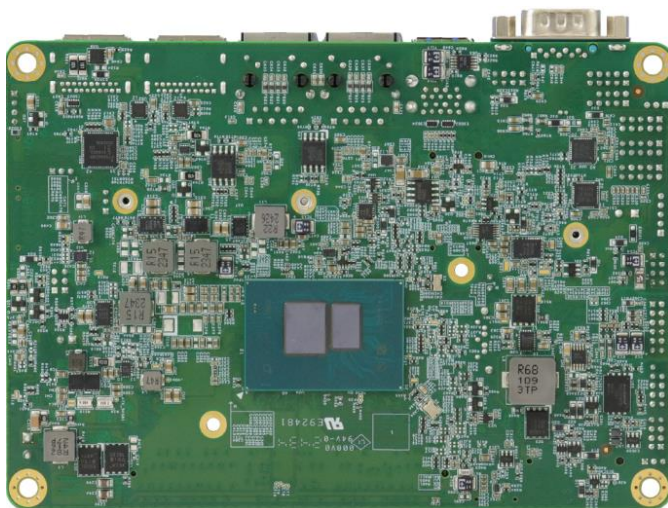


1.6 Board Pictures

Top View



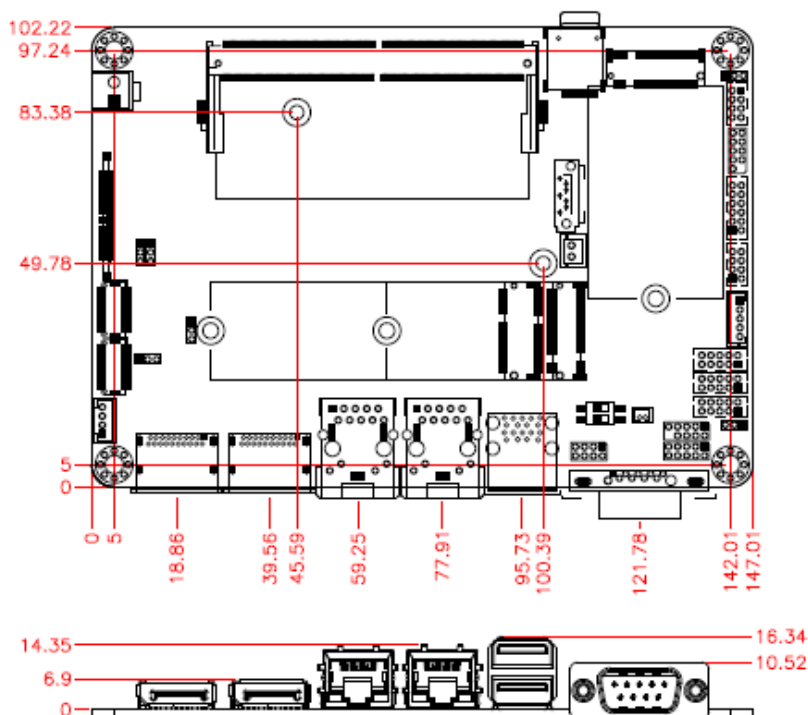
Bottom View



* The photos are for reference only. Some minor components may differ.

**Oblique View**

1.7 Dimensions



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Chapter 2

Hardware Configuration

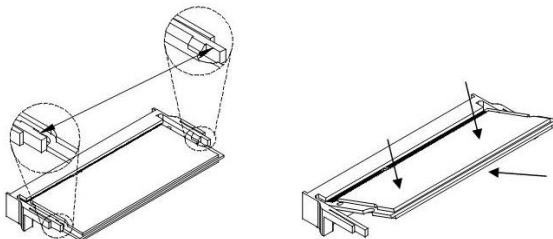
This section provides information on jumper settings and connectors on the IB839 in order to set up a workable system. On top of that, you will also need to install crucial pieces such as the CPU and the memory before using the product. The topics covered are:

- Essential installations before you begin
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Essential Installations

2.1.1 Installing the Memory

The IB839 supports one DDR5 memory socket. To install the modules, locate the memory slot on the board and perform the following steps:



1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

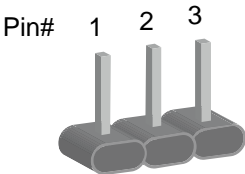
To remove the module, press the clips outwards with both hands, and the module will pop-up.

2.2 Setting the Jumpers

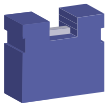
Set up and configure your IB839by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.

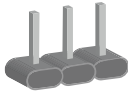
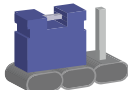
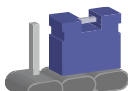


A 3-pin jumper



A jumper cap

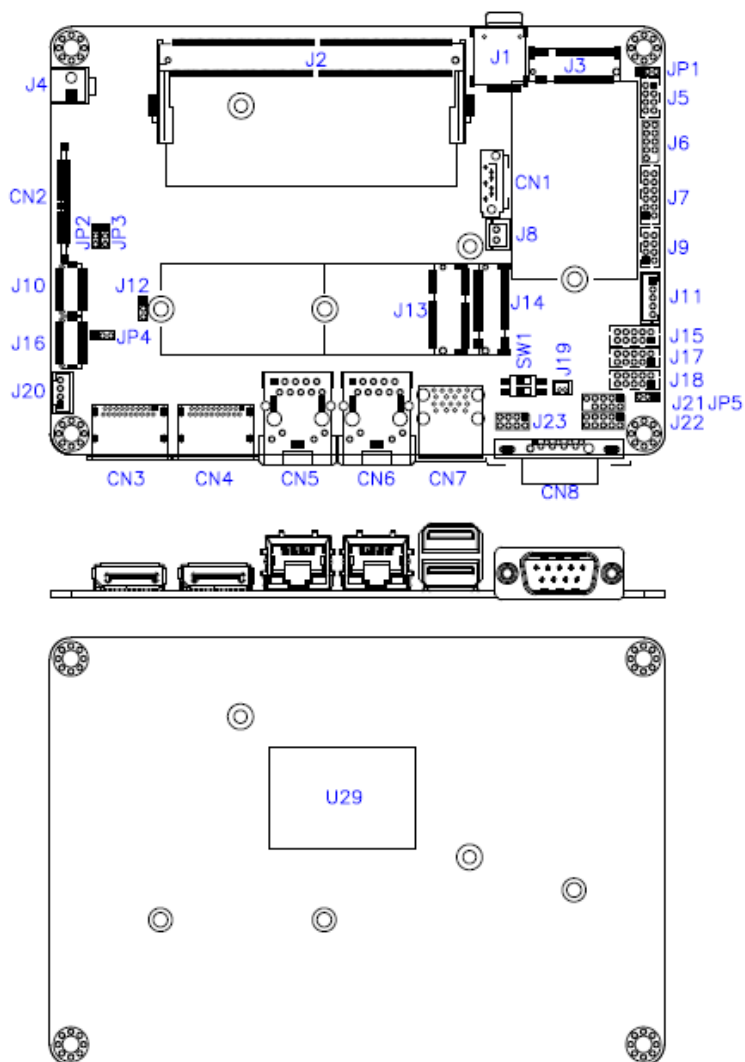
Refer to the illustration below to set jumpers.

| Pin closed | Jumper | Setting | | | | | | |
|-------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------|-----------------------|---|---|---|
| Open |  | <table><tr><td><input type="checkbox"/></td><td><input type="radio"/></td><td><input type="radio"/></td></tr><tr><td>1</td><td>2</td><td>3</td></tr></table> | <input type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | 1 | 2 | 3 |
| <input type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | | | | | | |
| 1 | 2 | 3 | | | | | | |
| 1-2 |  | <table><tr><td><input checked="" type="checkbox"/></td><td><input type="radio"/></td><td><input type="radio"/></td></tr><tr><td>1</td><td>2</td><td>3</td></tr></table> | <input checked="" type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | 1 | 2 | 3 |
| <input checked="" type="checkbox"/> | <input type="radio"/> | <input type="radio"/> | | | | | | |
| 1 | 2 | 3 | | | | | | |
| 2-3 |  | <table><tr><td><input type="checkbox"/></td><td><input checked="" type="radio"/></td><td><input type="radio"/></td></tr><tr><td>1</td><td>2</td><td>3</td></tr></table> | <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="radio"/> | 1 | 2 | 3 |
| <input type="checkbox"/> | <input checked="" type="radio"/> | <input type="radio"/> | | | | | | |
| 1 | 2 | 3 | | | | | | |

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

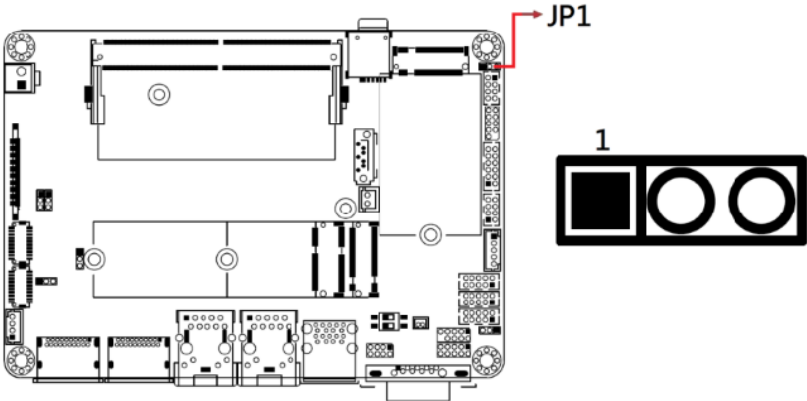
2.3 Jumper & Connector Locations



2.4 Jumpers Quick Reference

| Function | Jumper |
|--------------------------------------|--------|
| Sierra 5G Module Interface Selection | JP1 |
| eDP Panel Power Selection | JP2 |
| LVDS Panel Brightness Selection | JP3 |
| LVDS Panel Power Selection | JP4 |
| AT / ATX Selection | JP5 |
| Clear CMOS Data | SW1 |
| Clear ME Register | SW1 |

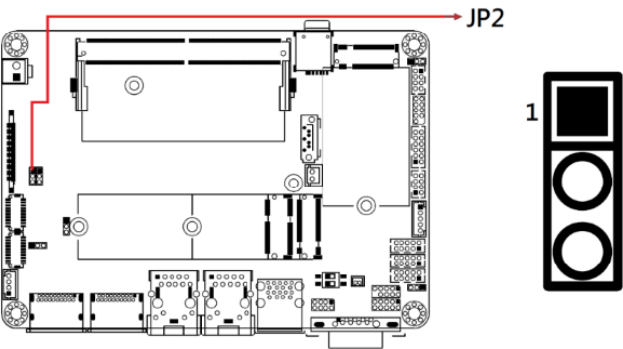
2.4.1 Sierra Module Interface Selection (JP1)



| Function | Pin closed | Setting |
|-------------------|------------|---------|
| USB | 1-2 | 1 |
| PCIE (default) | 2-3 | 1 |

Note: This is via J3.

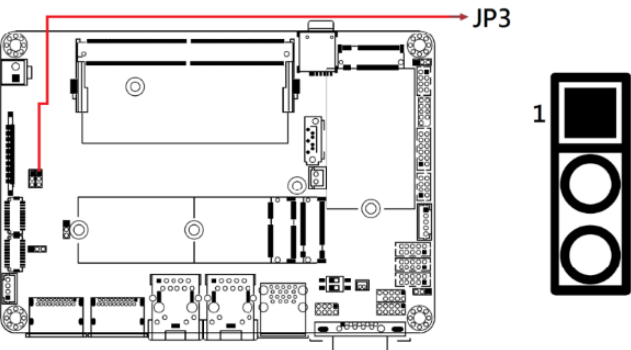
2.4.2 eDP Panel Power Selection (JP2)



| Function | Pin closed | Setting |
|----------------|------------|---------|
| 3.3V (default) | 1-2 | 1 |
| 5V | 2-3 | 1 |

Note: This is for setting Pin1~Pin5 voltage of CN2.

