IB837 Series

Intel® Celeron® N & J Series
3.5" Disk-Size SBC

User's Manual

Version 1.0
(April 2023)

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 is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Important Safety Information

Carefully read the precautions before using the board.

Environmental conditions:

- Use this product in environments with temperatures between 0˚C and 60˚C or between -40˚C to 85˚C depending on the board model.
- Do not leave this product in an environment where the storage temperature may be below -40°C or above 85° 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

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, prepare the following information of your product and elaborate upon the problem.
   - 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 log in to the RMA system of the website or and contact your distributor or sales representative for assistance.

Table of Contents

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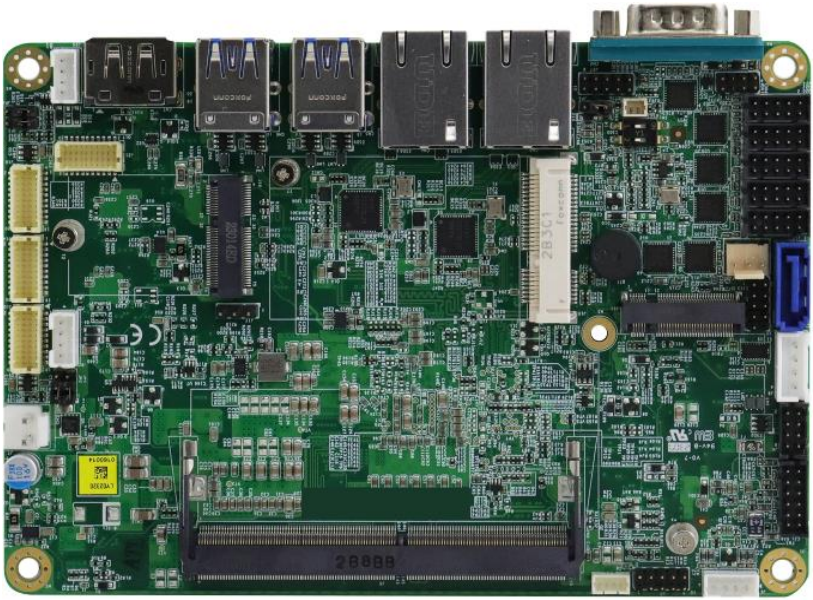
Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Block Diagram
- Product View
- Board Dimensions

1.1 Introduction

- The IB837 is a 3.5-inch single board computer powered by Intel® Celeron® N & J series processors and designed for retail, transport, and factory automation applications. The SBC has a DDR4 memory slot with a 16GB and graphics interface for a DisplayPort and two dual-channel LVDS displays. I/O connectivity and expansion are provided by 2x I226V PCI-E 2.5G LAN, 6x COM ports, 4x USB 3.1, 2x USB 2.0, 1x SATA III (shared with M/2 B-key), 2x M.2 sockets (E-key & B-key), and 1x Mini PCI-E slot. The SBC measures 102mm by 147mm.



IB837 3.5” disk-size SBC

1.2 Features

- Onboard Intel® Celeron® N & J series processor
- 1x DDR4-3200 SO-DIMM, Max. 16GB
- Supports 1x DisplayPort & 2x dual channel LVDS
- 2x I226V PCI-E 2.5G LAN, 6x COM ports
- 4x USB 3.1, 2x USB 2.0, 1x SATA III (shared with M/2 B-key)
- 2x M.2 sockets (E-key & B-key), 1x Mini PCI-E slot (full-size)
- Watchdog timer, Digital I/O, fTPM, mSATA

1.3 Packing List

Your IB837 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.

- IB837 SBC x 1

1.4 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 (USB-29)	x 1

- Audio cable (Audio-18)
- Heat Sink (HSIB837-A)
- Heat Spreader (HSIB8371)

