IB839

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

User's Manual

Version 1.0A
(November 2025)

iBASE

Compliance

CE

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.

FC

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.

Table of Contents

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 +12 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

- Audio cable (Audio-18)
- 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

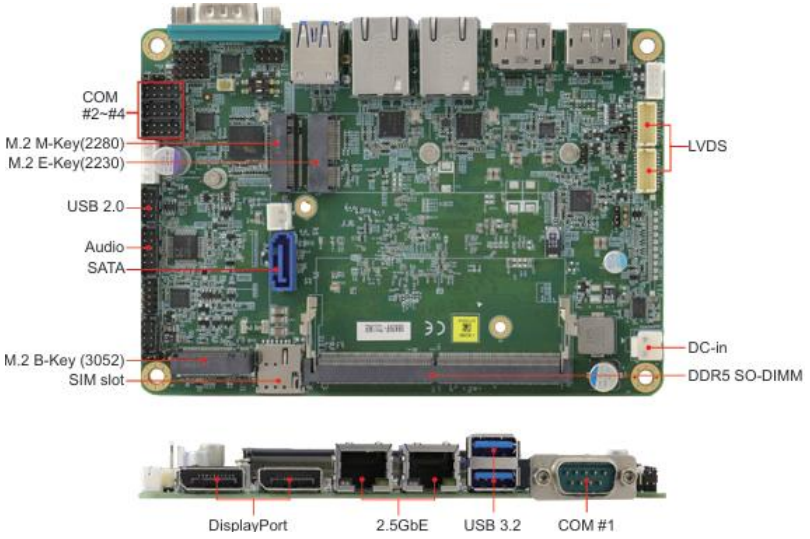
Model Name	Description
IB839F-7211RE	Intel® Atom® x7211RE SoC on board 3.5-inch SBC, w/ 2x 2.5GbE LAN, 2x DP, LVDS, 4x COM, 3x M.2, TPM, EuP/ErP, +12V~24V DC-in
IB839FE-N97	Intel® N97 SoC on board 3.5-inch SBC, w/ 2x 2.5GbE LAN, 2x DP, eDP, 4x COM, 3x M.2, TPM, EuP/ErP, +12V~24V DC-in
IB839F-7211RE	Intel®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

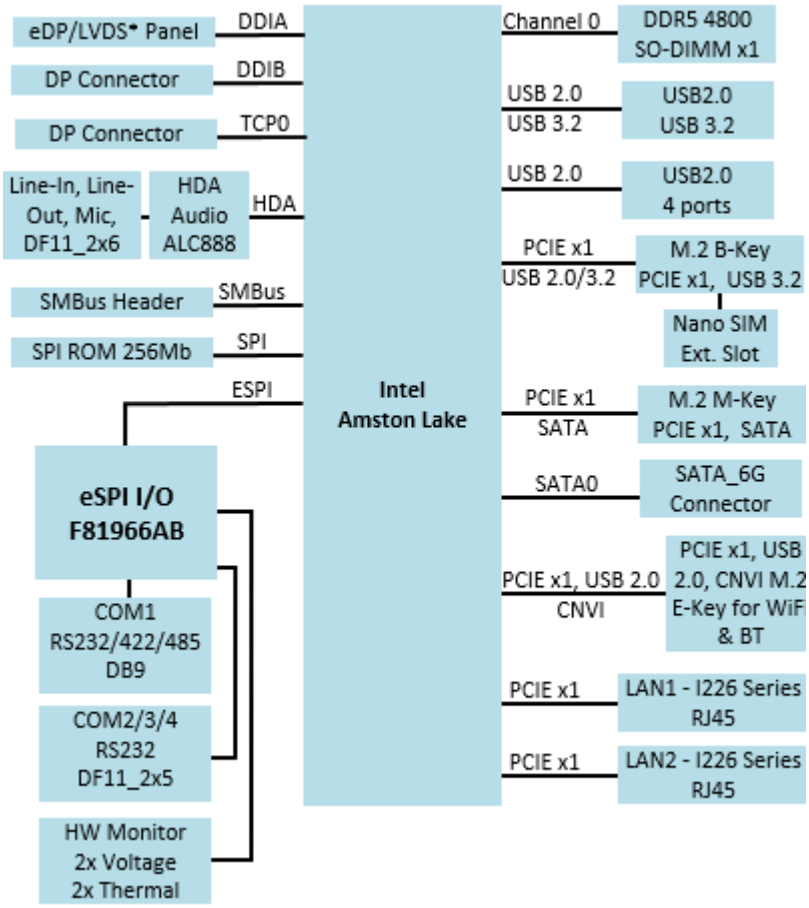
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec / min)
Others	EuP/ErP
Dimensions	102mm x 147mm (4" x 5.8")

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.

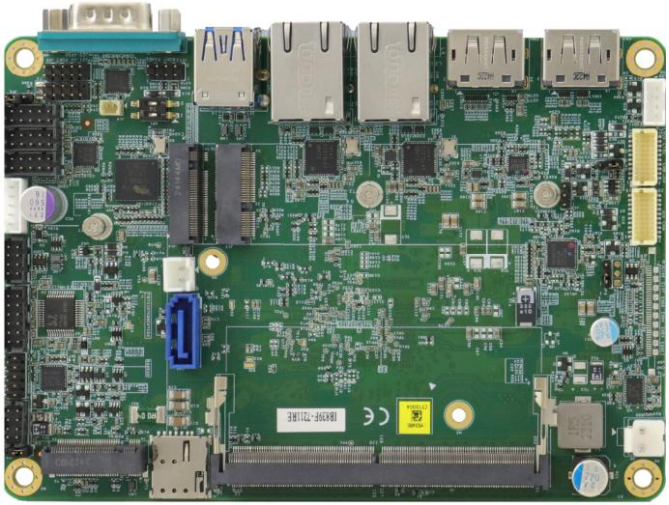


Block Diagram

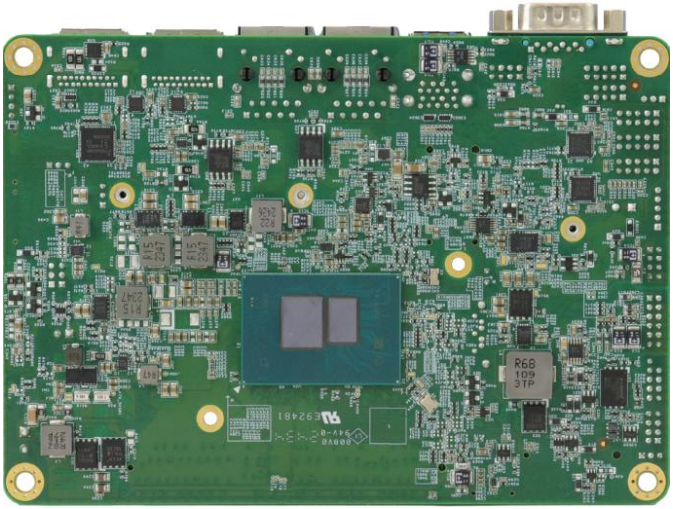


1.6 Board Pictures

Top View



Bottom View

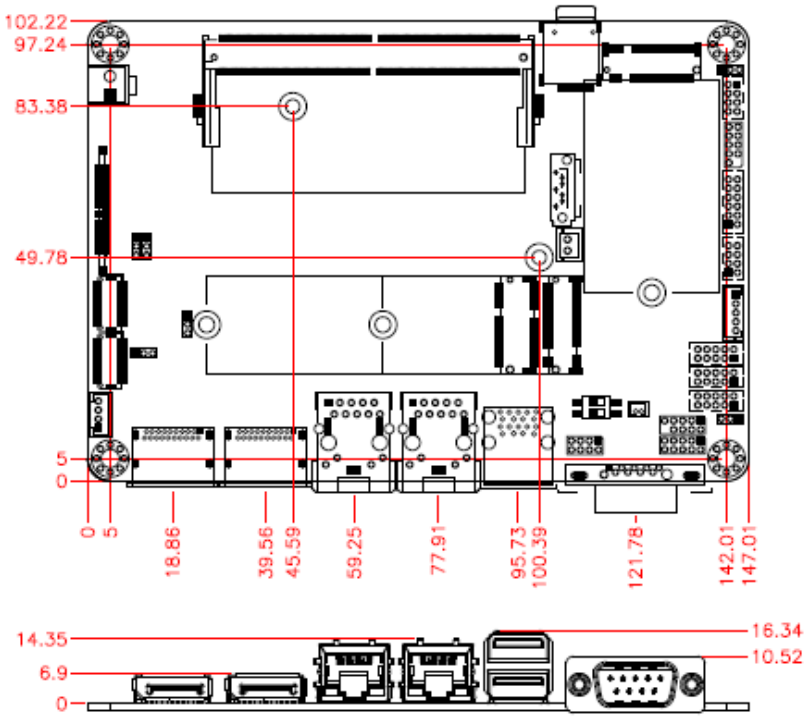


* The photos are for reference only. Some minor components may differ.

I/O View

Oblique View

1.7 Dimensions



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Chapter 2
Hardware Configuration

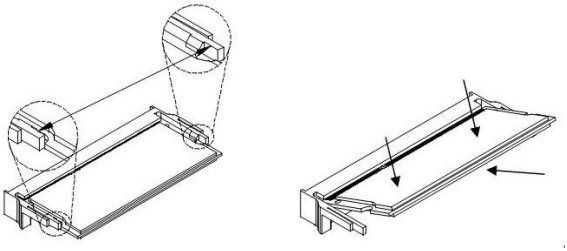
This section provides information on jumper settings and connectors on the IB839in order to set up a workable system. On top of that, you will also need to install crucial pieces such as the CPU and the memory before using the product. The topics covered are:

- 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.

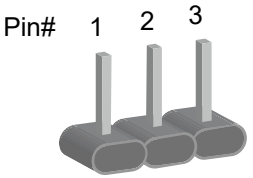
To remove the module, press the clips outwards with both hands, and the module will pop-up.

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

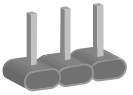
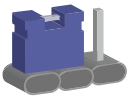
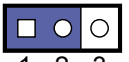
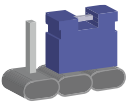
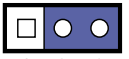
Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.