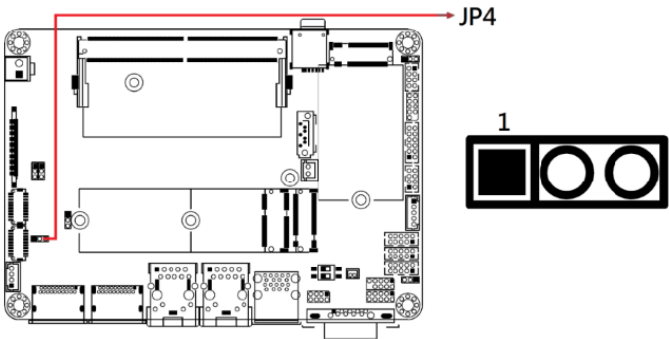
2.4.3 LVDS Panel Brightness Selection (JP3)



| Function | Pin closed | Setting |
|----------------|------------|---------|
| 3.3V (default) | 1-2 | 1 |
| 5V | 2-3 | 1 |

Note: This is for setting Pin3 voltage of J20.

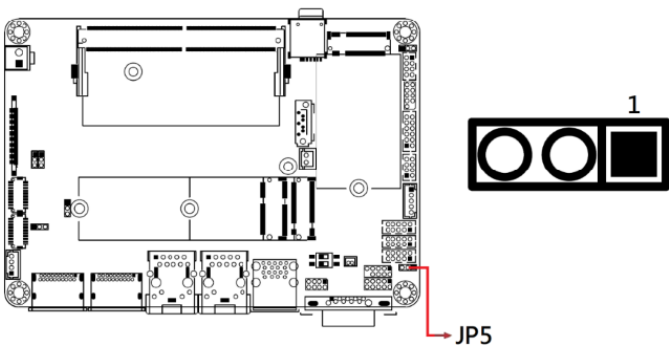
2.4.4 LVDS Panel Power Selection (JP4)



| Function | Pin closed | Setting |
|----------------|------------|---------|
| 3.3V (default) | 1-2 | 1 |
| 5V | 2-3 | 1 |

Note: This is for setting Pin19~Pin20 voltage of J10, J16.

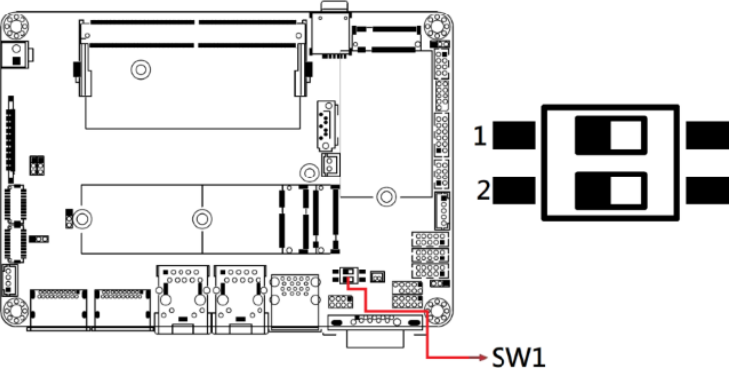
2.4.5 AT / ATX Selection (JP5)



| Function | Pin closed | Setting |
|----------|------------|---------|
| ATX | 1-2 | 1 |
| AT | 2-3 | 1 |

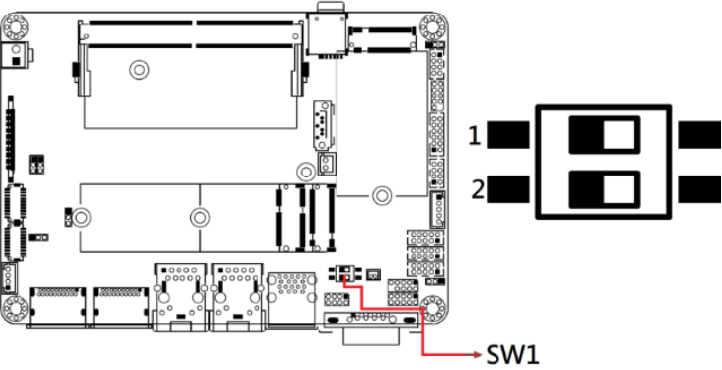
Note: AT: Auto power on; ATX: Manual power on

2.4.6 Clear CMOS Data (SW1)



| Function | Setting |
|------------------|---------|
| Normal (default) | P1-OFF |
| Clear CMOS | P1-ON |

2.4.7 Clear ME Register (SW1)

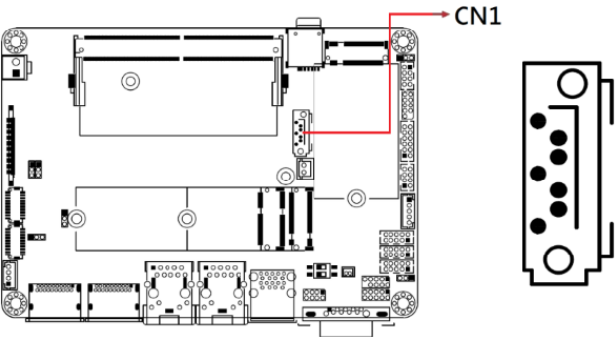


| Function | Setting |
|-------------------|---------|
| Normal (default) | P2-OFF |
| Clear ME Register | P2-ON |

2.5 Connectors Quick Reference

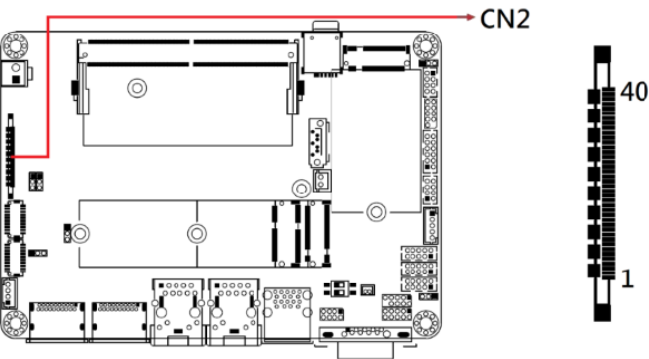
| Function | Connector |
|---------------------------------|------------------|
| SATA Connectors | CN1 |
| eDP Connector | CN2 |
| DP Connectors | CN3, CN4 |
| LAN Connectors | CN5, CN6 |
| USB 3.2 Connector | CN7 |
| COM1 RS-232/422/485 Serial Port | CN8 |
| Nano SIM Card Slot | J1 |
| DDR5 SO-DIMM Connector | J2 |
| M.2 B-Key 3052 Connector | J3 |
| DC Power Input Connector | J4 |
| USB 2.0 Connector | J5 |
| SPI Flash Tool Connector | J6 |
| Audio Connector | J7 |
| SATA HDD Power Connector | J8 |
| LVDS Connectors | J10, J16 |
| SMBUS Connector | J11 |
| M.2 E-Key 2230 Connector | J13 |
| M.2 M-Key 2280 Connector | J14 |
| COM2, COM3, COM4 RS-232 Ports | J18, J17, J15 |
| RTC Battery Connector | J19 |
| LVDS Backlight Connector | J20 |
| 80 Port Debug Tool Connector | J21 |
| Digital I/O Connector | J22 |
| Front Panel Connector | J23 |

2.5.1 SATA Connectors (CN1)



| Pin | Assignment | Pin | Assignment |
|-----|------------|-----|------------|
| 1 | Ground | 5 | RX- |
| 2 | TX+ | 6 | RX+ |
| 3 | TX- | 7 | Ground |
| 4 | Ground | | |

2.5.2 eDP Connector (CN2)



Remarks: KEL_SSL00-40S

Note: Use JP1 to set Pin1~ Pin5 voltage; Total current: 1A

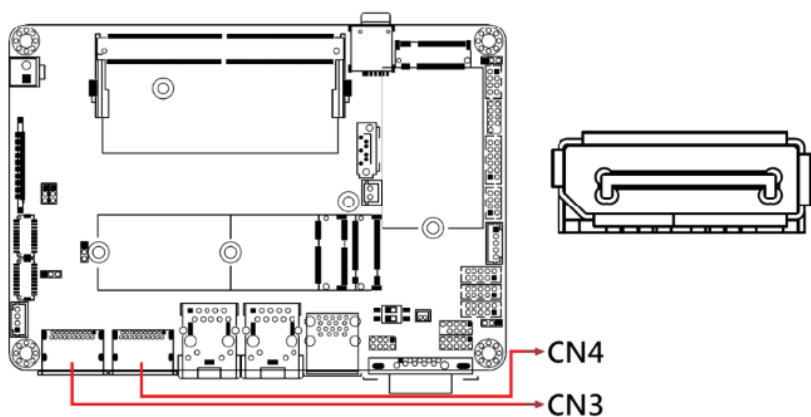
Pin27, Pin36 Total current: 1A

Pin28, Pin35 Total current: 1A

Pin31 Total current: 0.5A

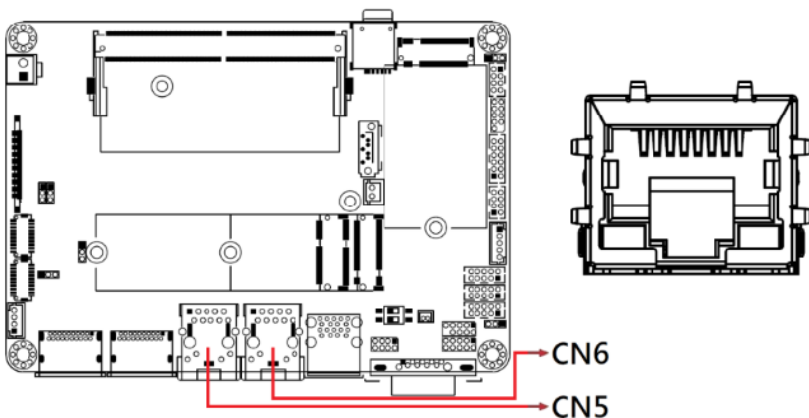
| Pin | Assignment | Pin | Assignment |
|-----|-----------------|-----|--------------------|
| 1 | eDP Vcc | 21 | TXN0 |
| 2 | eDP Vcc | 22 | TXP1 |
| 3 | eDP Vcc | 23 | Ground |
| 4 | eDP Vcc | 24 | AUXP |
| 5 | eDP Vcc | 25 | AUXN |
| 6 | Ground | 26 | NC |
| 7 | Ground | 27 | +3.3V |
| 8 | Ground | 28 | EDP BKLT (+12V) |
| 9 | Ground | 29 | NC |
| 10 | Hot Plug detect | 30 | Ground |
| 11 | Ground | 31 | +5V |
| 12 | TXN3 | 32 | NC |
| 13 | TXP3 | 33 | Back Light Control |
| 14 | Ground | 34 | Back Light Enable |
| 15 | TXN2 | 35 | EDP BKLT (+12V) |
| 16 | TXP2 | 36 | +3.3V |
| 17 | Ground | 37 | Ground |
| 18 | TXN1 | 38 | NC |
| 19 | TXP1 | 39 | NC |
| 20 | Ground | 40 | NC |

2.5.3 DP Connectors (CN3, CN4)

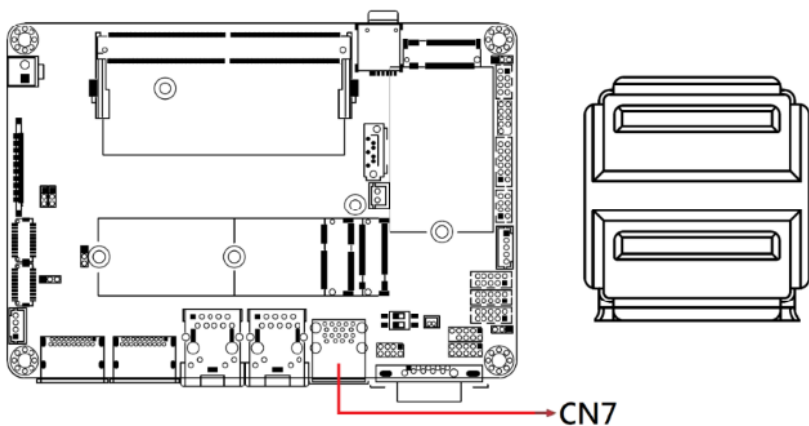


| Pin | Assignment | Pin | Assignment |
|-----|------------|-----|------------|
| 1 | LAN0_P | 11 | GND |
| 2 | GND | 12 | LAN3_N |
| 3 | LAN0_N | 13 | CONFIG |
| 4 | LAN1_P | 14 | GND |
| 5 | GND | 15 | AUXP |
| 6 | LAN1_N | 16 | GND |
| 7 | LAN2_P | 17 | AUXN |
| 8 | GND | 18 | Hot Plug |
| 9 | LAN2_N | 19 | GND |
| 10 | LAN3_P | 20 | +3.3V/0.5A |