1.5 Specifications

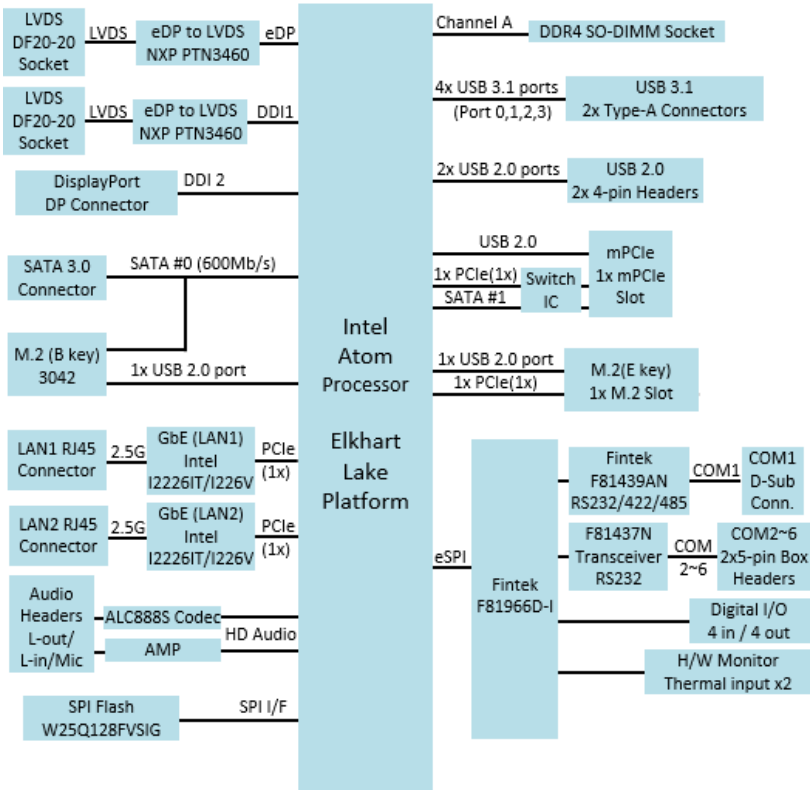
Product Models	
IB837F-J6412	Intel® Celeron® J6412 (2GHz~2.6GHz) onboard 3.5- inch SBC, w/ 2x 2.5GbE LAN, 1x DisplayPort, 2x LVDS (24-bit LVDS Dual channel), mSATA, M.2, 12V DC-in
IB837F-N6210	Intel® Celeron® N6210 (1.2GHz~2.6GHz) onboard 3.5-inch SBC , w/ 2x 2.5GbE LAN, 1x DisplayPort, 2x LVDS (24-bit LVDS Dual channel), mSATA, M.2, 12V DC-in

Specifications	
CPU	• Intel® Celeron® QC J6412 (2.0Ghz/2.6GHz) • Intel® Celeron® DC N6210 (1.2Ghz/2.6GHz)
Memory	1x DDR4 SO-DIMM, Max. 16GB
BIOS	AMI
Graphics	Intel® SoC integrated Gen11 Graphics
Video Output	1x DisplayPort, 2x 24-bit dual-channel LVDS
Ethernet	2x Intel® I226V PCI-E Gigabit LAN
Storage Interface	• 1x mSATA • 1x M.2 B3042
Mini Type Slots	1x Mini PCI-E, 1x M.2 (E2230), 1x M.2 (B3042)
Serial ATA	1x SATA III (Share with M.2 B-key
Super I/O	Fintek F81966D-I
Serial Ports	• 1x RS232/422/485 (Jumperless selection) • 5x RS232
USB 2.0	2x USB2.0 (Pin-header)
USB 3.X	4x USB3.1 (Type A)
Audio	Built-in HD with Realtek ALC888S + amplifier
TPM	fTPM
Hardware Monitor	Yes
Watchdog Timer	256 levels (256 segments, 0, 1, 2…255 sec / min)
Power Input	+12V DC-in thru onboard 2-pin connector
Dimensions (L x W)	102mm x 147mm (4" x 5.8"
Supported OS	Windows 10 (64-bit) ; Linux [Ubuntu]

Environment	
Temperature	• Operating: 0 ~ 60 °C (32 ~ 140 °F) • Storage: -20 ~ 80 °C (-4 ~ 176 °F)
Relative Humidity	10 ~ 95 %, non-condensing