A 3-pin jumper

A jumper cap

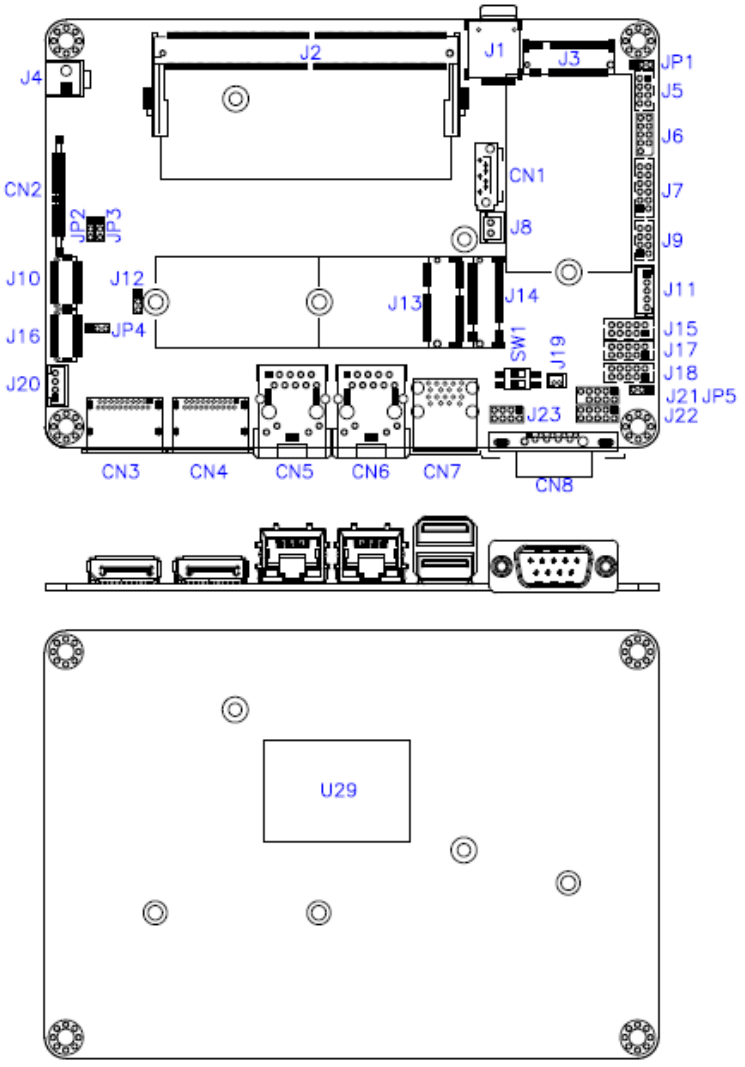
Refer to the illustration below to set jumpers.

Pin closed	Jumper	Setting
Open		
1-2		
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**.

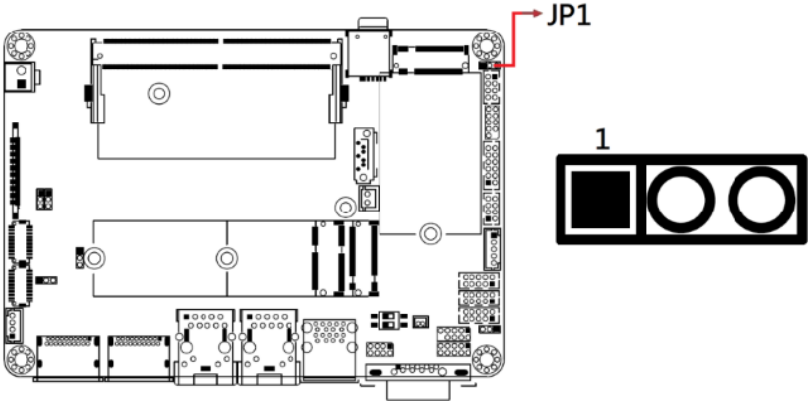
2.3 Jumper & Connector Locations



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

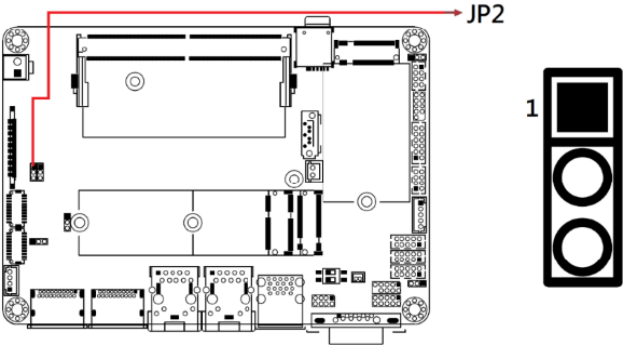
2.4.1 Sierra Module Interface Selection (JP1)



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

Note: This is via J3.

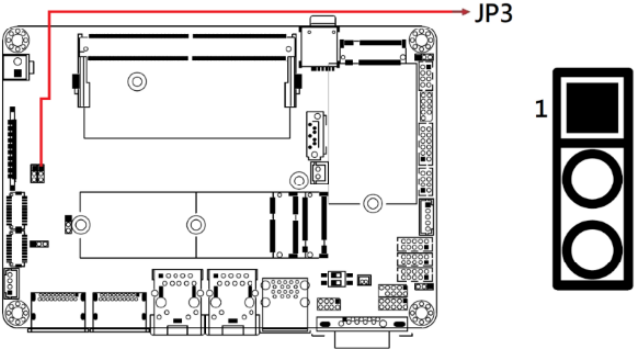
2.4.2 eDP Panel Power Selection (JP2)



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

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

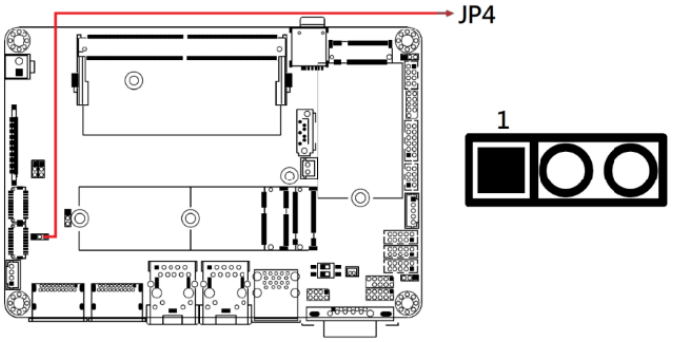
2.4.3 LVDS Panel Brightness Selection (JP3)



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

Note: This is for setting Pin3 voltage of J20.

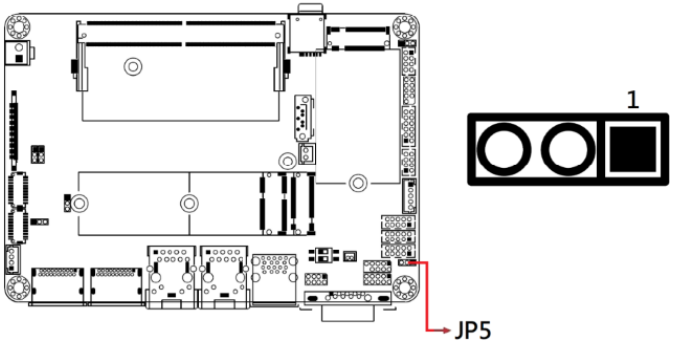
2.4.4 LVDS Panel Power Selection (JP4)



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.

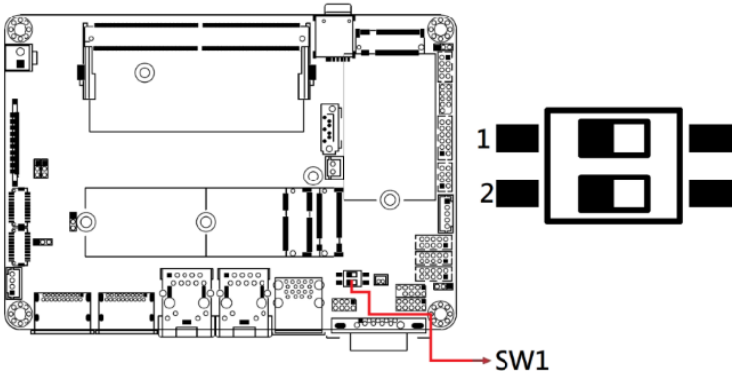
2.4.5 AT / ATX Selection (JP5)



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

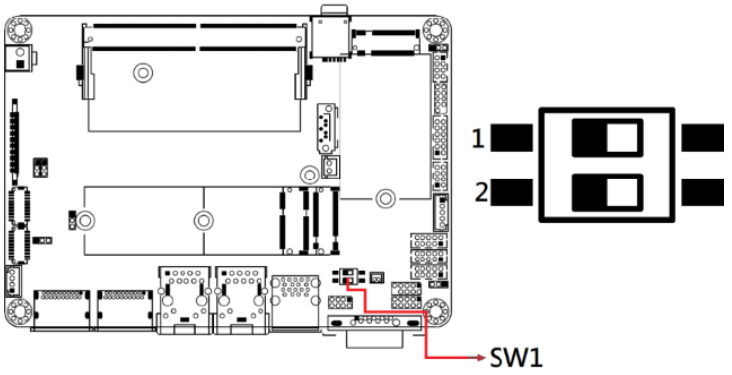
Note: AT: Auto power on; ATX: Manual power on