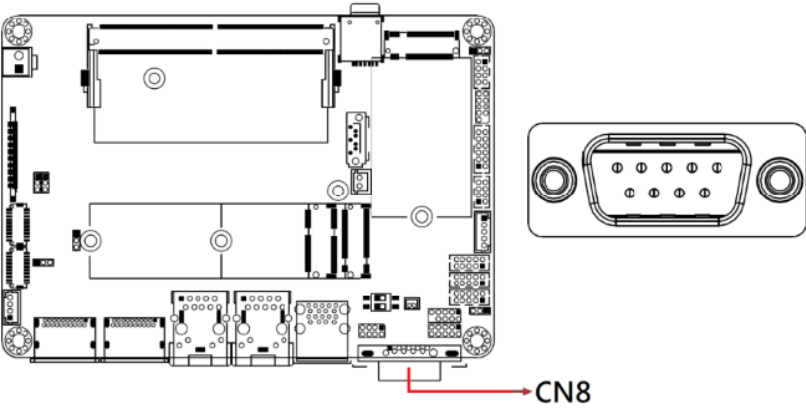
2.5.4 LAN Connectors (CN5, CN6)



2.5.5 USB 3.2 Connector (CN7)



2.5.6 COM1 RS-232/422/485 Serial Port (CN8)

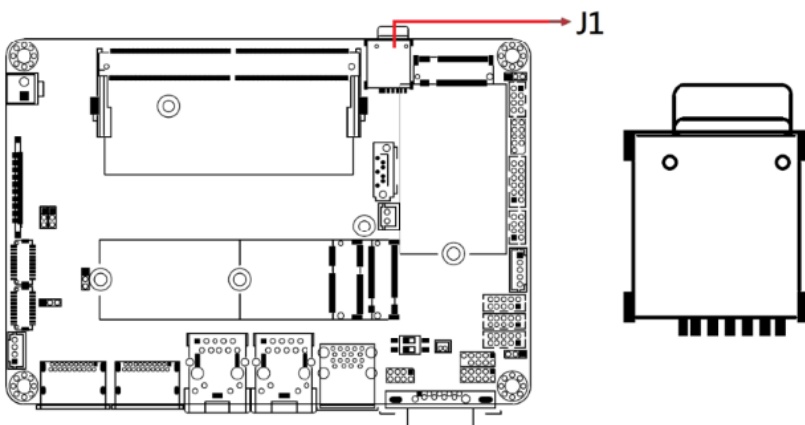


**COM1 port is jumper-less and configurable in BIOS.*

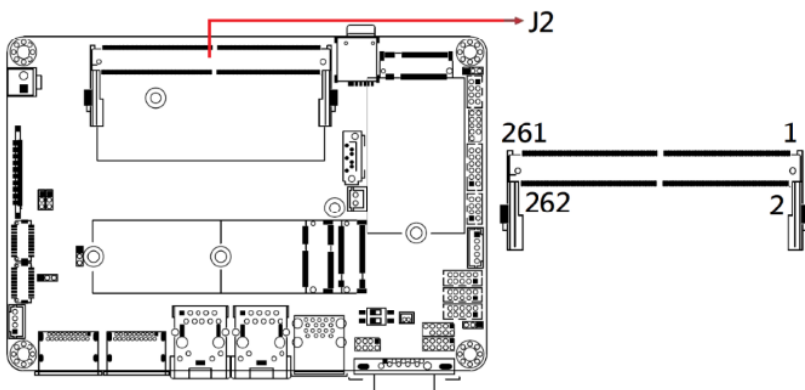
| Pin | Assignment | Pin | Assignment |
|-----|---------------------|-----|--------------------------|
| 1 | DSR, Data set ready | 6 | DCD, Data carrier detect |
| 2 | Ground | 7 | DTR, Data terminal ready |
| 3 | Ground | 8 | CTS, Clear to send |
| 4 | TX, Transmit | 9 | RTS, Request to send |
| 5 | RX, Receive | 10 | RI, Ring Indicator |

| Pin | Assignment | | |
|-----|---------------------|--------|--------|
| | RS-232 (default) | RS-422 | RS-485 |
| 1 | DSR | NC | NC |
| 2 | Ground | Ground | Ground |
| 3 | Ground | Ground | Ground |
| 4 | TX | RX+ | NC |
| 5 | RX | TX+ | Data+ |
| 6 | DCD | TX- | Data- |
| 7 | DTR | RX- | NC |
| 8 | CTS | NC | NC |
| 9 | RTS | NC | NC |
| 10 | RI | NC | NC |

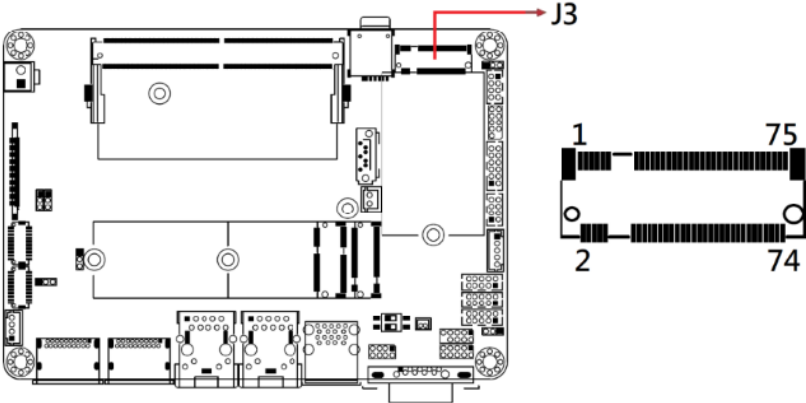
2.5.7 Nano SIM Card Slot (J1)



2.5.8 DDR5 SO-DIMM Connector (J2)

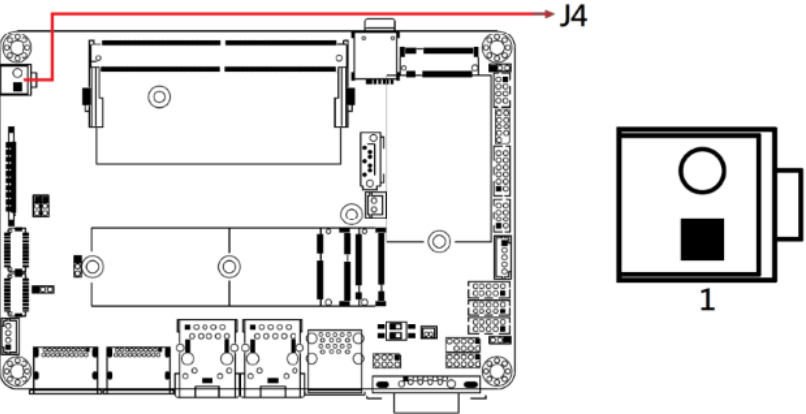


2.5.9 M.2 B-Key 3052 Connector (J3)



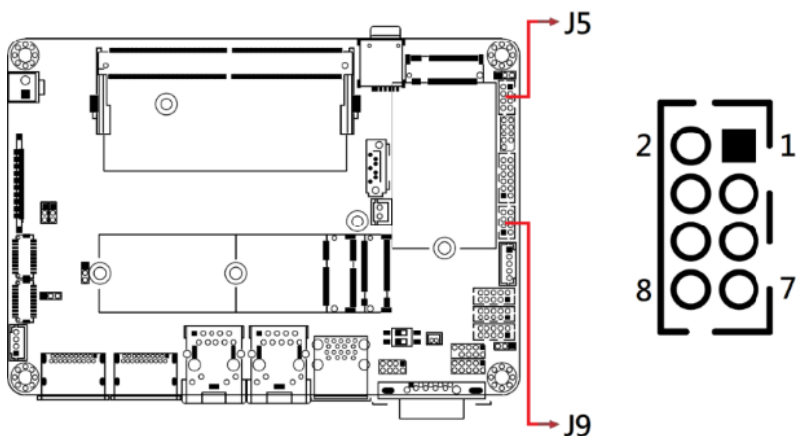
**With sierra LTE card, USB/PCIE I/F is configurable by JP5, JP6.*

2.5.10 DC Power Input Connector (J4)



| Pin | Assignment |
|-----|------------|
| 1 | +9V ~ +36V |
| 2 | Ground |

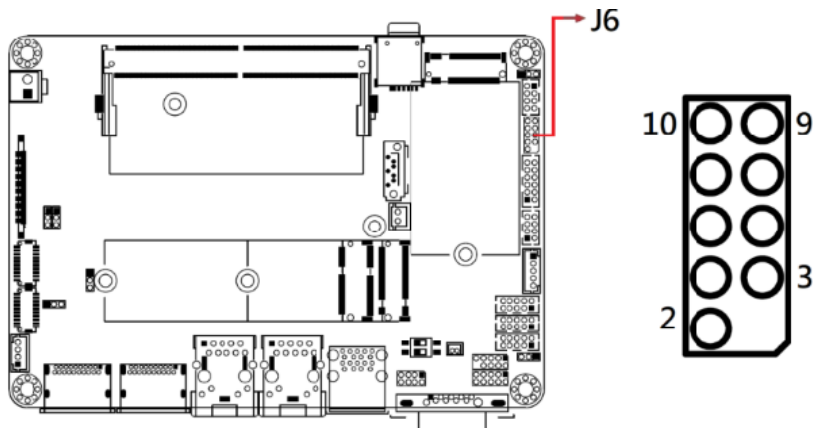
2.5.11 USB 2.0 Connector (J5)



Remarks: HK_DF11-8S-PA66H

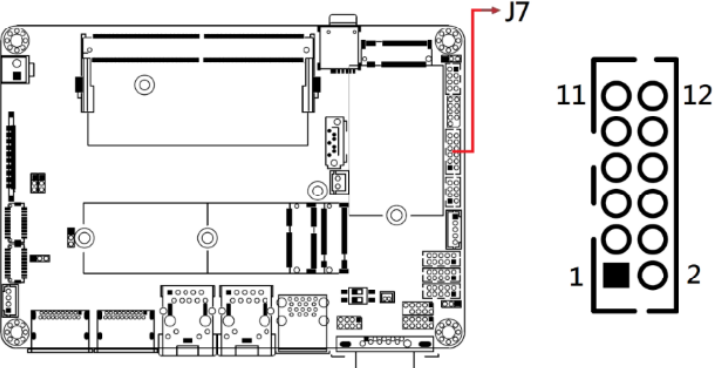
| Pin | Assignment | Pin | Assignment |
|-----|------------|-----|------------|
| 1 | +5V/0.5A | 2 | Ground |
| 3 | Data- | 4 | Data+ |
| 5 | Data+ | 6 | Data- |
| 7 | Ground | 8 | +5V/0.5A |

2.5.12 SPI Flash Tool Connector (J6)



Remarks: Factory use only.