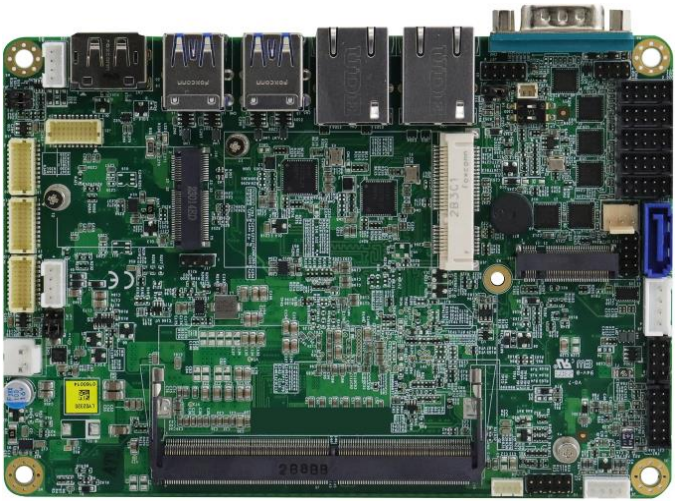
All specifications are subject to change without prior notice.

1.6 Block Diagram

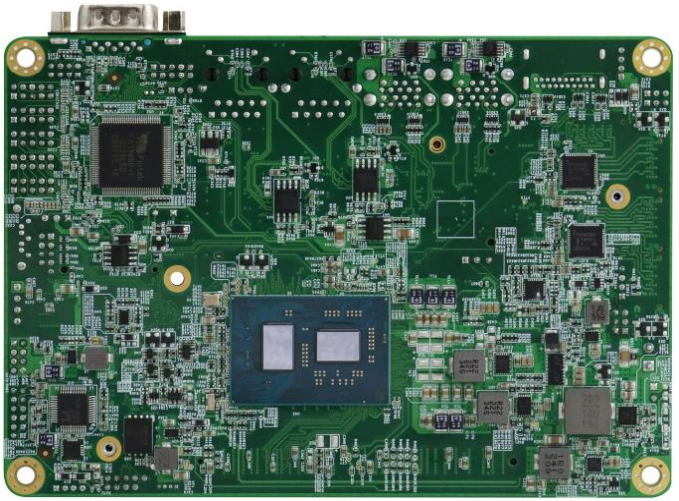


1.7 Product View

Top View

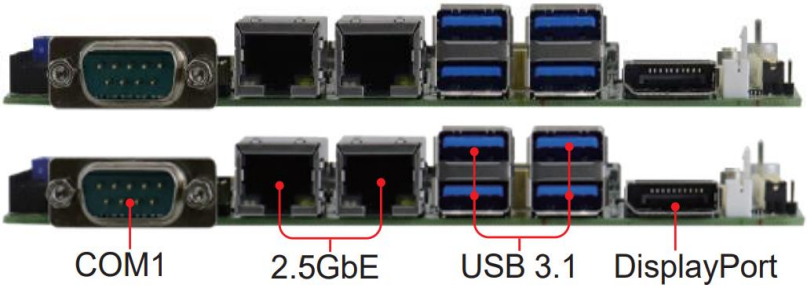


Bottom View

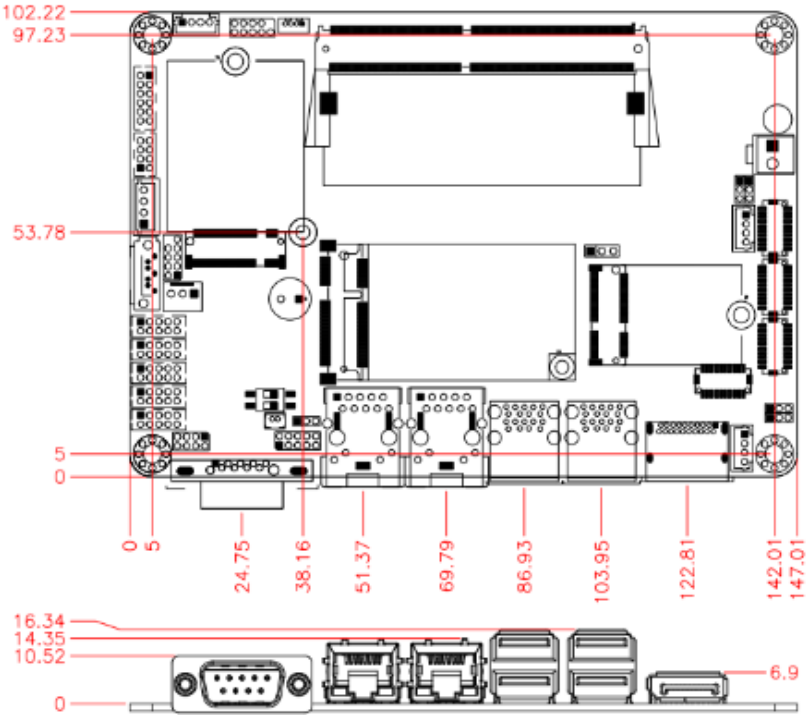


* The photos above are for reference only. Some minor components may differ.