2.4.6 Clear CMOS Data (SW1)



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

2.4.7 Clear ME Register (SW1)

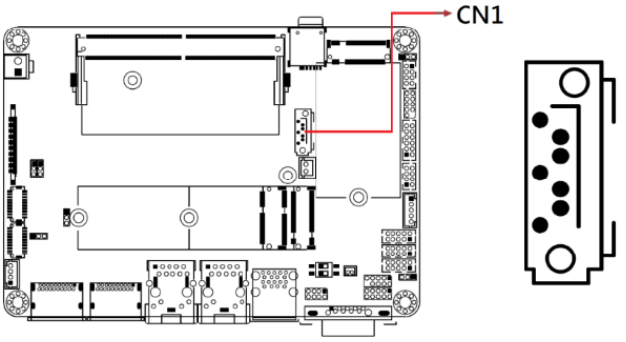


Function	Setting
Normal (default)	P2-OFF
Clear ME Register	P2-ON

2.5 Connectors Quick Reference

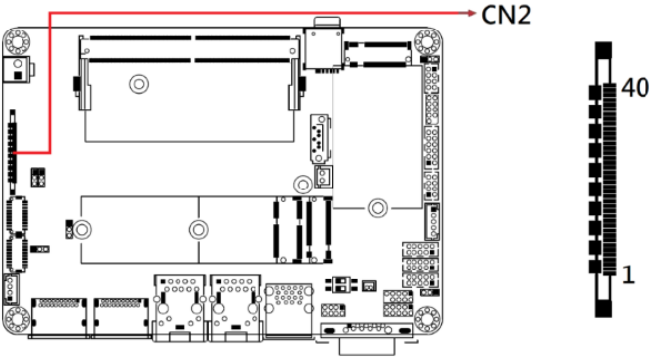
Function	Connector
SATA Connectors	CN1
eDP Connector	CN2
DP Connectors	CN3, CN4
LAN Connectors	CN5, CN6
USB 3.2 Connector	CN7
COM1 RS-232/422/485 Serial Port	CN8
Nano SIM Card Slot	J1
DDR5 SO-DIMM Connector	J2
M.2 B-Key 3052 Connector	J3
DC Power Input Connector	J4
USB 2.0 Connector	J5
SPI Flash Tool 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

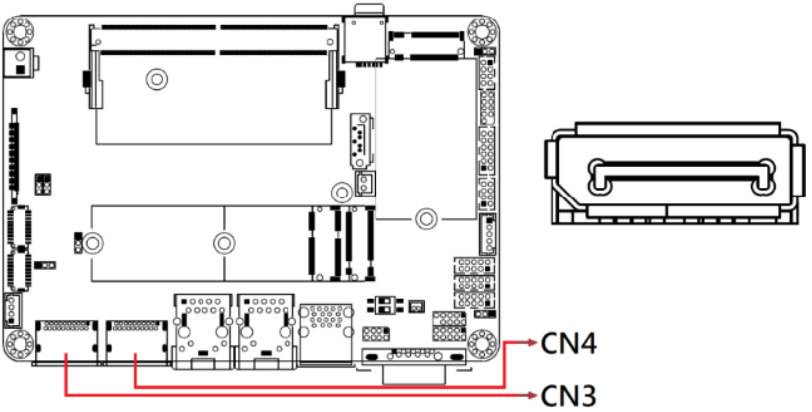
Pin27, Pin36 Total current: 1A

Pin28, Pin35 Total current: 1A

Pin31 Total current: 0.5A

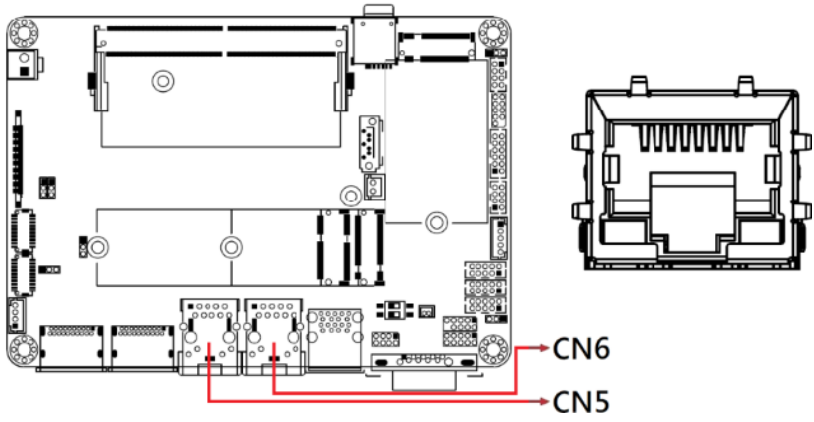
Pin	Assignment	Pin	Assignment
1	eDP Vcc	21	TXN0
2	eDP Vcc	22	TXP1
3	eDP Vcc	23	Ground
4	eDP Vcc	24	AUXP
5	eDP Vcc	25	AUXN
6	Ground	26	NC
7	Ground	27	+3.3V
8	Ground	28	EDP BKLT (+12V)
9	Ground	29	NC
10	Hot Plug detect	30	Ground
11	Ground	31	+5V
12	TXN3	32	NC
13	TXP3	33	Back Light Control
14	Ground	34	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)

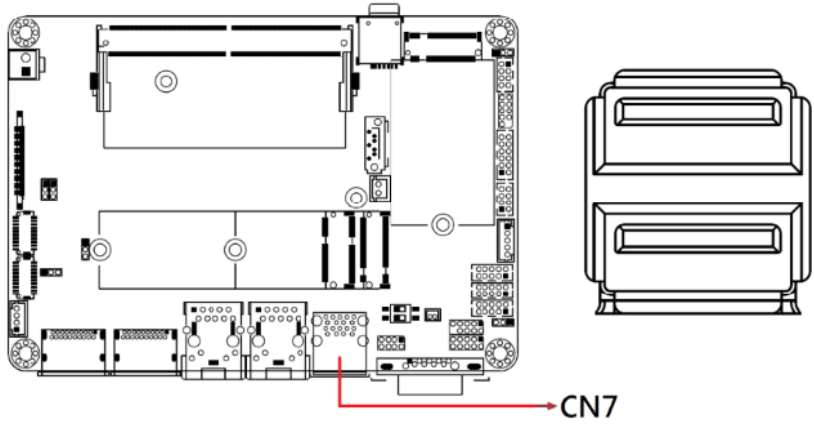


Pin	Assignment	Pin	Assignment
1	LAN0_P	11	GND
2	GND	12	LAN3_N
3	LAN0_N	13	CONFIG
4	LAN1_P	14	GND
5	GND	15	AUXP
6	LAN1_N	16	GND
7	LAN2_P	17	AUXN
8	GND	18	Hot Plug
9	LAN2_N	19	GND
10	LAN3_P	20	+3.3V/0.5A

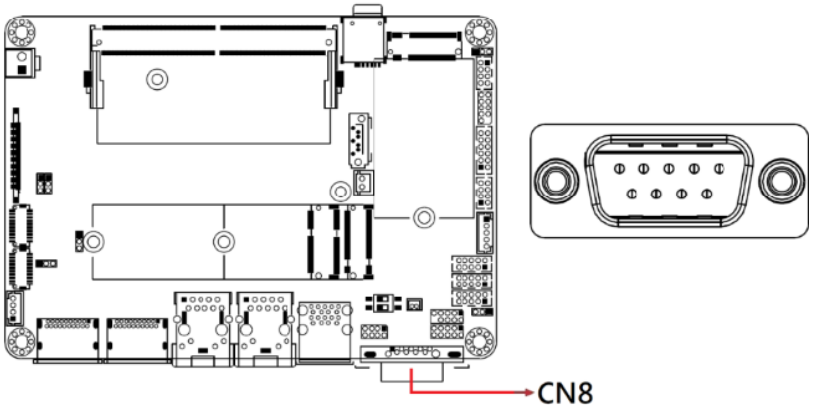
2.5.4 LAN Connectors (CN5, CN6)



2.5.5 USB 3.2 Connector (CN7)



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

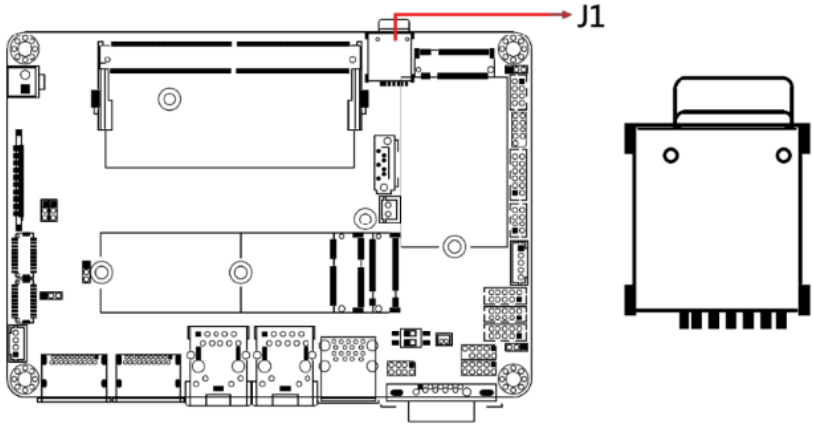


**COM1 port is jumper-less and configurable in BIOS.*

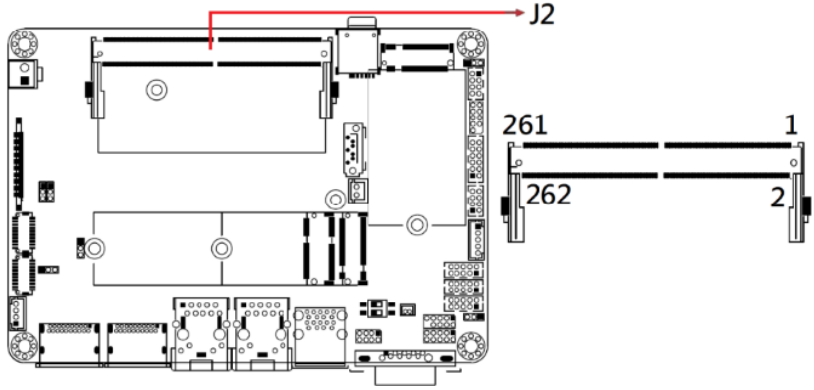
Pin	Assignment	Pin	Assignment
1	DCD,Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

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

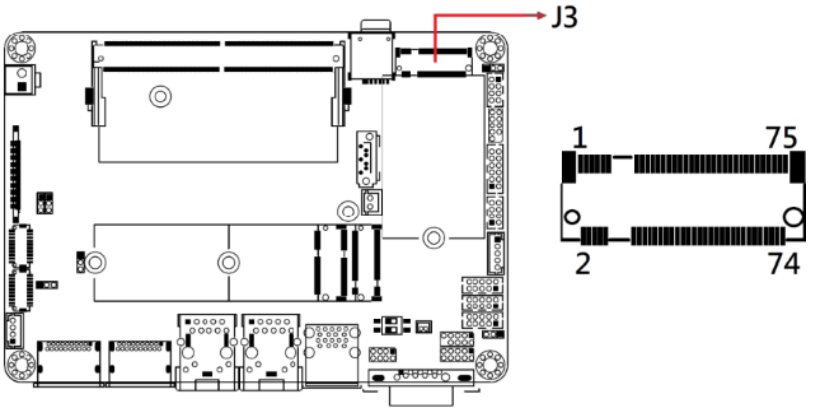
2.5.7 Nano SIM Card Slot (J1)