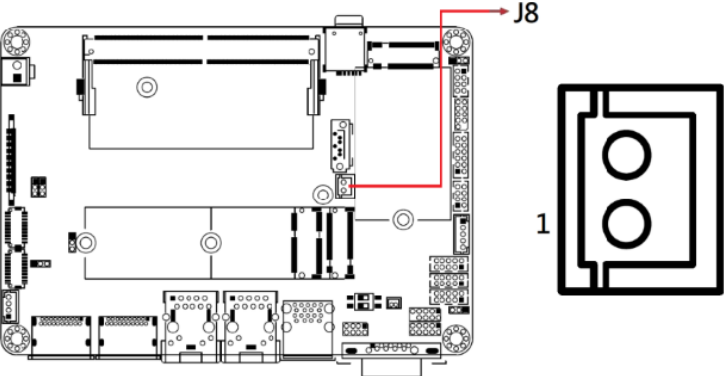
2.5.13 Audio Connector (J7)



Remarks: HK_DF11-12S-PA66H

| Pin | Assignment | Pin | Assignment |
|-----|------------|-----|------------|
| 1 | Lineout_L | 2 | Lineout_R |
| 3 | JD_FRONT | 4 | Ground |
| 5 | LINEIN_L | 6 | Linein_R |
| 7 | JD_LINEIN | 8 | Ground |
| 9 | MIC_L | 10 | MIC-R |
| 11 | JD_MIC1 | 12 | Ground |

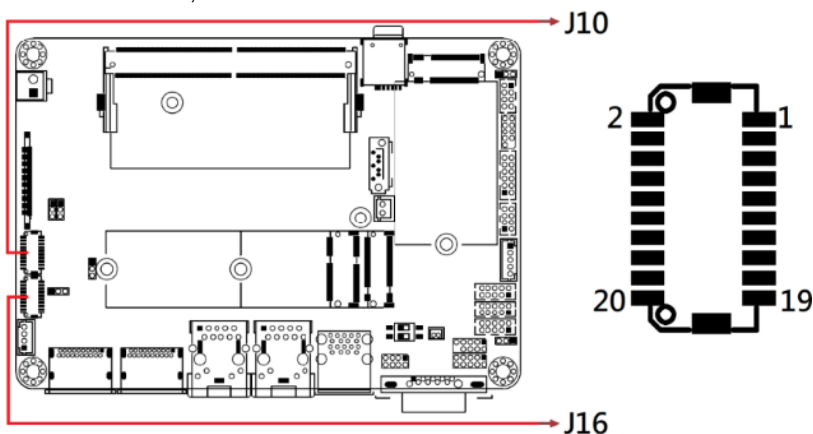
2.5.1 SATA HDD Power Connector (J8)



| Pin | Assignment |
|-----|------------|
| 1 | VCC5 |
| 2 | Ground |

2.5.2 LVDS Connectors (J10, J16)

** J10:Channel-A, J16:Channel-B

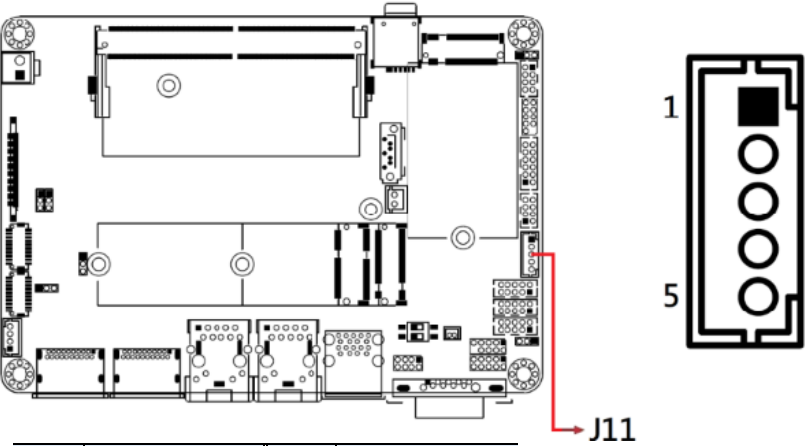


Remarks: HIROSE_DF20G-20DP-1V(56)

Note: Use JP3 to set Pin19~Pin20 voltage.Total current: 1A

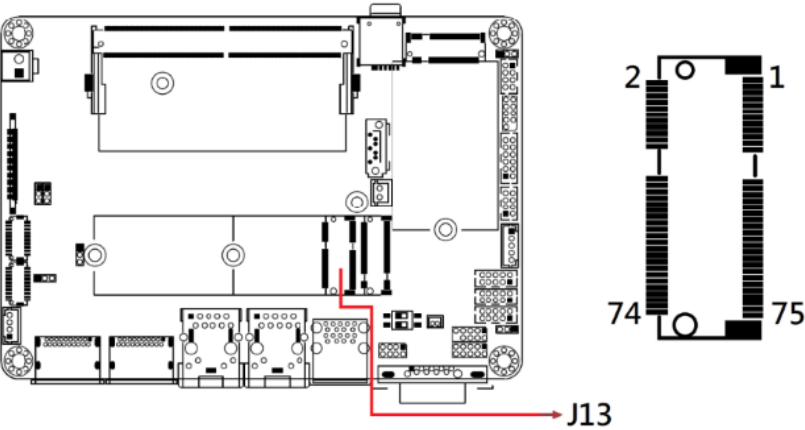
| Pin | Assignment | Pin | Assignment |
|-----|------------|-----|------------|
| 1 | TX0P | 2 | TX0N |
| 3 | Ground | 4 | Ground |
| 5 | TX1P | 6 | TX1N |
| 7 | Ground | 8 | Ground |
| 9 | TX2P | 10 | TX2N |
| 11 | Ground | 12 | Ground |
| 13 | CLKP | 14 | CLKN |
| 15 | Ground | 16 | Ground |
| 17 | TX3P | 18 | TX3N |
| 19 | Power | 20 | Power |

2.5.3 SMBUS Connector (J11)



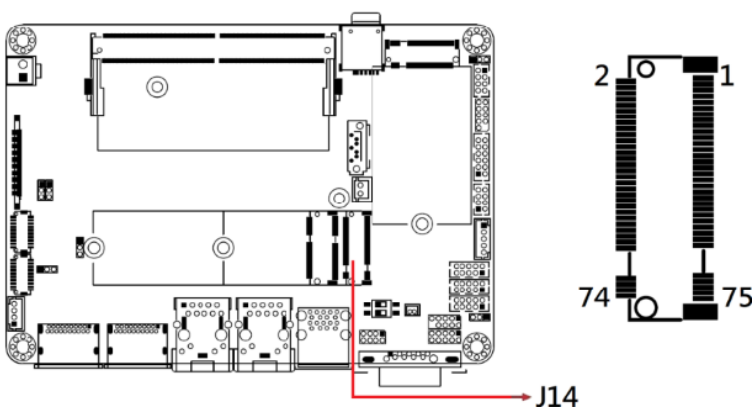
| Pin | Assignment | Pin | Assignment |
|-----|------------|-----|------------|
| 1 | PLT_RST# | 4 | SMB_DATA |
| 2 | GPIO | 5 | SMB_CLK- |
| 3 | Ground | | |

2.5.4 M.2 E-Key 2230 Connector (J13)

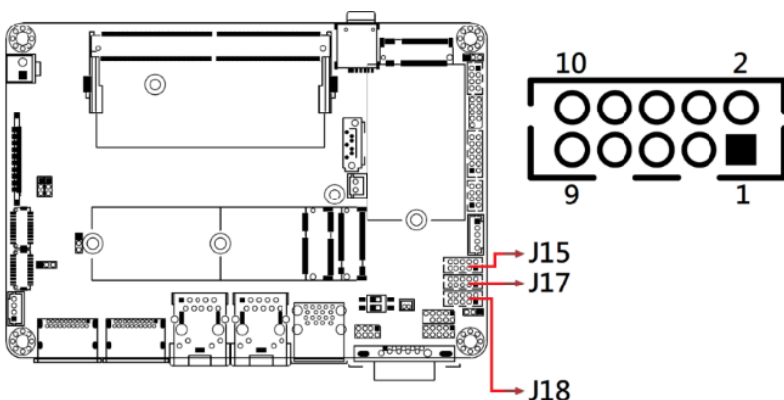


*Supports CNVI Card

2.5.1 M.2 M-Key 2280 Connector (J14)



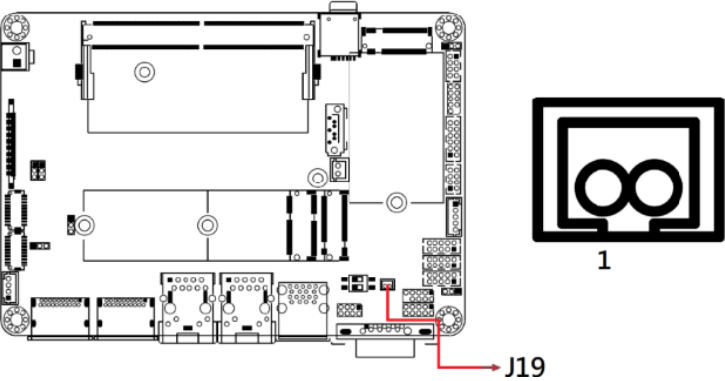
2.5.2 COM2, COM3, COM4 RS-232 Ports (J18, J17, J15)



Remarks: HK_DF11-10S-PA66H

| Pin | Assignment | Pin | Assignment |
|-----|--------------------------|-----|--------------------------|
| 1 | DCD, Data carrier detect | 2 | RXD, Receive data |
| 3 | TXD, Transmit data | 4 | DTR, Data terminal ready |
| 5 | Ground | 6 | DSR, Data set ready |
| 7 | RTS, Request to send | 8 | CTS, Clear to send |
| 9 | RI, Ring indicator | 10 | Not Used |

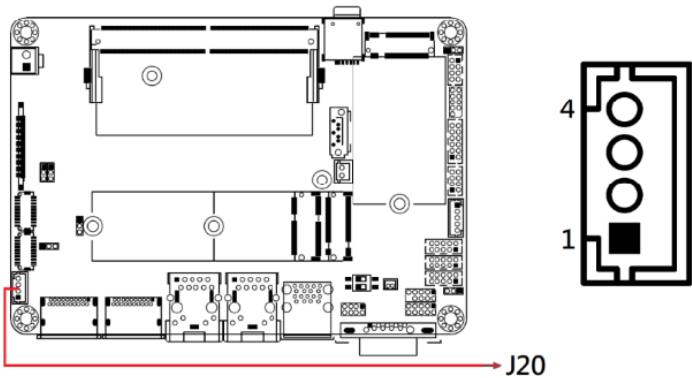
2.5.3 RTC Battery Connector (J19)



Note: Coin battery with cable.

| Pin | Assignment |
|-----|------------|
| 1 | +3V |
| 2 | Ground |

2.5.4 LVDS Backlight Connector (J20)

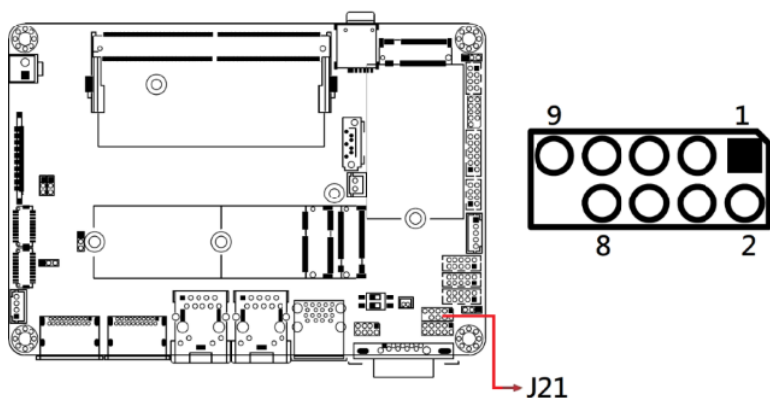


Remarks: E-CALL_0110-161-040

Note: Use JP2 to set Pin3 voltage.