I/O View



1.8 Dimensions



Chapter 2
Hardware Configuration

This section provides information on jumper settings and connectors on the IB837 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:

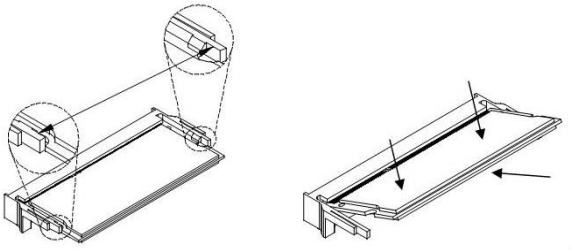
- Essential installations before you begin
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Essential Installations

Follow the instructions below to install the memory.

2.1.1 Installing the Memory

The IB837 series supports two DDR4 memory sockets for a maximum total memory of 32 GB. 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.

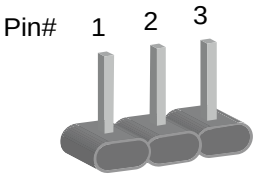
To remove the module, press the clips outwards with both hands, and the module will pop-up.

2.2 Setting the Jumpers

Set up and configure your IB837 by 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

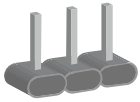
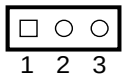
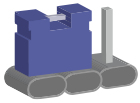
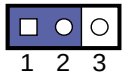
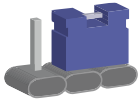
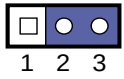
Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.



A 3-pin jumper

A jumper cap

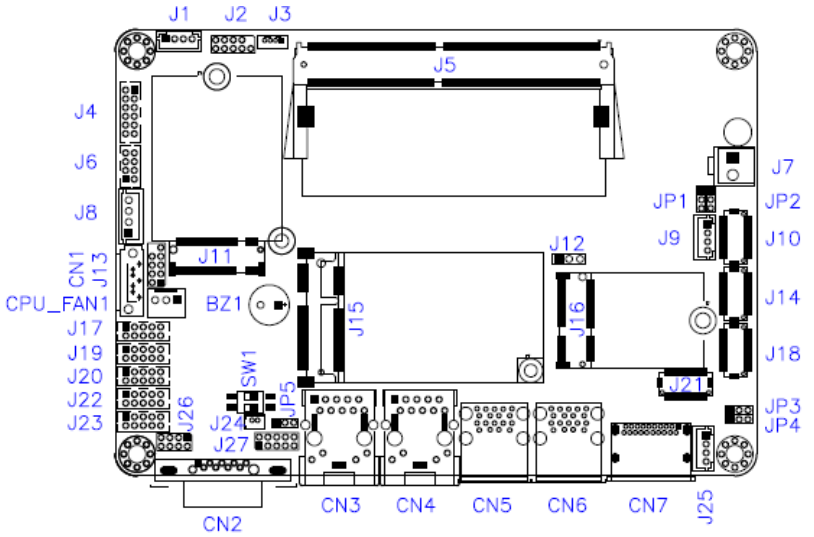
Refer to the illustration below to set jumpers.

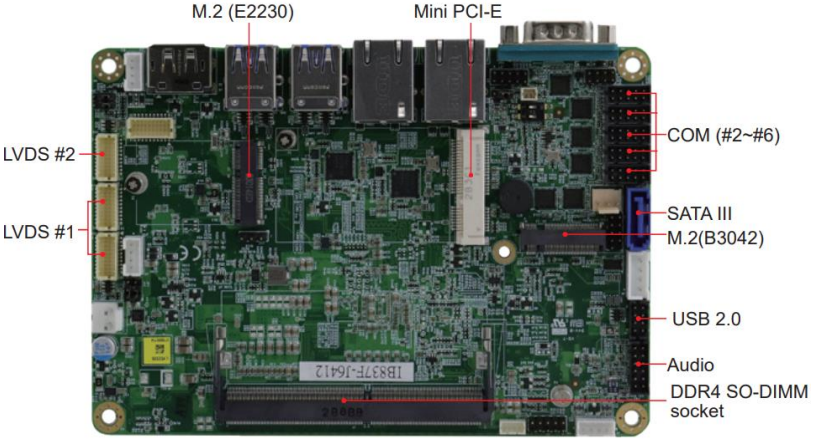
Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		