2.5.8 DDR5 SO-DIMM Connector (J2)

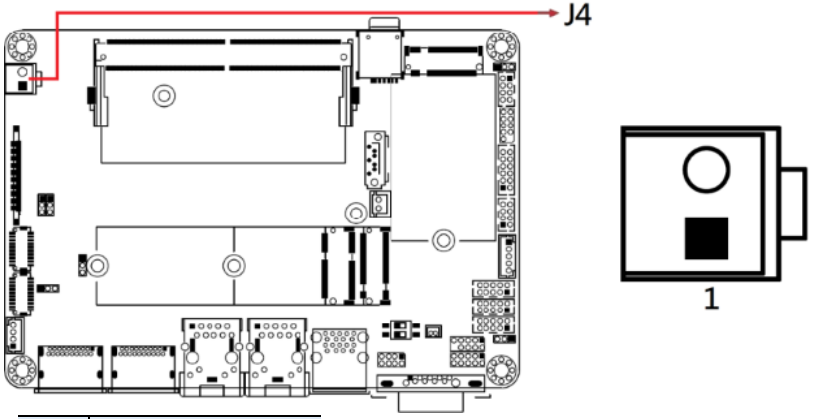


2.5.9 M.2 B-Key 3052 Connector (J3)



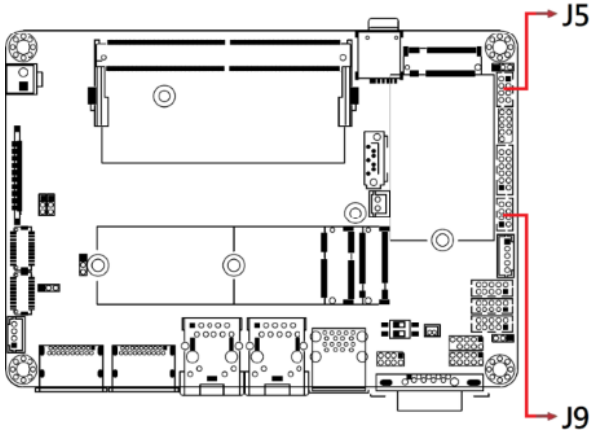
With sierra LTE card, USB/PCIE I/F is configurable by JP5, JP6.

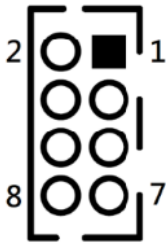
2.5.10 DC Power Input Connector (J4)



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

2.5.11 USB 2.0 Connector (J5)

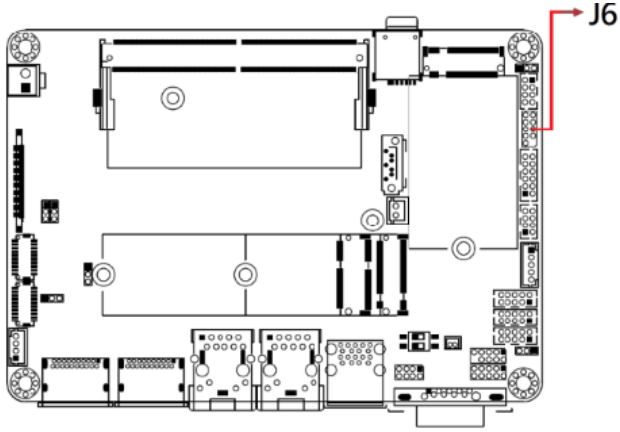


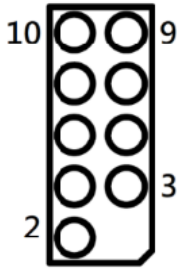


Remarks: HK_DF11-8S-PA66H

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

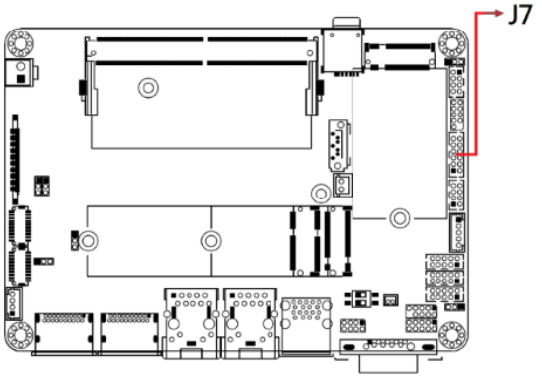
2.5.12 SPI Flash Tool Connector (J6)

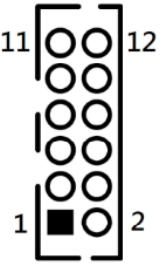




Remarks: Factory use only.

2.5.13 Audio Connector (J7)

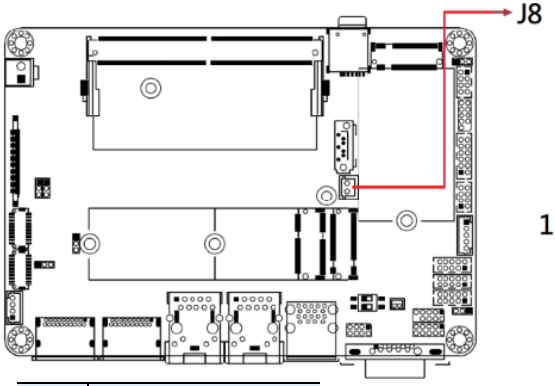


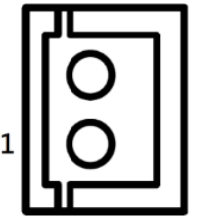


Remarks: HK_DF11-12S-PA66H

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)

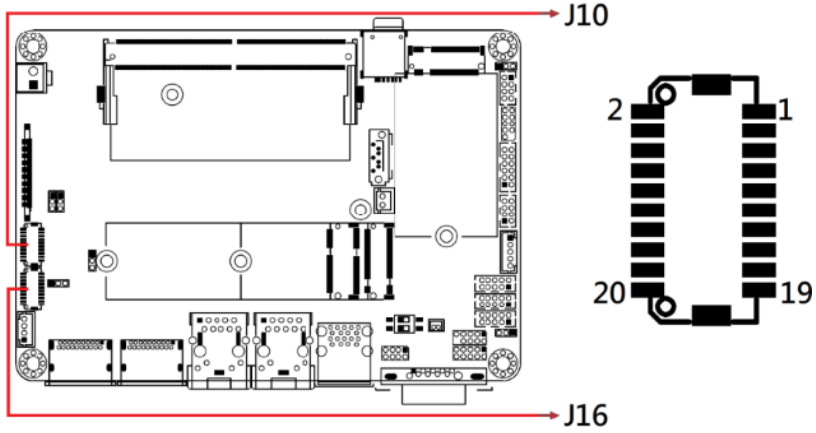




Pin	Assignment
1	VCC5
2	Ground

2.5.2 LVDS Connectors (J10, J16)

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

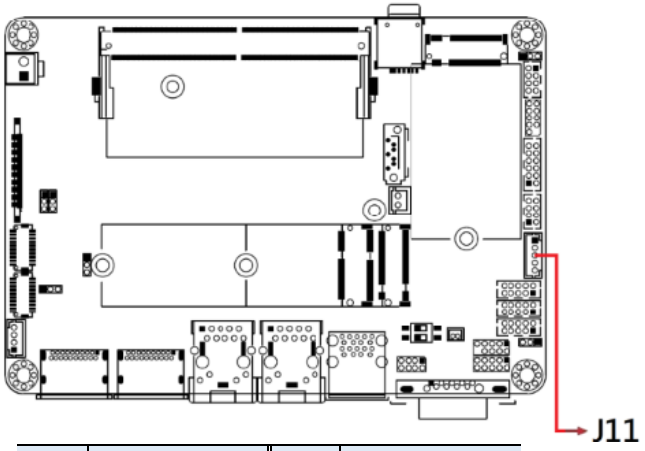


Remarks: HIROSE_DF20G-20DP-1V(56)

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

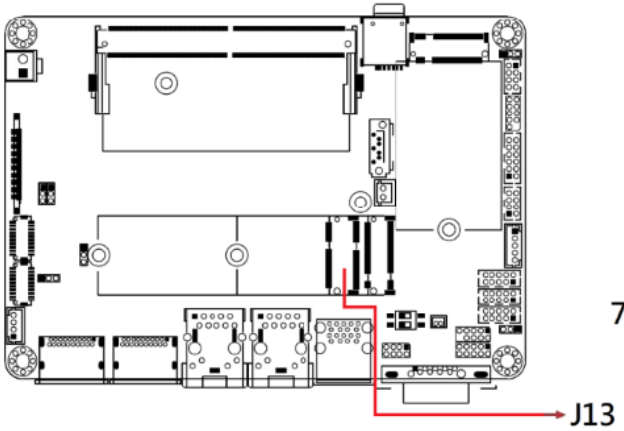
Pin	Assignment	Pin	Assignment
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	Power	20	Power

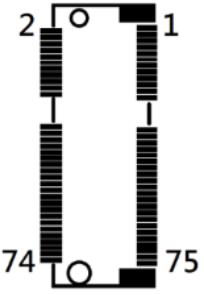
2.5.3 SMBUS Connector (J11)



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

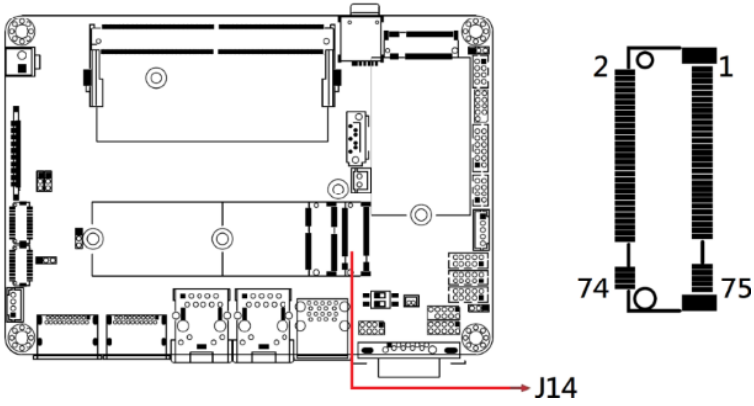
2.5.4 M.2 E-Key 2230 Connector (J13)