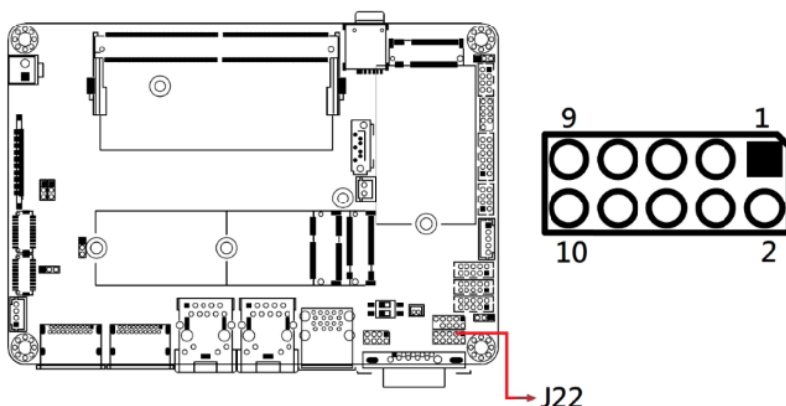
| Pin | Assignment | Pin | Assignment |
|-----|------------------|-----|--------------------|
| 1 | +12V/1.5A | 3 | Brightness Control |
| 2 | Backlight Enable | 4 | Ground |

2.5.5 80 Port Debug Tool Connector (J21)



Remarks: Factory use only.

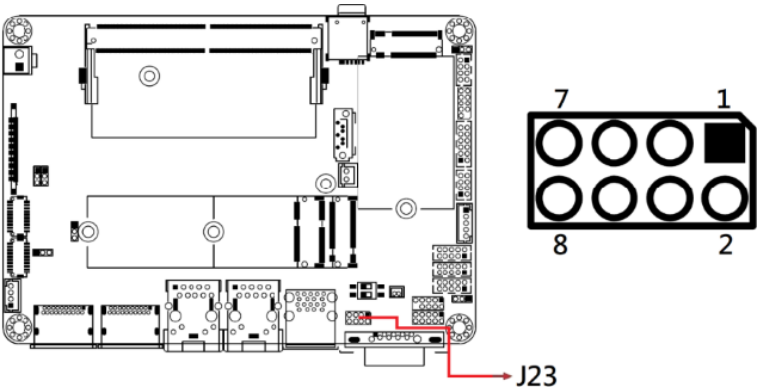
2.5.6 Digital I/O Connector (J22)



Remarks: E-CALL_0196-01-200-100

| Pin | Assignment | Pin | Assignment |
|-----|------------|-----|------------|
| 1 | Ground | 2 | +5V/0.5A |
| 3 | OUT3 | 4 | OUT1 |
| 5 | OUT2 | 6 | OUT0 |
| 7 | IN3 | 8 | IN1 |
| 9 | IN2 | 10 | IN0 |

2.5.7 Front Panel Setting Connector (J23)



Remarks: E-CALL_0126-01-203-080

| Pin | Assignment | Pin | Assignment |
|-----|----------------|-----|------------|
| 1 | PWR_BTN- | 2 | PWR_BTN+ |
| 3 | HDD_LED+, 3.3V | 4 | HDD Active |
| 5 | Ground | 6 | Reset |
| 7 | POWER_LED+, 5V | 8 | Ground |

Chapter 3

Drivers Installation

This chapter introduces installation of the following drivers:

- Intel® Chipset Software Installation Utility
- Intel® Graphics Drivers
- Realtek HD Audio Driver
- Intel® ME Drivers
- Intel® Serial IO Drivers
- Intel® LAN Drivers

3.1 Introduction

This section describes the installation procedures for software and drivers.

Note: After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.

3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for Intel chipset components. Follow the instructions below to complete the installation.

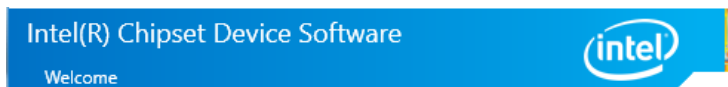
1. Go to the download page of the product. Copy the compressed drivers file to your computer. Double click the file to decompress it. Run “CDGuide” to go to the main drivers page as shown below. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) Amston Lake Chipset Drivers** on the right pane.



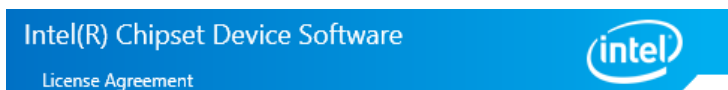
- Click **Intel(R) Chipset Software Installation Utility**.



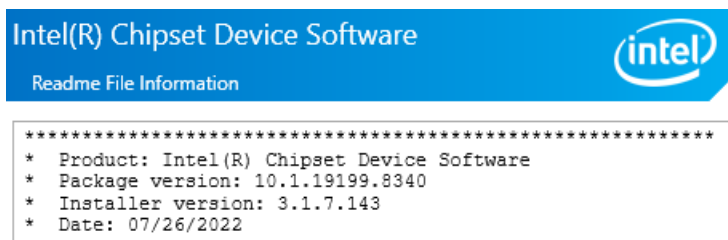
- When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.



- Accept the software license agreement and proceed with the installation process.



- On the *Readme File Information* screen, click **Install**.



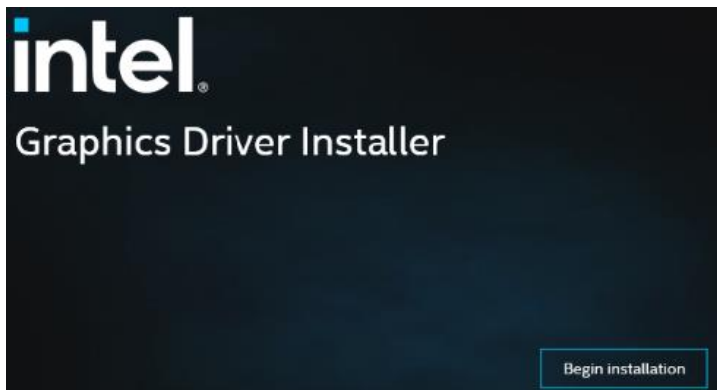
- After completing the installation, click **Finish** to complete the setup process.

3.3 VGA Driver Installation

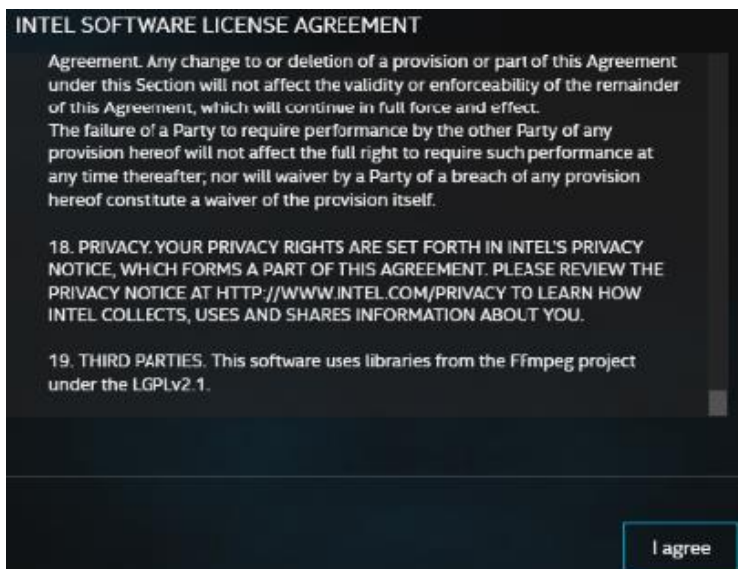
1. Click **Intel** on the left pane and then **Intel(R) Amston Lake Chipset Drivers** on the right pane.
2. Click **Intel(R) HD Graphics Driver**.



3. Click **Begin installation**.



4. Click **I agree** to accept the license agreement.

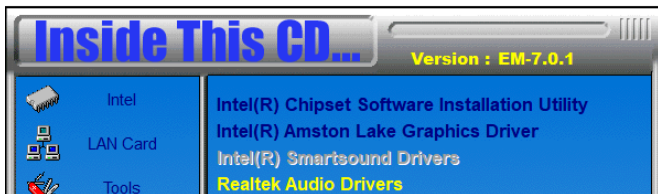


5. On the next screen, click **Start and** then click **Finish** when installation has been completed.



3.4 Realtek Audio Driver Installation

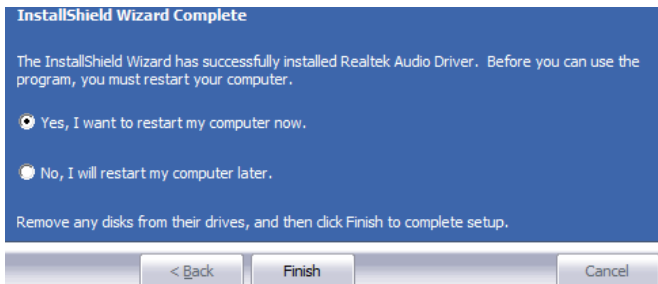
1. Click **Intel** on the left pane and then **Intel(R) Amston Lake Chipset Drivers** on the right pane.
2. Click **Realtek Audio Driver** and then **Realtek Audio DCH Drivers**.



3. On the *Welcome* screen of the InstallShield Wizard, click **Next**.

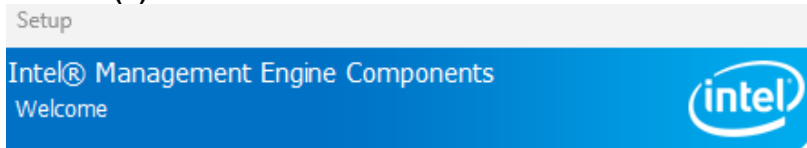


4. Realtek Audio Driver will configure the new software installation. After the InstallShield Wizard has successfully installed Realtek Audio Driver, restart the computer to use the program. Click **Finish**.

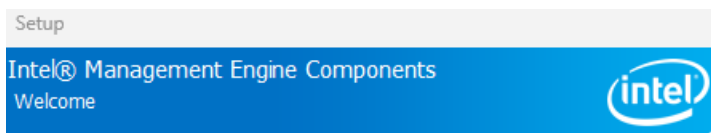


3.6 Intel® Management Engine Drivers Installation

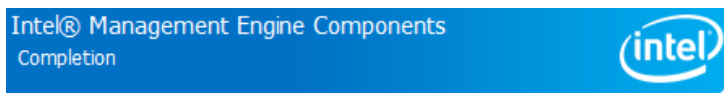
1. Click **Intel** on the left pane and then **Intel(R) Amston Lake Chipset Drivers** on the right pane.
2. Click **Intel(R) ME 15.x Drivers**.



3. When the *Welcome* screen appears, click **Next**.



4. Accept the license agreement and click **Next**.
5. Click **Next** to install to the default folder, or click **Change** to choose another destination folder
6. After Intel Management Engine Components have been successfully installed, click **Finish**.



You have successfully installed the following components:

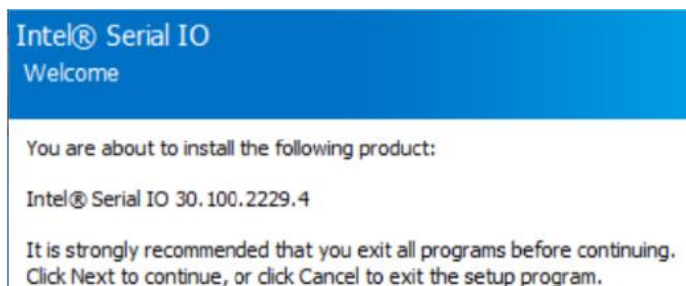
- Intel® Management Engine Interface
- Intel® Dynamic Application Loader
- Intel® Trusted Connect Service

3.7 Intel(R) Serial IO Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Amston Lake Chipset Drivers** on the right pane.
2. Click **Intel(R) Serial IO Drivers Installation**.



3. In the Welcome screen, click **Next**.



4. In the next screen, accept the license agreement and click **Next**.
5. In the Readme File Information screen, click **Next**.
6. In the Confirmation screen, click **Next**.