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

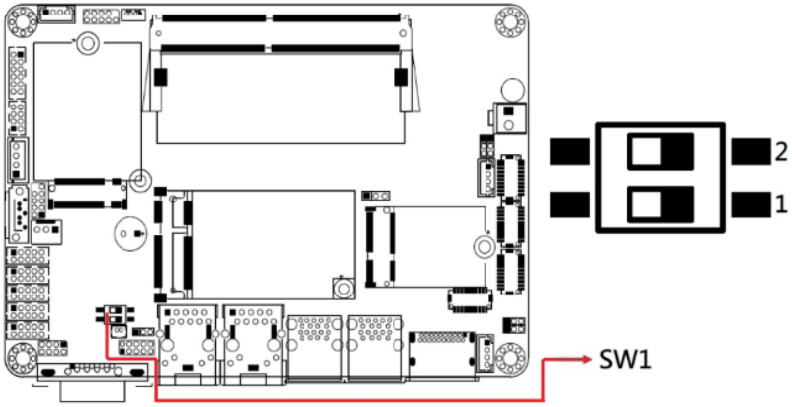




2.4 Jumpers Quick Reference

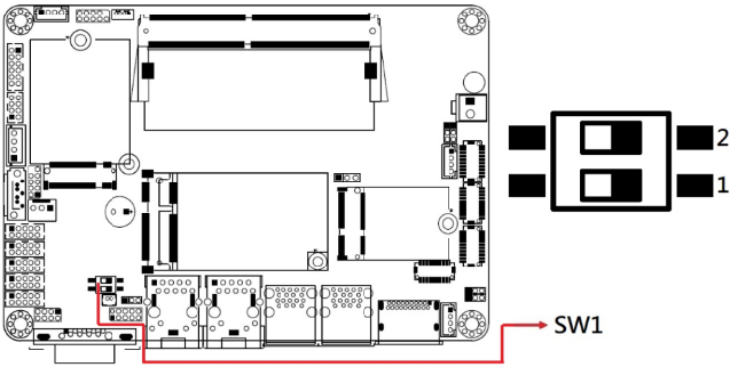
Jumper / Switch	Function
SW1	Clear CMOS Data
SW1	Clear ME Register
JP2, JP3	LVDS Panel Power Selection
JP1, JP4	LVDS Panel Brightness Selection
JP5	ATX / AT Power Select

2.4.1 Clear CMOS Data (SW1)



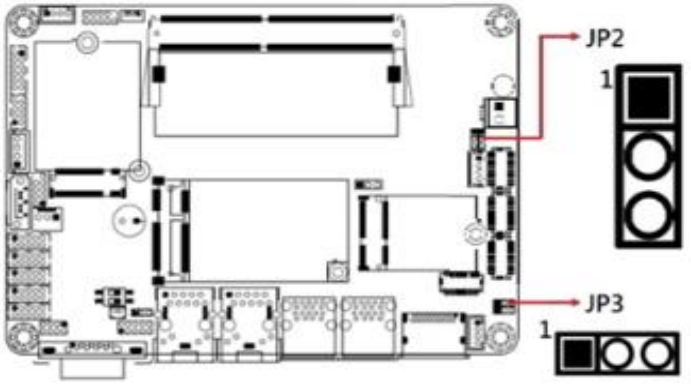
Function	Setting
Normal (default)	P1-OFF
Clear CMOS	P1-ON