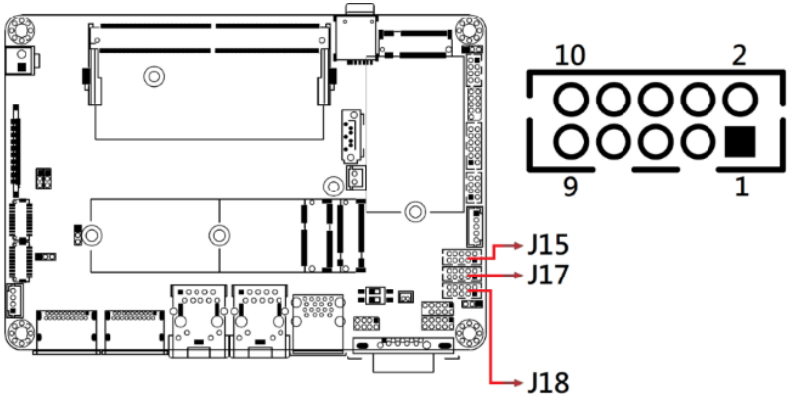


**Supports CNVI Card*

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



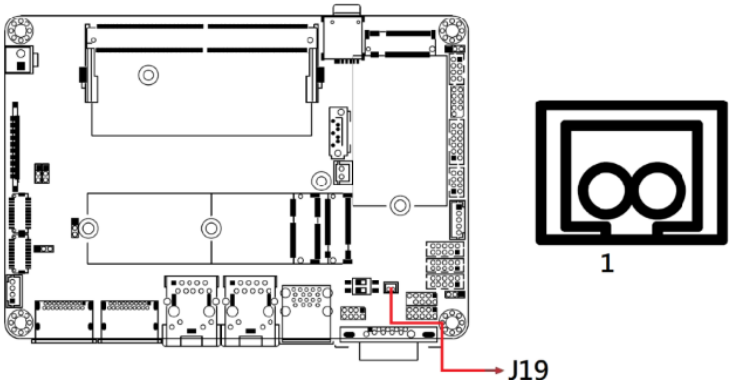
2.5.2 COM2, COM3, COM4 RS-232 Ports (J18, J17, J15)



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

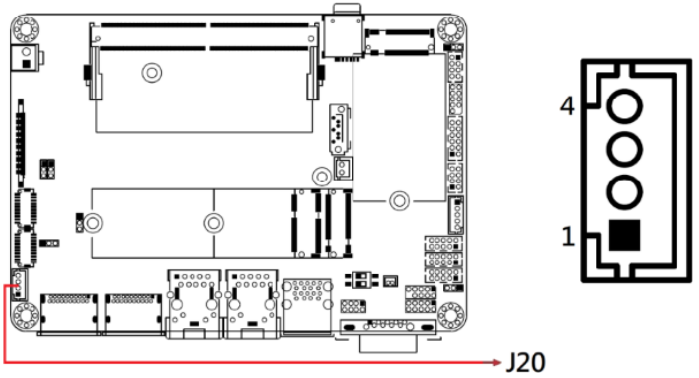
2.5.3 RTC Battery Connector (J19)



Note: Coin battery with cable.

Pin	Assignment
1	+3V
2	Ground

2.5.4 LVDS Backlight Connector (J20)

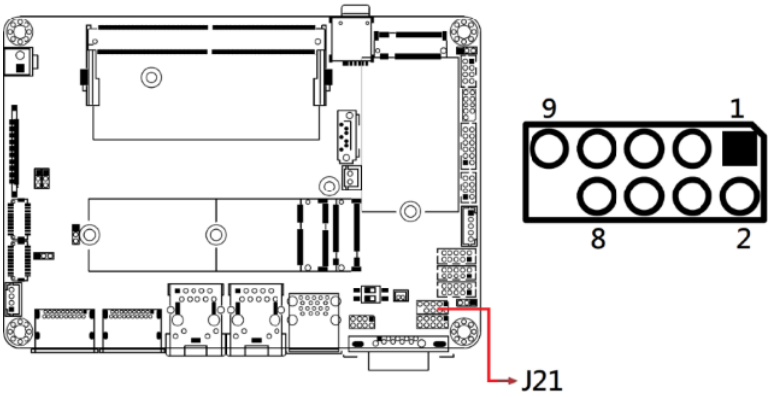


Remarks: E-CALL_0110-161-040

Note: Use JP2 to set Pin3 voltage.

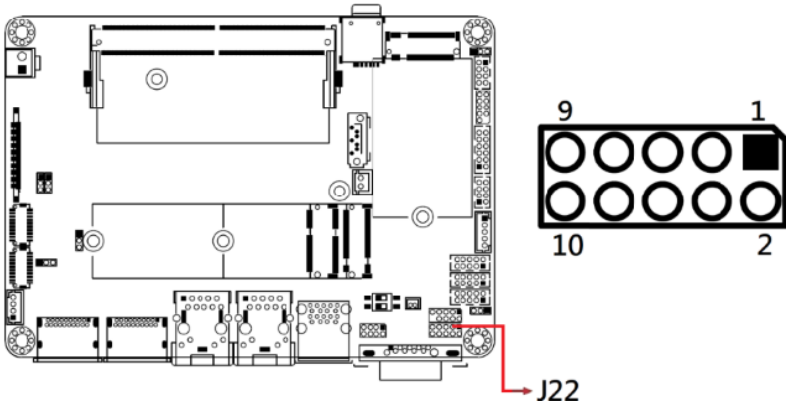
Pin	Assignment	Pin	Assignment
1	+12V/1.5A	3	Brightness Control
2	Backlight Enable	4	Ground

2.5.5 80 Port Debug Tool Connector (J21)



Remarks: Factory use only.

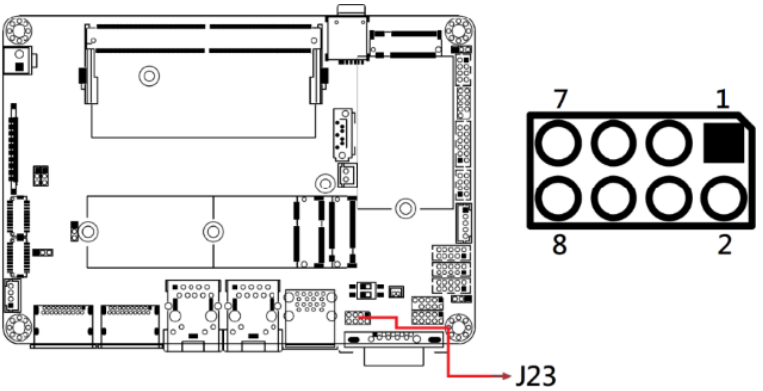
2.5.6 Digital I/O Connector (J22)



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.

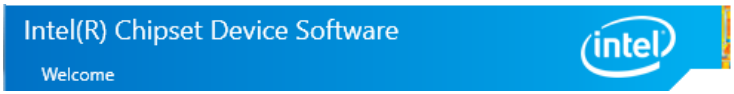
3.2 Intel® Chipset Software Installation Utility

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.

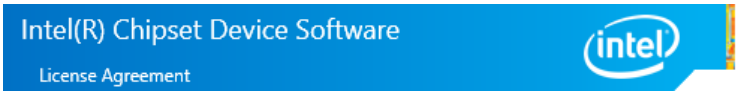
1. Go to the download page of the product. Copy the compressed drivers file to your computer. Double click the file to decompress it. Run "CDGuide" to go to the main drivers page as shown below. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) Amston Lake Chipset Drivers** on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

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

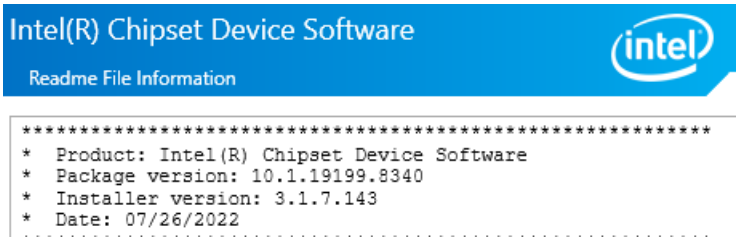
3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.



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



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

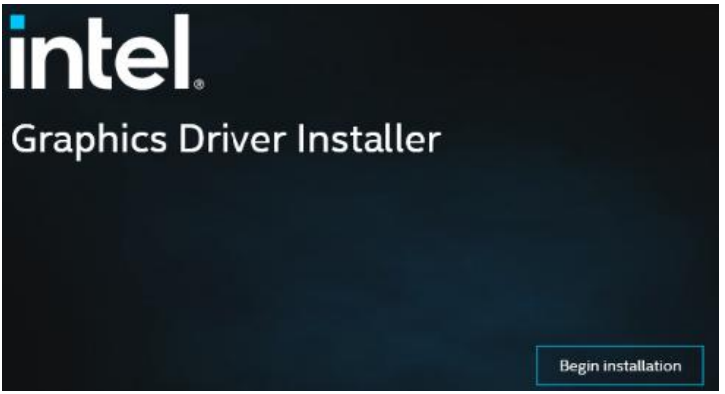


6. After completing the installation, click **Finish** to complete the setup process.

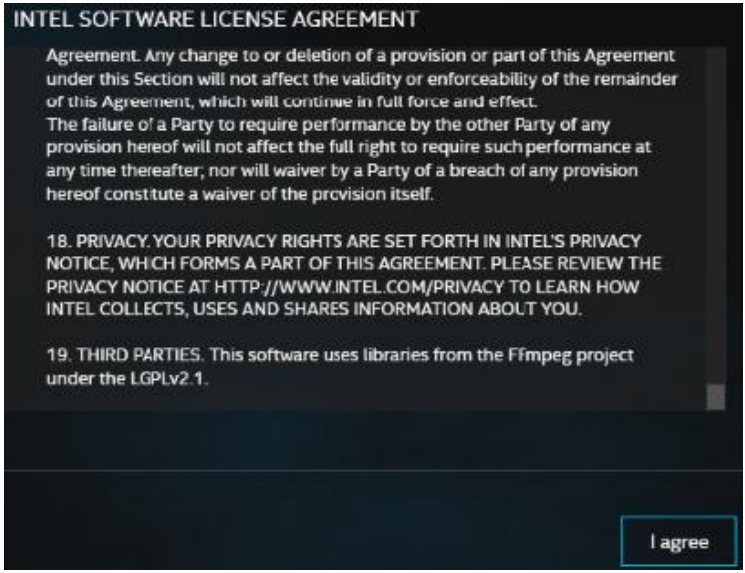
3.3 VGA Driver Installation

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**.