You are about to install the following components:

- Intel® Serial IO GPIO Driver
- Intel® Serial IO UART Driver

7. When installation has been completed, click **Finish**.



You have successfully installed the following product:

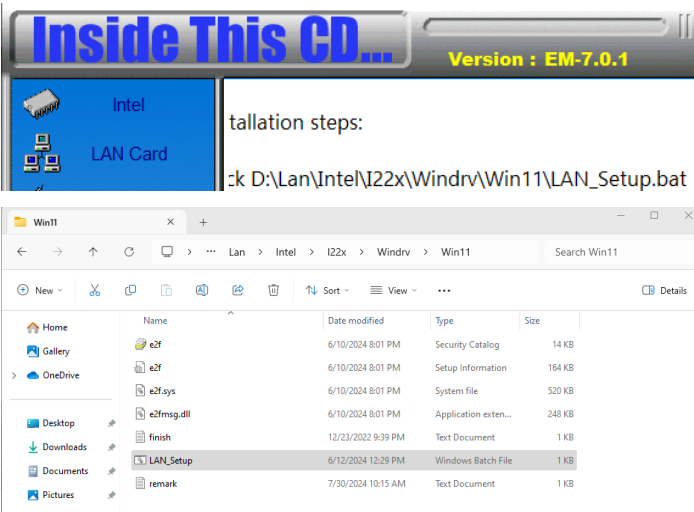
Intel® Serial IO 30.100.2229.4

3.8 LAN Driver Installation

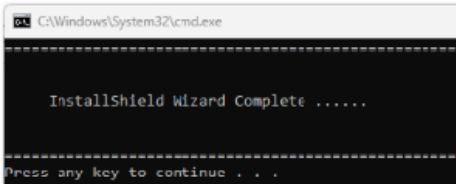
1. Click **LAN Card** on the left pane and then **Intel LAN Controller Drivers**. Click **Intel(R) I22x 2.5G Network Drivers** .



2. Run the LAN_Setup.bat file as shown on the screen to proceed.



3. Setup is complete.



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Chapter 4

BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the key immediately allows you to enter the Setup utility. If you are a little bit late pressing the key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

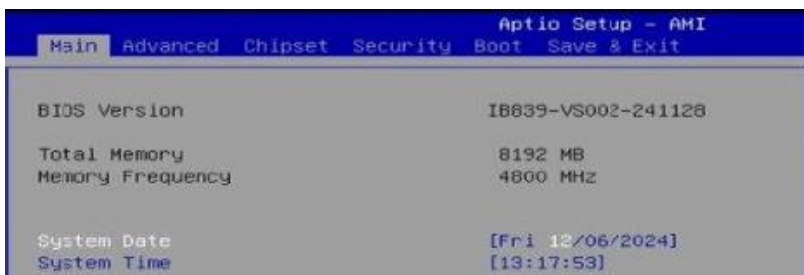
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: It is strongly recommended that you avoid making any changes to the chipset defaults.

These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

4.3 Main Settings



| BIOS Setting | Description |
|--------------|-----------------------------------------------------------------------|
| System Date | Sets the date. Use the <Tab> key to switch between the date elements. |
| System Time | Set the time. Use the <Tab> key to switch between the time elements. |

4.4 Advanced Settings

This section allows you to configure system features according to your preference.



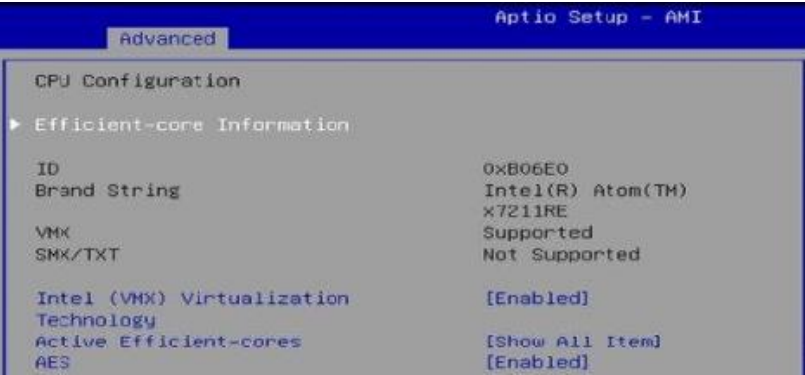
4.4.1 Connectivity Configuration



| BIOS Setting | Description |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CNVi Mode | This option configures Connectivity. Auto Detection – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; Disable Integrated – disables Integrated Solution. |
| RFI Mitigation | This is an option intended to enable/disable DDR-RFIM feature for Connectivity. This feature may result in temporary slowdown of the DDR speed. |
| Discrete Bluetooth Interface | Serial IO UART0 needs to be enabled to select BT interface. |
| BT Tile Mode | Options: Enabled/Disabled |
| Advanced Settings | Configure ACPI objects for wireless devices Default: Disabled |
| WWAN Configuration | Configure WWAN related options. WWAN Device: enable or disable M.2 WWAN device |

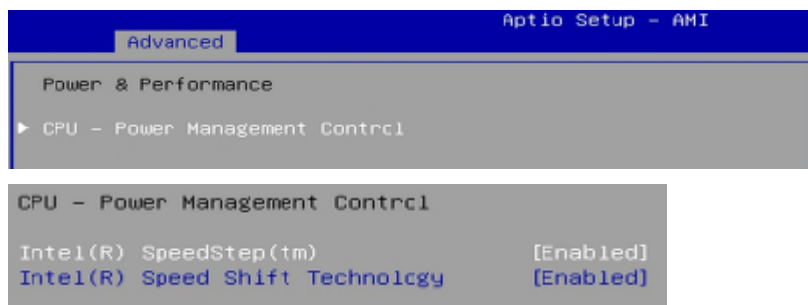
| | | |
|-------------|------------|-------------------------------------------------------------------------------------------------|
| WWAN Device | [Disabled] | Select the M.2 WWAN Device options to enable 4G - 7560/7560 (Intel), 5G - M80 (MediaTek) Modems |
|-------------|------------|-------------------------------------------------------------------------------------------------|

4.4.2 CPU Configuration



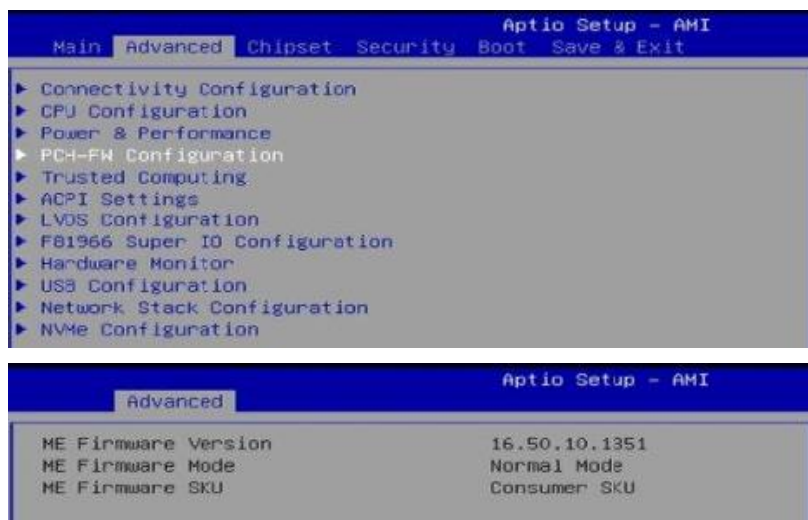
| BIOS Setting | Description |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Efficient-core Information | Displays the E-core Information. |
| Intel (VMX) Virtualization Technology | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. |
| Active Efficient-cores | Number of E-cores to enable in each processor package. Note: Number of cores and E-cores are looked at together. When both are (o,o), Pcode will enable all cores. |
| AES | Enable/Disable AES (Advanced Encryption Standard) |

4.4.3 Power & Performance



| BIOS Setting | Description |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| CPU – Power Management Control | CPU – Power Management Control Options |
| Intel Speedstep | Allows more than two frequency ranges to be supported |
| Intel Speed Shift Technology | Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states. |

4.4.4 PCH-FW Configuration



4.4.5 Trusted Computing

| Advanced | | Aptio Setup - AMI | |
|--------------------------------|--|-------------------|--|
| TPM 2.0 Device Found | | | |
| Firmware Version: | | 15.23 | |
| Vendor: | | IFX | |
| Security Device Support | | [Enable] | |
| Active PCR banks | | SHA256 | |
| Available PCR banks | | SHA256,SHA384 | |
| SHA256 PCR Bank | | [Enabled] | |
| SHA384 PCR Bank | | [Disabled] | |
| Pending operation | | [None] | |
| Platform Hierarchy | | [Enabled] | |
| Storage Hierarchy | | [Enabled] | |
| Endorsement Hierarchy | | [Enabled] | |
| Physical Presence Spec Version | | [1.3] | |
| TPM 2.0 InterfaceType | | [TIS] | |
| Device Select | | [Auto] | |

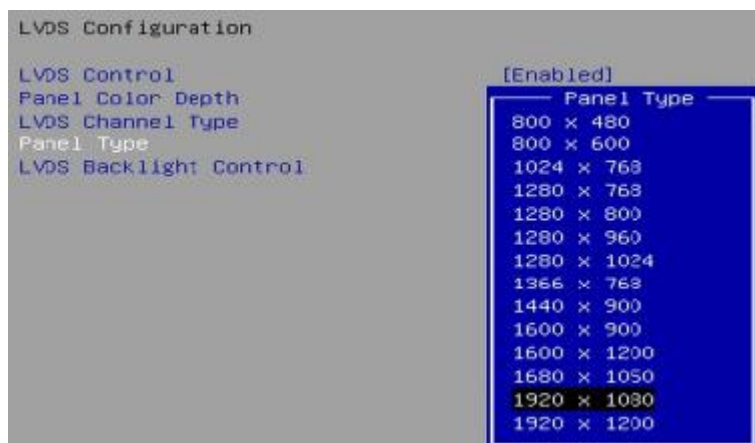
| BIOS Setting | Description |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Security Device Support | Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available. |
| SHA256 PCR Bank | Options: Enabled / Disabled |
| SHA384 PCR Bank | Options: Enabled / Disabled |
| Pending operation | Schedule an operation for the security device. Note: Your computer will reboot during restart in order to change state of security device. |
| Platform Hierarchy | Enables / Disables platform hierarchy. |
| Storage Hierarchy | Enables / Disables storage hierarchy. |
| Endorsement Hierarchy | Enables / Disables endorsement hierarchy. |
| Physical Presence Spec Version | Select to tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3. |
| Device Select | TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated. |

4.4.6 ACPI Settings



| BIOS Setting | Description |
|--------------------|------------------------------------------------------------------------------------------------------------------------|
| Enable Hibernation | Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS. |
| ACPI Sleep State | Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. |

4.4.7 LVDS Configuration

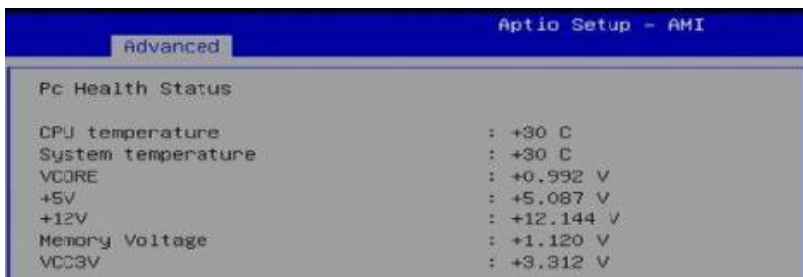


4.4.8 F81966 Super IO Configuration



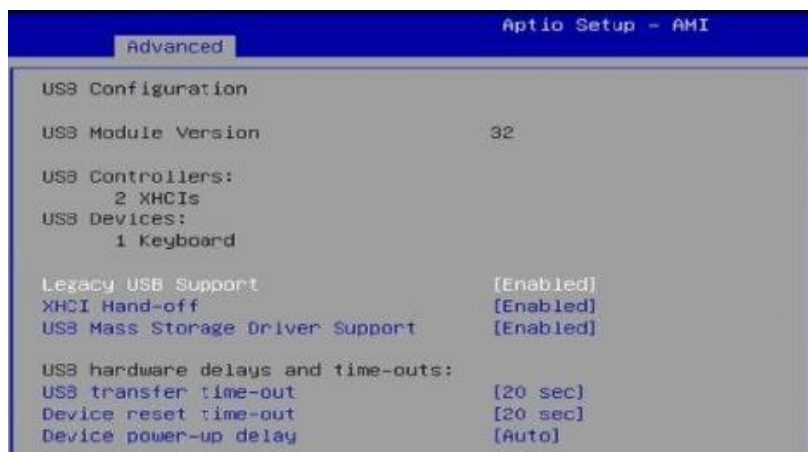
| BIOS Setting | Description |
|---------------------------|------------------------------------------------------------------------------------------|
| Serial Port Configuration | Sets parameters of Serial Port 1/2/3/4 |
| Standby Power on S5 (Eup) | Enable – provide the standby power for devices. Disable – shutdown the standby power. |