2.4.2 Clear ME Register (SW1)



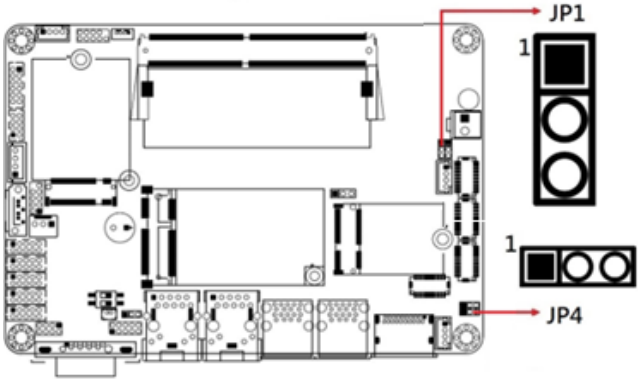
Function	Setting
Normal (default)	P2-OFF
Clear ME	P2-ON

2.4.3 LVDS Panel Power Selection (JP2, JP3)



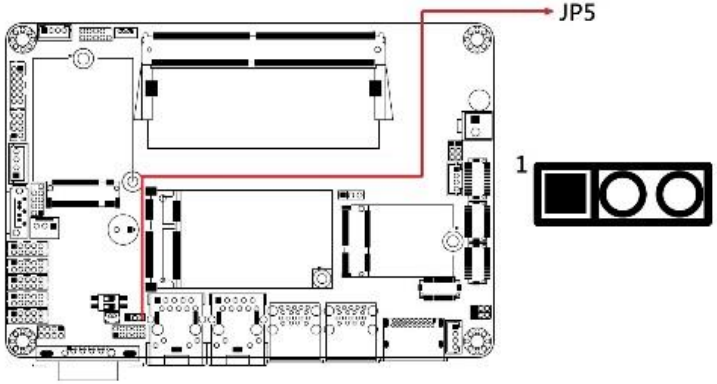
Function	Pin closed	Illustration
3.3V (default)	1-2	1
5V	2-3	1

2.4.4 LVDS Panel Brightness Selection (JP1, JP4)



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

2.4.5 ATX / AT Power Selection (JP5)

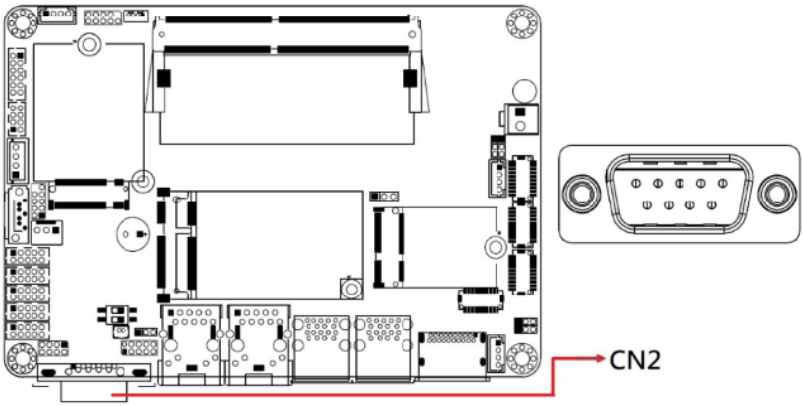


Function	Pin closed	Illustration
ATX (default)	1-2	1
AT	2-3	1

2.5 Connectors Quick Reference

Connector	Function
CN2	COM1 RS-232/422/485 Port
CN3, CN4	I226V LAN Connectors
CN5, CN6	USB 3.0 Connectors
CN7	DP Connector
CN1	SATA Connector
J1	Amplifier Connector
J3	SMBus Connector
J4	Audio Connector
J5	DDR Connector
J6	USB 2.0 Connector
J7	DC Power Input Connector
J8	SATA HDD Power Connector
J9, J25	LCD Backlight Connector
J14, J10	LVDS1 Connector
J21, J18	LVDS 2 Connector
J11	M.2 B-Key Connector
J15	Mini PCIE Connector
J16	M.2 E-Key Connector
J23, J17, J20, J22	COM2, COM3, COM4, COM5, COM6 RS-232 Ports
J24	Battery Connector
J26	Front Panel Connector
J27	Digital I/O Connector
CPU_FAN1	CPU Fan Power Connector