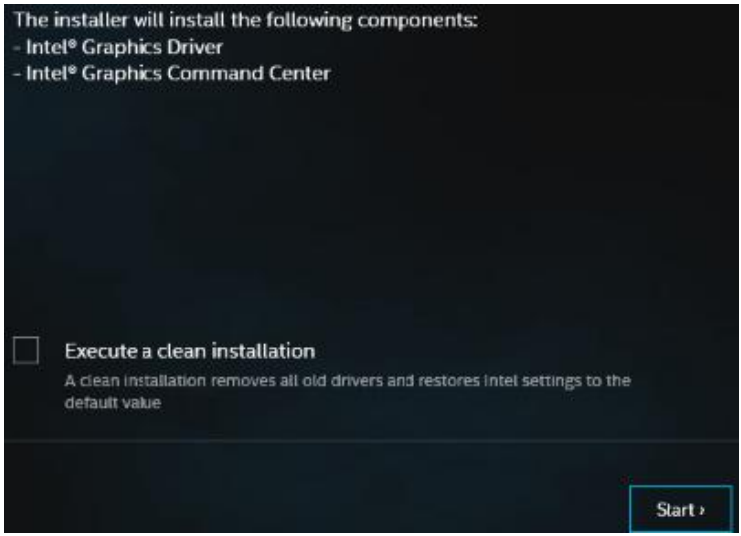
3. Click **Begin installation**.



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



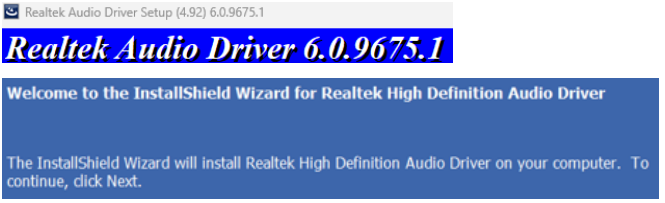
5. On the next screen, click **Start and** then click **Finish** when installation has been completed.



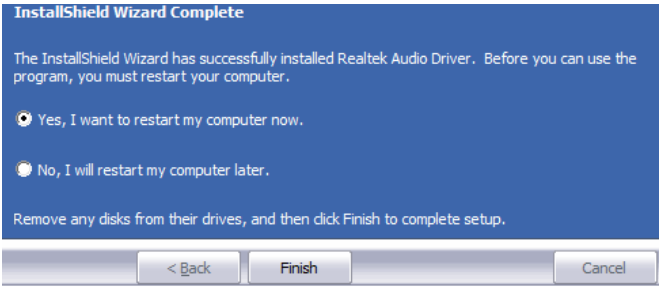
3.4 Realtek Audio Driver Installation

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**.

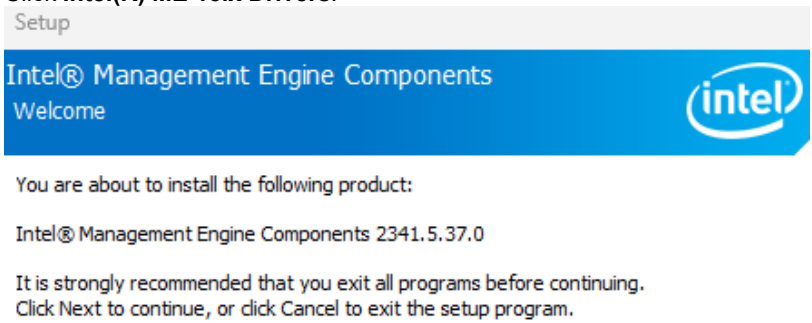


4. Realtek Audio Driver will configure the new software installation. After the InstallShield Wizard has successfully installed Realtek Audio Driver, restart the computer to use the program. Click **Finish**.

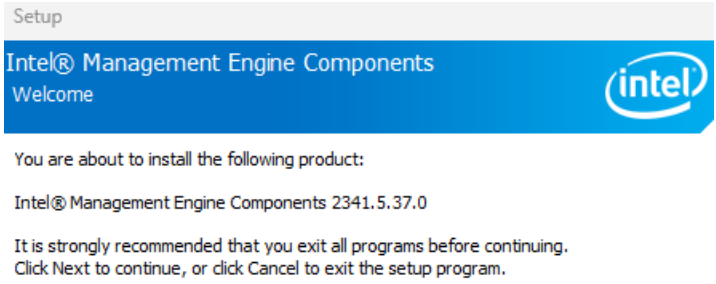


3.6 Intel® Management Engine Drivers Installation

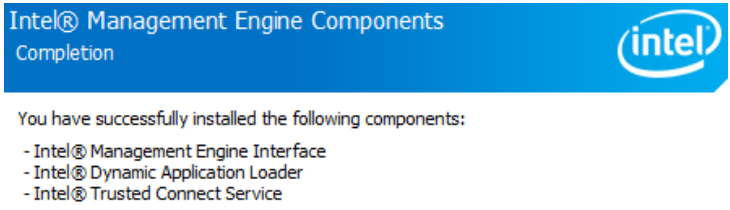
1. Click **Intel** on the left pane and then **Intel(R) Amston Lake Chipset Drivers** on the right pane.
2. Click **Intel(R) ME 15.x Drivers**.



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



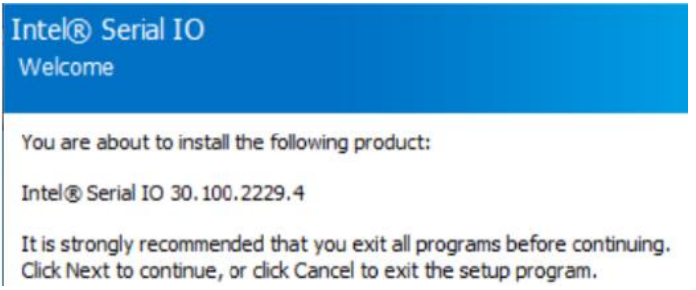
4. Accept the license agreement and click **Next**.
5. Cick **Next** to install to the default folder, or click Change to choose another destination folder
6. After Intel Management Engine Components have been successfully installed, click **Finish**.



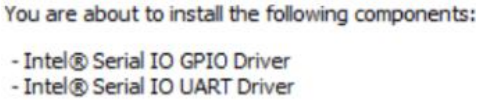
3.7 Intel(R) Serial IO Drivers Installation

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**.

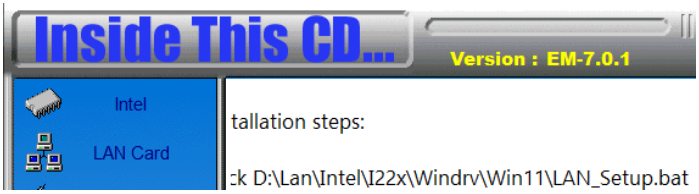


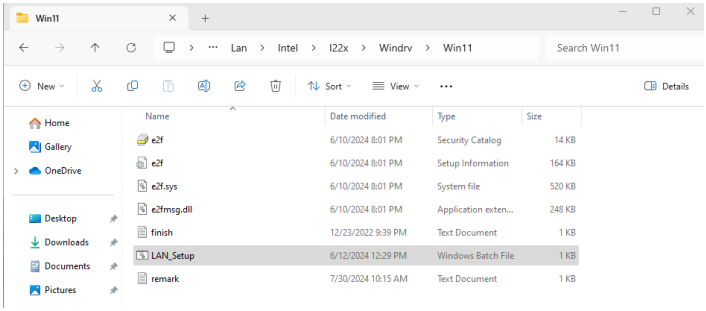
7. When installation has been completed, click **Finish**.

3.8 LAN Driver Installation

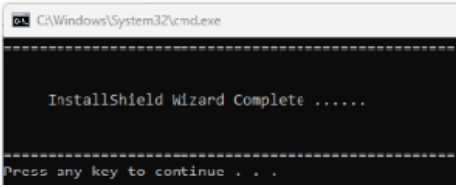
1. Click **LAN Card** on the left pane and then **Intel LAN Controller Drivers**. Click **Intel(R) I22x 2.5G Network Drivers** .