4.4.9 Hardware Monitor



| BIOS Setting | Description |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperatures / Voltages | These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status. |

4.4.11 USB Configuration



| BIOS Setting | Description |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Legacy USB Support | <ul style="list-style-type: none"> • Enabled enables Legacy USB support. • Auto disables legacy support if there is no USB device connected. • Disabled keeps USB devices available only for EFI applications. |
| XHCI Hand-off | This is a workaround for OSES without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. |
| USB Mass Storage Driver Support | Enables / Disables the support for USB mass storage driver. |
| USB Transfer time-out | The time-out value (1 / 5 10 / 20 secs) for Control, Bulk, and Interrupt transfers. |
| Device reset time-out | USB mass storage device Start Unit command time-out |
| Device power-up delay | Max.time the device will take before it properly reports itself to the Host Controller. ' Auto ' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor. |

4.4.12 Network Stack Configuration

| Advanced | | Aptio Setup - AMI |
|---------------|------------|-------------------|
| Network Stack | [Disabled] | |

| Advanced | | Aptio Setup - AMI |
|--------------------|------------|-------------------------------------------------------------------------------------------------|
| Network Stack | [Enabled] | Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available. |
| IPv4 PXE Support | [Disabled] | |
| IPv4 HTTP Support | [Disabled] | |
| IPv6 PXE Support | [Disabled] | |
| IPv6 HTTP Support | [Disabled] | |
| PXE boot wait time | 0 | |
| Media detect count | 1 | |

| Advanced | | Aptio Setup - AMI |
|--------------------|------------|---------------------------------------------------------------------------------------------------|
| Network Stack | [Enabled] | Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available. |
| IPv4 PXE Support | [Disabled] | |
| IPv4 HTTP Support | [Disabled] | |
| IPv6 PXE Support | [Disabled] | |
| IPv6 HTTP Support | [Disabled] | |
| PXE boot wait time | 0 | |
| Media detect count | 1 | |

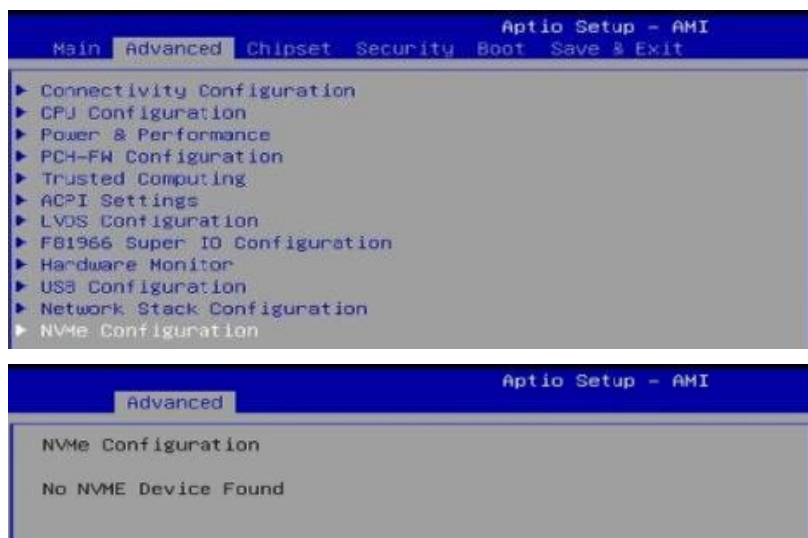
| Advanced | | Aptio Setup - AMI |
|--------------------|------------|-------------------------------------------------------------------------------------------------|
| Network Stack | [Enabled] | Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available. |
| IPv4 PXE Support | [Disabled] | |
| IPv4 HTTP Support | [Disabled] | |
| IPv6 PXE Support | [Disabled] | |
| IPv6 HTTP Support | [Disabled] | |
| PXE boot wait time | 0 | |
| Media detect count | 1 | |

| Advanced | | Aptio Setup - AMI |
|--------------------|------------|---------------------------------------------------------------------------------------------------|
| Network Stack | [Enabled] | Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available. |
| IPv4 PXE Support | [Disabled] | |
| IPv4 HTTP Support | [Disabled] | |
| IPv6 PXE Support | [Disabled] | |
| IPv6 HTTP Support | [Disabled] | |
| PXE boot wait time | 0 | |
| Media detect count | 1 | |

| Advanced | | Aptio Setup - AMI |
|--------------------|------------|---------------------------------------------------------------------------------------------------------------|
| Network Stack | [Enabled] | Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value. |
| IPv4 PXE Support | [Disabled] | |
| IPv4 HTTP Support | [Disabled] | |
| IPv6 PXE Support | [Disabled] | |
| IPv6 HTTP Support | [Disabled] | |
| PXE boot wait time | 0 | |
| Media detect count | 1 | |

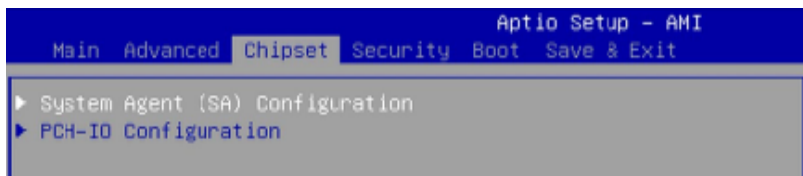
| Advanced | | Aptio Setup - AMI |
|--------------------|------------|---------------------------------------------------------------------------------------------------------|
| Network Stack | [Enabled] | Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value. |
| IPv4 PXE Support | [Disabled] | |
| IPv4 HTTP Support | [Disabled] | |
| IPv6 PXE Support | [Disabled] | |
| IPv6 HTTP Support | [Disabled] | |
| PXE boot wait time | 0 | |
| Media detect count | 1 | |

4.4.13 NVME Configuration

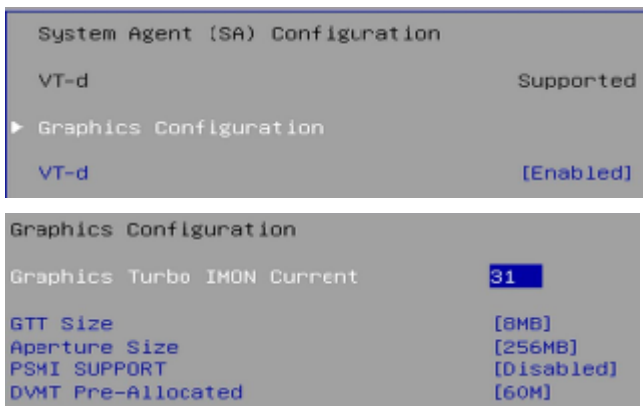


4.5 Chipset Settings

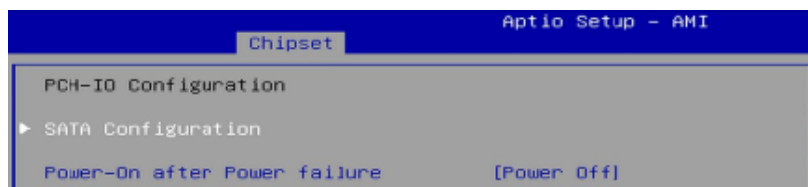
4.5.1 System Agent (SA) Configuration



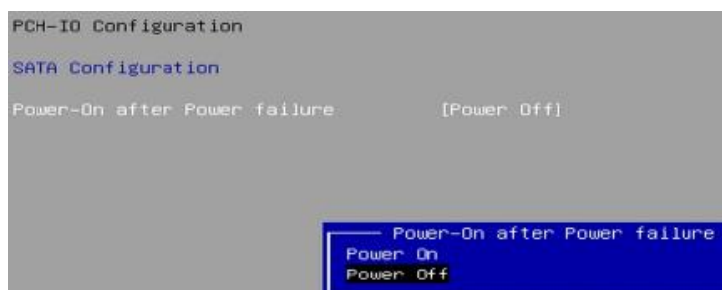
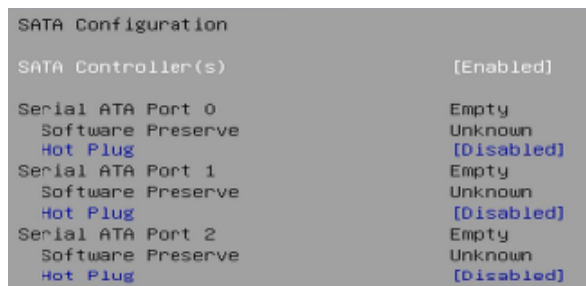
4.5.1.1. Graphics Configuration:



4.5.2 PCH-IO Configuration

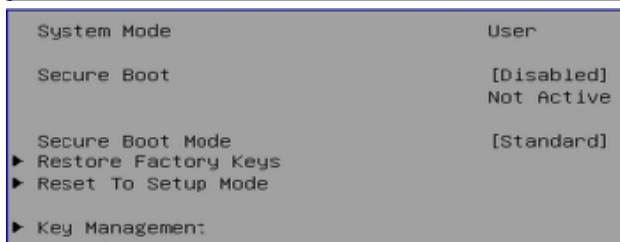


4.5.2.1 SATA Configuration:



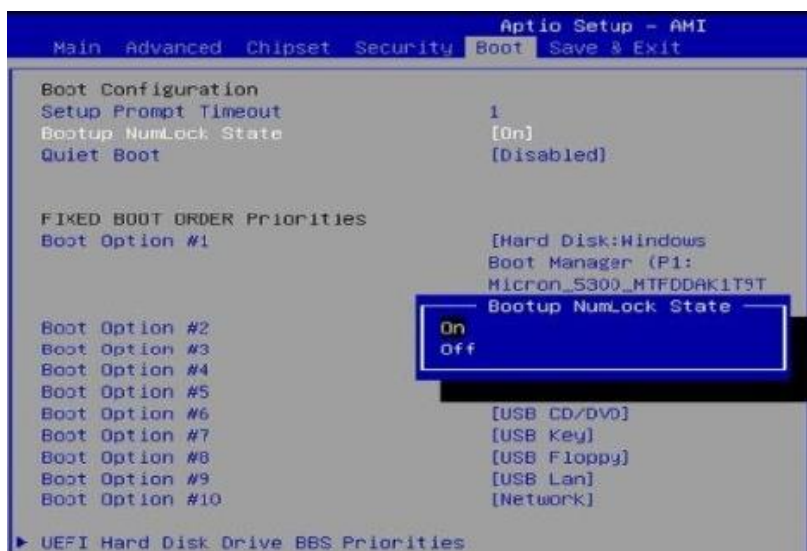
| BIOS Setting | Description |
|------------------------------|---------------------------------------------------------------------------------------|
| SATA and RST Configuration | SATA device options and settings |
| SATA Controller(s) | Enables / Disables the Serial ATA. |
| SATA Mode Selection | Selects IDE or AHCI Mode. |
| Serial ATA Port 0~2 | Enables / Disables Serial Port 0 ~ 2. |
| SATA Ports Hot Plug | Enables / Disables SATA Ports HotPlug. |
| Power-On After Power failure | Specify what state to go to when power is re-applied after a power failure (G3 state) |

4.6 Security Settings



| BIOS Setting | Description |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Setup Administrator Password | Sets an administrator password for the setup utility. |
| User Password | Sets a user password. |
| Secure Boot | Secure Boot feature is Active if Secure Boot is enabled. Platform Key(PK) is enrolled and the system is in user mode. The mode change requires platform reset. |
| Secure Boot Mode | Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication |