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 <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> 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
```

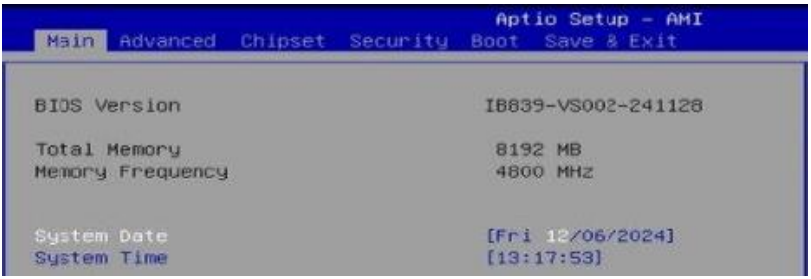
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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

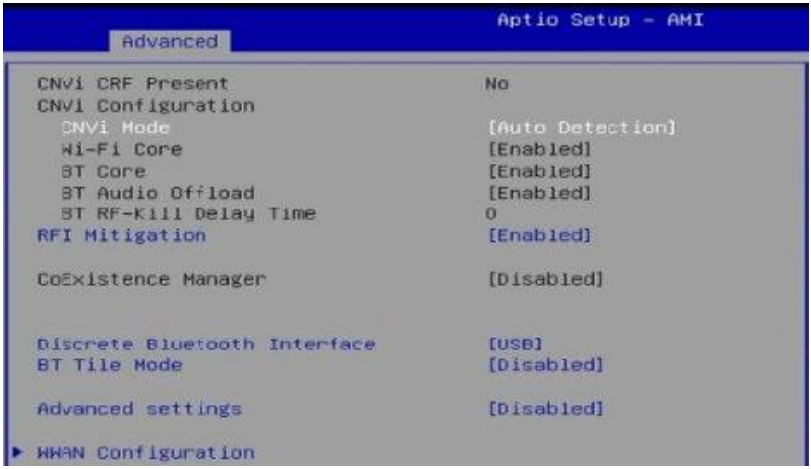


BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the date elements.
System Time	Set the time. Use the <Tab> key to switch between the time elements.

4.4 Advanced Settings

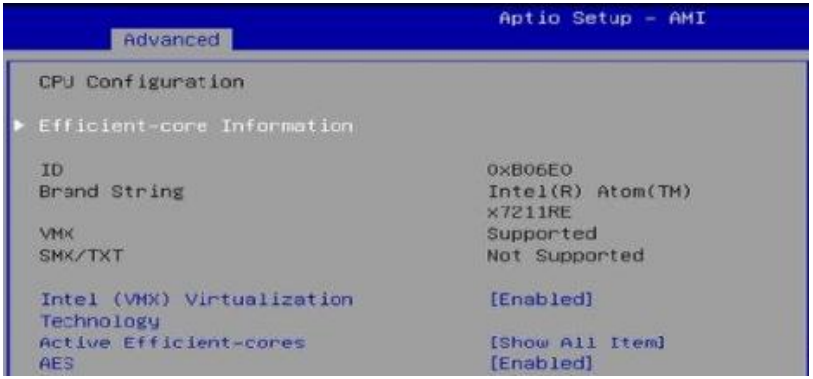
This section allows you to configure system features according to your preference.

4.4.1 Connectivity Configuration



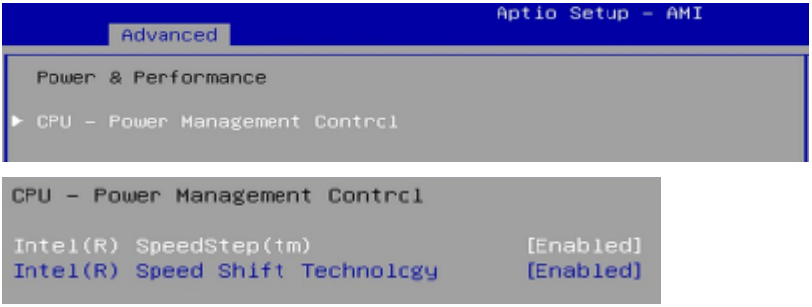
BIOS Setting	Description
CNVI Mode	This option configures Connectivity. ***Auto Detection*** – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; ***Disable Integrated*** – disables Integrated Solution.
RFI Mitigation	This 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

4.4.2 CPU Configuration



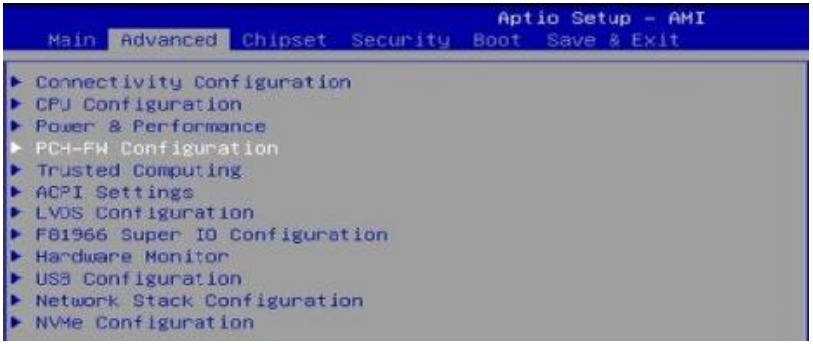
BIOS Setting	Description
Efficient-core Information	Displays the E-core Information.
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Efficient-cores	Number of E-cores to enable in each processor package. 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

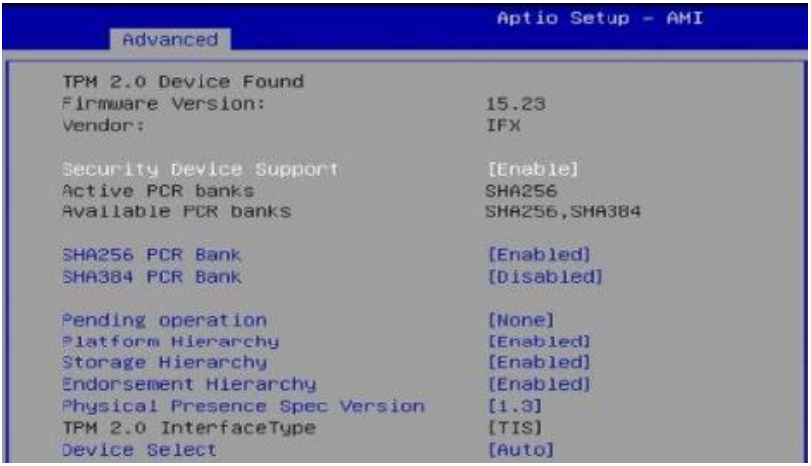


BIOS Setting	Description
CPU – Power Management Control	CPU – Power Management Control Options
Intel Speedstep	Allows more than two frequency ranges to be supported
Intel Speed Shift Technology	Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for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

4.4.4 PCH-FW Configuration



4.4.5 Trusted Computing

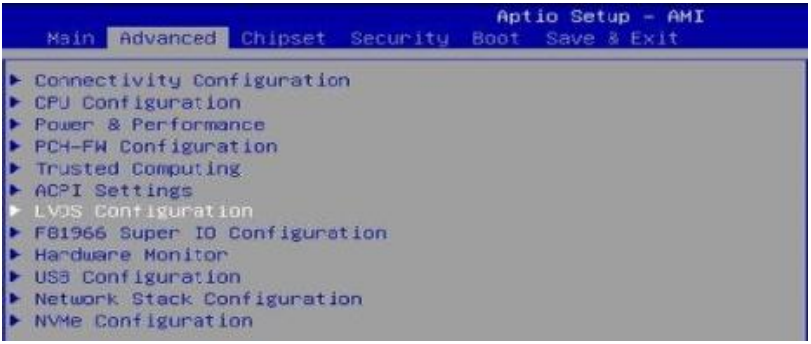


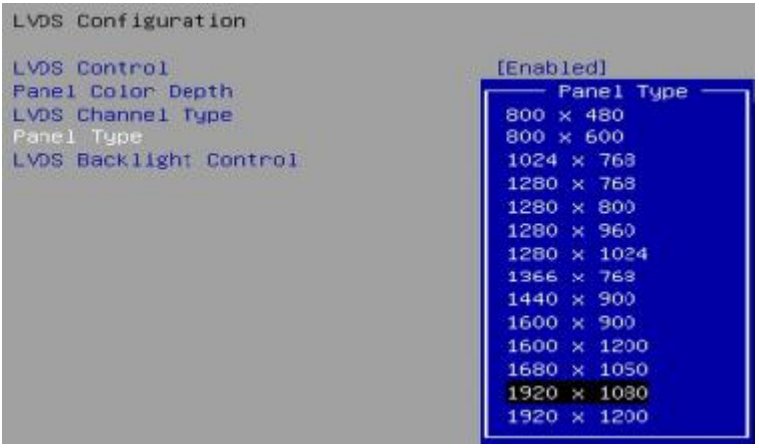
BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Options: Enabled / Disabled
SHA384 PCR Bank	Options: Enabled / Disabled
Pending operation	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

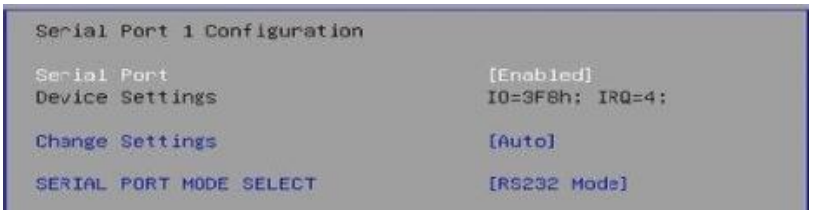
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

4.4.7 LVDS Configuration



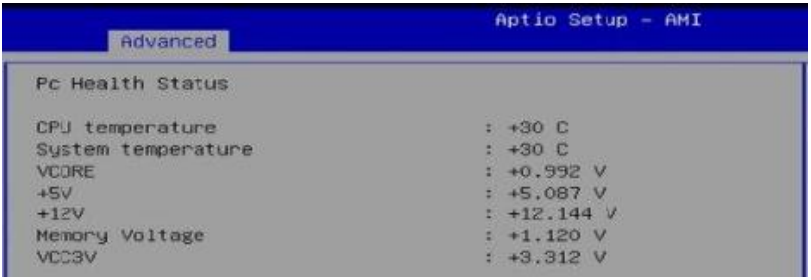


4.4.8 F81966 Super IO Configuration



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