4.7 Boot Settings



| BIOS Setting | Description |
|-----------------------------|----------------------------------------------------------------------------------------------|
| Setup Prompt Timeout | Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting. |
| Bootup NumLock State | Selects the keyboard NumLock state. |
| Quiet Boot | Enables / Disables Quiet Boot option. |
| FIXED BOOT ORDER Priorities | Sets the system boot order. |

4.8 Save & Exit Settings



| BIOS Setting | Description |
|-----------------------------------------|----------------------------------------------------------------------------------------------------|
| Save Changes and Exit | Exits system setup after saving the changes. |
| Discard Changes and Exit | Exits system setup without saving any changes. |
| Save Changes and Reset | Resets the system after saving the changes. |
| Discard Changes and Reset | Resets system setup without saving any changes. |
| Save Changes | Saves changes done so far to any of the setup options. |
| Discard Changes | Discards changes done so far to any of the setup options. |
| Restore Defaults | Restores / Loads defaults values for all the setup options. |
| Save as User Defaults | Saves the changes done so far as User Defaults. |
| Restore User Defaults | Restores the user defaults to all the setup options. |
| Launch EFI Shell from filesystem device | Attempts to launch EFI shell application (Shell.efi) from one of the available filesystem devices. |

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Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

| Address | Device Description |
|-----------------------|-------------------------------|
| 0x00000A00-0x00000A0F | Motherboard resources |
| 0x00000A10-0x00000A1F | Motherboard resources |
| 0x00000A10-0x00000A1F | Motherboard resources |
| 0x0000002E-0x0000002F | Motherboard resources |
| 0x0000004E-0x0000004F | Motherboard resources |
| 0x00000061-0x00000061 | Motherboard resources |
| 0x00000063-0x00000063 | Motherboard resources |
| 0x00000065-0x00000065 | Motherboard resources |
| 0x00000067-0x00000067 | Motherboard resources |
| 0x00000070-0x00000070 | Motherboard resources |
| 0x00000080-0x00000080 | Motherboard resources |
| 0x00000092-0x00000092 | Motherboard resources |
| 0x000000B2-0x000000B3 | Motherboard resources |
| 0x00000680-0x0000069F | Motherboard resources |
| 0x0000164E-0x0000164F | Motherboard resources |
| 0x00000040-0x00000043 | System timer |
| 0x00000050-0x00000053 | System timer |
| 0x000003F8-0x000003FF | Communications Port (COM1) |
| 0x000002F8-0x000002FF | Communications Port (COM2) |
| 0x000003E8-0x000003EF | Communications Port (COM3) |
| 0x000002E8-0x000002EF | Communications Port (COM4) |
| 0x0000EFA0-0x0000EFBF | SMBus - 54A3 |
| 0x00001854-0x00001857 | Motherboard resources |
| 0x00000000-0x00000CF7 | PCI Express Root Complex |
| 0x00000D00-0x0000FFFF | PCI Express Root Complex |
| 0x00003090-0x00003097 | Standard SATA AHCI Controller |
| 0x00003080-0x00003083 | Standard SATA AHCI Controller |
| 0x00003060-0x0000307F | Standard SATA AHCI Controller |
| 0x00003000-0x0000303F | Intel(R) UHD Graphics |
| 0x00002000-0x000020FE | Motherboard resources |

| Address | Device Description |
|-------------------------|-----------------------------------|
| 0x00000020-0x00000021 | Programmable interrupt controller |
| 0x00000024-0x00000025 | Programmable interrupt controller |
| 0x00000028-0x00000029 | Programmable interrupt controller |
| 0x0000002C-0x0000002D | Programmable interrupt controller |
| 0x00000030-0x00000031 | Programmable interrupt controller |
| 0x00000034-0x00000035 | Programmable interrupt controller |
| 0x00000038-0x00000039 | Programmable interrupt controller |
| 0x0000003C-0x0000003D | Programmable interrupt controller |
| 0x000000A0-0x000000A1 | Programmable interrupt controller |
| 0x000000A4-0x000000A5 | Programmable interrupt controller |
| 0x000000A8-0x000000A9 | Programmable interrupt controller |
| 0x000000AC-0x000000AD | Programmable interrupt controller |
| 0x000000B0-0x000000B1 | Programmable interrupt controller |
| 0x000000B4-0x000000B5 | Programmable interrupt controller |
| 0x000000B8-0x000000B9 | Programmable interrupt controller |
| 0x000000BC-0x000000BD | Programmable interrupt controller |
| 0x0000004D0-0x0000004D1 | Programmable interrupt controller |

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

| Level | Function |
|----------------|-----------------------------------------------------------------|
| IRQ 4294967292 | Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft) |
| IRQ 0 | System timer |
| IRQ 4294967284 | Intel(R) Management Engine Interface #1 |
| IRQ 4294967287 | Intel(R) Ethernet Controller I226-IT |
| IRQ 4294967286 | Intel(R) Ethernet Controller I226-IT |
| IRQ 4294967285 | Intel(R) Ethernet Controller I226-IT |
| IRQ 4 | Communications Port (COM1) |
| IRQ 3 | Communications Port (COM2) |
| IRQ 5 | Communications Port (COM3) |
| IRQ 6 | Communications Port (COM4) |
| IRQ 19 | High Definition Audio Controller |
| IRQ 16 | Intel(R) Serial IO UART Host Controller - 54A8 |
| IRQ 55~204 | Microsoft ACPI-Compliant System |
| IRQ 256~511 | Microsoft ACPI-Compliant System |
| IRQ 4294967290 | Intel(R) Ethernet Controller I226-IT #2 |
| IRQ 4294967289 | Intel(R) Ethernet Controller I226-IT #2 |
| IRQ 4294967288 | Intel(R) Ethernet Controller I226-IT #2 |
| IRQ 4294967294 | Standard SATA AHCI Controller |
| IRQ 4294967293 | Intel(R) UHD Graphics |
| IRQ 4294967291 | Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft) |
| IRQ 14 | Intel(R) Serial IO GPIO Host Controller - INT1057 |
| IRQ 1 | Standard PS/2 Keyboard |
| IRQ 12 | Microsoft PS/2 Mouse |

C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81966.H"
//-----

int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//-----

int main (int argc, char *argv[])
{
    unsigned char bBuf;
    unsigned char bTime;
    char **endptr;

    char SIO;

    printf("Fintek 81966 watch dog program\n");
    SIO = Init_F81966();
    if (SIO == 0)
    {
        printf("Can not detect Fintek 81966, program abort.\n");
        return(1);
    }
    if (SIO == 0)

    if (argc != 2)
    {
        printf(" Parameter incorrect!\n");
        return (1);
    }
}
```

```

bTime = strtol(argv[1], endptr, 10);
printf("System will reset after %d seconds\n", bTime);

if (bTime)
{
    EnableWDT(bTime);
}
else
{
    DisableWDT();
}
return 0;
}

//-----
void EnableWDT(int interval)
{
    unsigned char bBuf;

    bBuf = Get_F81966_Reg(0x2B);
    bBuf &= (~0x20);
    Set_F81966_Reg(0x2B, bBuf);           //Enable WDTO

    Set_F81966_LD(0x07);                  //switch to logic device 7
    Set_F81966_Reg(0x30, 0x01);          //enable timer

    bBuf = Get_F81966_Reg(0xF5);
    bBuf &= (~0x0F);
    bBuf |= 0x52;
    Set_F81966_Reg(0xF5, bBuf);          //count mode is second

    Set_F81966_Reg(0xF6, interval);       //set timer

    bBuf = Get_F81966_Reg(0xFA);
    bBuf |= 0x01;
    Set_F81966_Reg(0xFA, bBuf);          //enable WDTO output

    bBuf = Get_F81966_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81966_Reg(0xF5, bBuf);          //start counting
}

//-----
void DisableWDT(void)
{
    unsigned char bBuf;

    Set_F81966_LD(0x07);                  //switch to logic device 7

    bBuf = Get_F81966_Reg(0xFA);
    bBuf &= ~0x01;
    Set_F81966_Reg(0xFA, bBuf);          //disable WDTO output

    bBuf = Get_F81966_Reg(0xF5);
    bBuf &= ~0x20;
    bBuf |= 0x40;
    Set_F81966_Reg(0xF5, bBuf);          //disable WDT
}

//-----

```



```

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81966.H"
#include <dos.h>
//-----
unsigned int F81966_BASE;
void Unlock_F81966 (void);
void Lock_F81966 (void);
//-----
unsigned int Init_F81966(void)
{
    unsigned int result;
    unsigned char ucDid;

    F81966_BASE = 0x4E;
    result = F81966_BASE;

    ucDid = Get_F81966_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81966
    {
        goto Init_Finish;
    }

    F81966_BASE = 0x2E;
    result = F81966_BASE;

    ucDid = Get_F81966_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81966
    {
        goto Init_Finish;
    }

    F81966_BASE = 0x00;
    result = F81966_BASE;

Init_Finish:
    return (result);
}
//-----
void Unlock_F81966 (void)
{
    outputb(F81966_INDEX_PORT, F81966_UNLOCK);
    outputb(F81966_INDEX_PORT, F81966_UNLOCK);
}
//-----
void Lock_F81966 (void)
{
    outputb(F81966_INDEX_PORT, F81966_LOCK);
}
//-----
void Set_F81966_LD( unsigned char LD)
{
    Unlock_F81966();
    outputb(F81966_INDEX_PORT, F81966_REG_LD);
    outputb(F81966_DATA_PORT, LD);
}

```

```

        Lock_F81966();
    }
//-----
void Set_F81966_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_F81966();
    outportb(F81966_INDEX_PORT, REG);
    outportb(F81966_DATA_PORT, DATA);
    Lock_F81966();
}
//-----

unsigned char Get_F81966_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_F81966();
    outportb(F81966_INDEX_PORT, REG);
    Result = inportb(F81966_DATA_PORT);
    Lock_F81966();
    return Result;
}
//-----

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#ifndef F81966_H
#define F81966_H                1
//-----
#define F81966_INDEX_PORT      (F81966_BASE)
#define F81966_DATA_PORT      (F81966_BASE+1)
//-----
#define F81966_REG_LD          0x07
//-----
#define F81966_UNLOCK          0x87
#define F81966_LOCK            0xAA
//-----
unsigned int Init_F81966(void);
void Set_F81966_LD( unsigned char);
void Set_F81966_Reg( unsigned char,
unsigned char); unsigned char
Get_F81966_Reg( unsigned char);
//-----
#endif // F81966_H

```

D. Onboard Connector Reference Types

| Function | Connector | Onboard Type | Compatible Mating Type |
|---------------------|-----------|--------------------------------------------|----------------------------------|
| Audio | J7 | Hao Guo Xing Ye DF11-12S-PA66H | Hirose DF11-12DS-2C |
| SATA HDD Power | J8 | E-CALL 0110-071-040 | JST XHP-4 |
| Front Panel Setting | J23 | E-CALL 2.0 mm-pitch pin header (Female) | Dupont 2.0 mm-pitch (Female) |
| USB 2.0 | J5 | Hao Guo Xing Ye DF11-8S-PA66H | Hirose DF11-8DS-2C |
| COM2 Serial Port | J18 | Hao Guo Xing Ye DF11-10S-PA66H | Hirose DF11-10DS-2C |
| DC Power Input | J4 | Hao Guo Xing Ye WAFER396-2S-WV | JST VHR-2N |
| Digital I/O | J22 | Dupont 2.00 mm-pitch pin header (Male) | Dupont 2.00 mm-pitch (Female) |
| LCD Backlight | J20 | E-CALL 0110-161-040 | JST PHR-4. |
| LVDS | J10, J16 | Hirose DF20G-20DP-1V | Hirose DF20A-20DS-1C |
| eDP | CN2 | KEL SSL00-40S | KEL SSL20-40S |

E. USB Power Control Mapping

| Function | Connector | Software Mapping |
|----------|-----------|------------------|
| USB | CN7 | bit_2 |