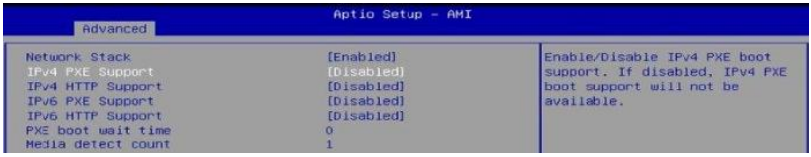


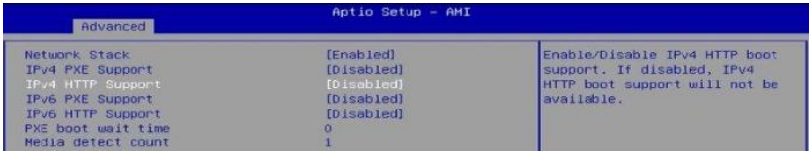
BIOS Setting	Description
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

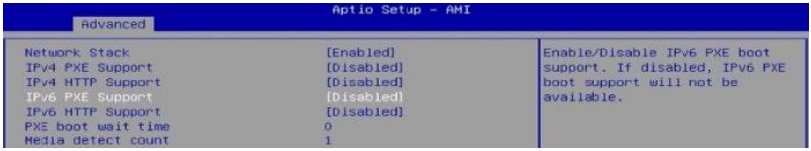
4.4.11 USB Configuration

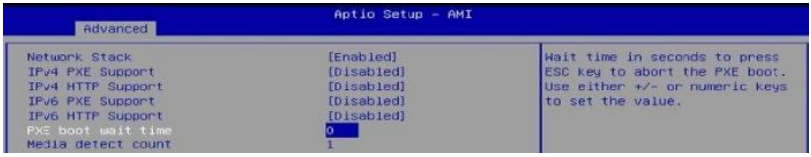
BIOS Setting	Description
Legacy USB Support	• **Enabled** enables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disabled** keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. 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.

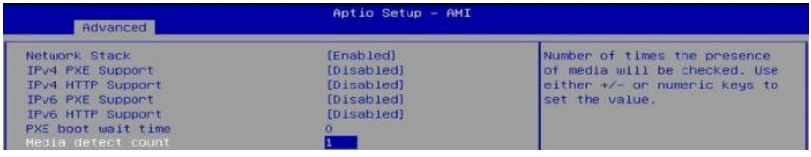
4.4.12 Network Stack Configuration



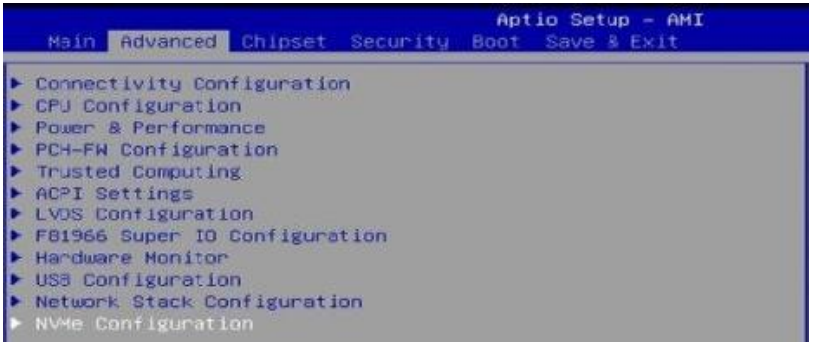






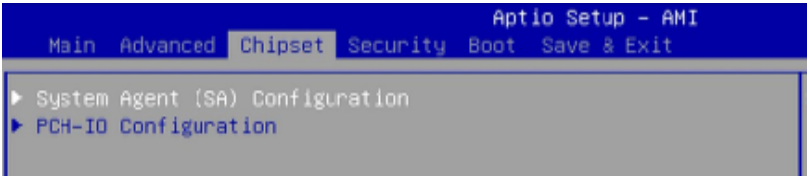


4.4.13 NVME Configuration

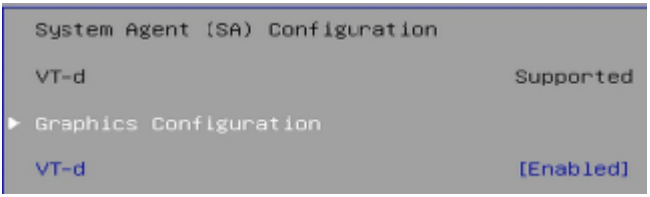


4.5 Chipset Settings

4.5.1 System Agent (SA) Configuration

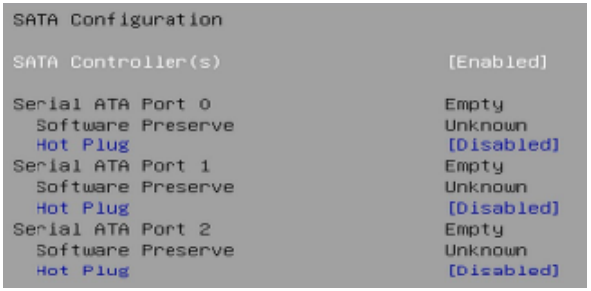


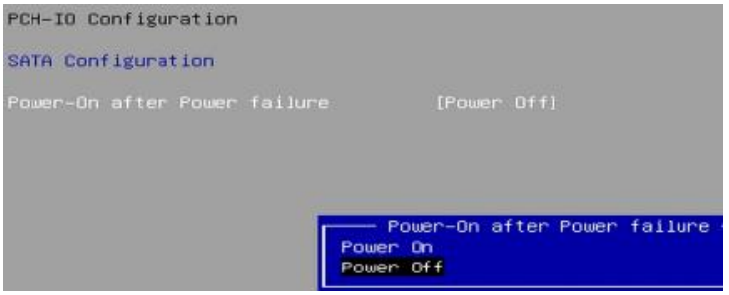
4.5.1.1. Graphics Configuration:



4.5.2 PCH-IO Configuration

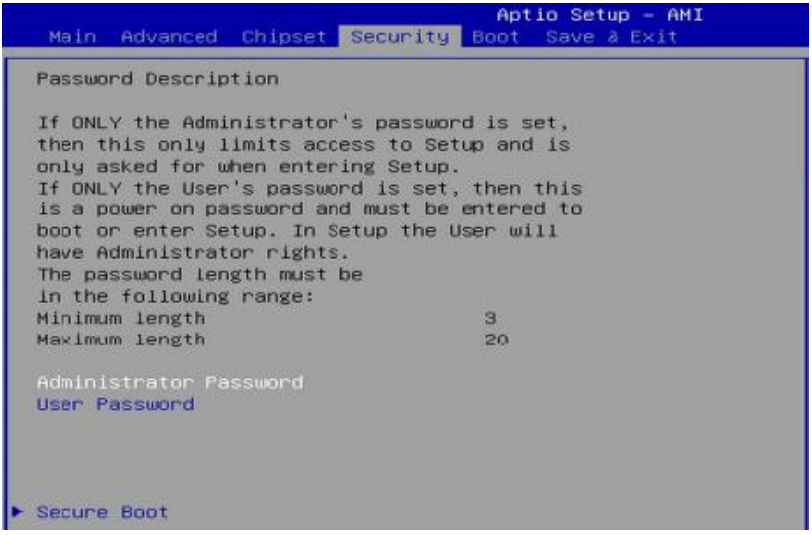
4.5.2.1 SATA Configuration:

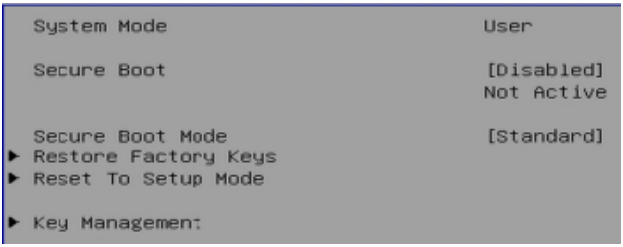




BIOS Setting	Description
SATA and RST Configuration	SATA device options and settings
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Selects IDE or AHCI Mode.
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.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

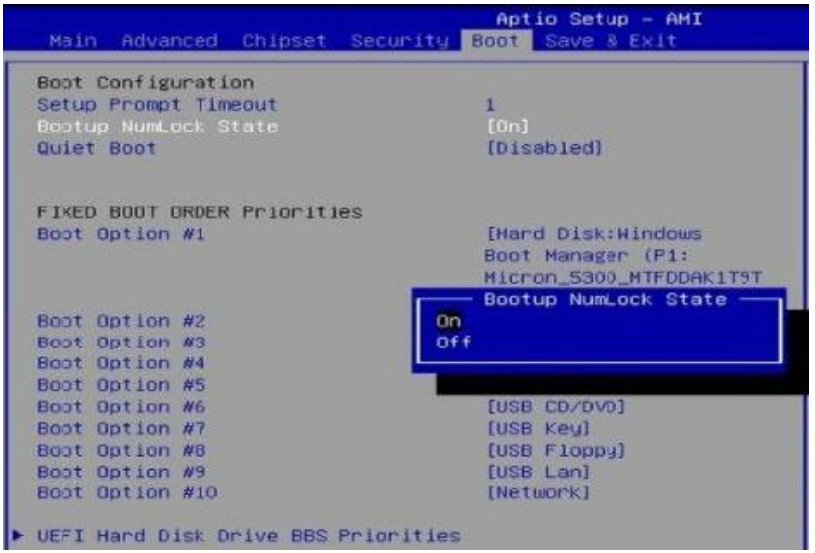
4.6 Security Settings





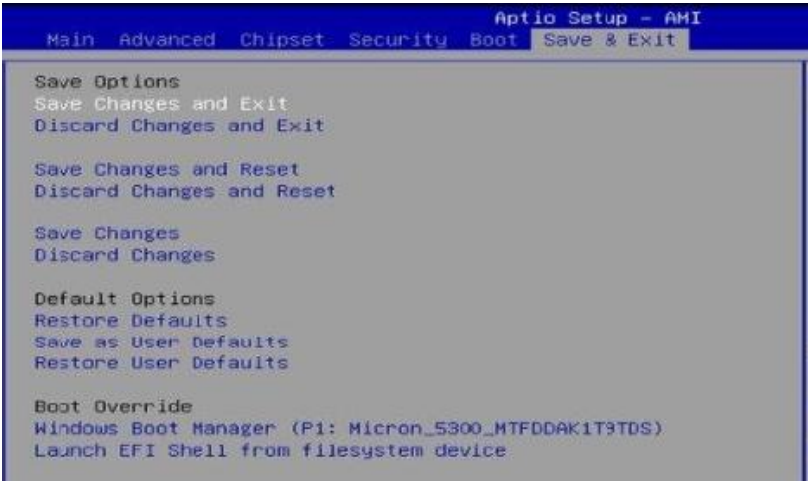
BIOS Setting	Description
Setup Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Secure Boot feature is Active if Secure Boot is enabled. Platform Key(PK) is enrolled and the system is in user mode. The mode change requires platform 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
0x000004D0-0x000004D1	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 - INTC1057
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)
{
        outportb(F81966_INDEX_PORT, F81966_UNLOCK);
        outportb(F81966_INDEX_PORT, F81966_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81966 (void)
{
        outportb(F81966_INDEX_PORT, F81966_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81966_LD( unsigned char LD)
{
        Unlock_F81966();
        outportb(F81966_INDEX_PORT, F81966_REG_LD);
        outportb(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**