2.5.1 COM1 RS-232/422/485 Port (CN2)

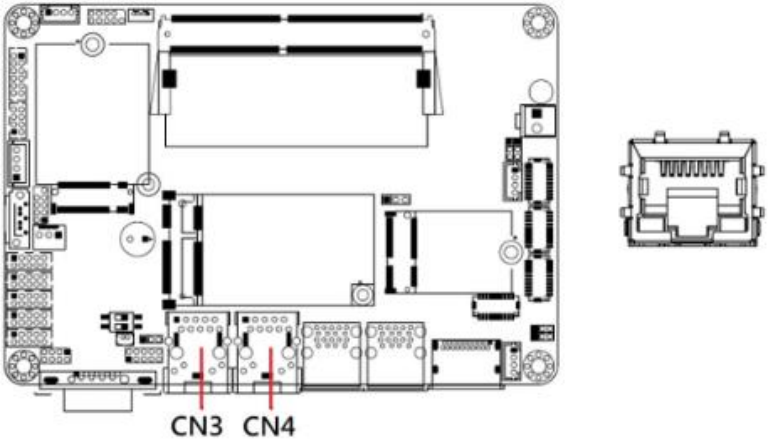


COM1 port is jumper-less and configurable in BIOS.

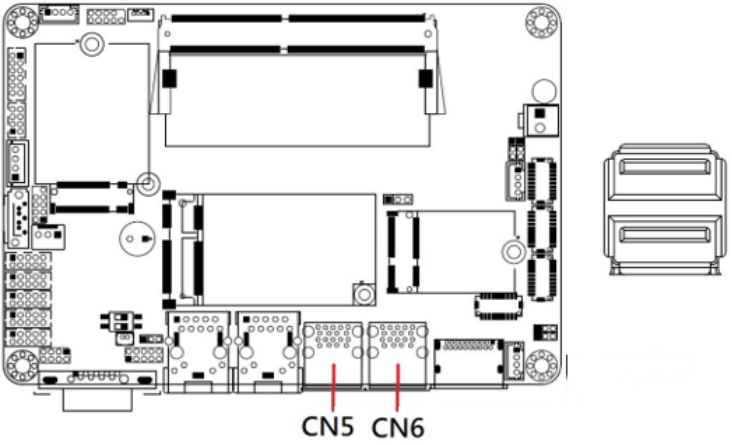
Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

Pin	Signal Name		
	RS-232	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

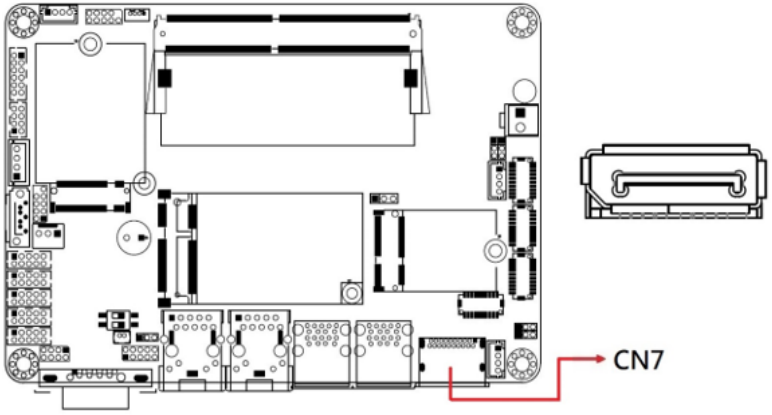
2.5.2 I226V LAN Connectors (CN3, CN4)



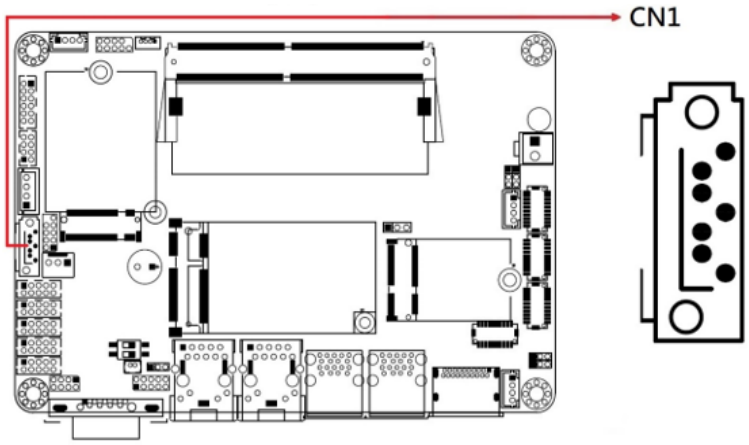
2.5.3 USB 3.0 Connectors (CN5, CN6)



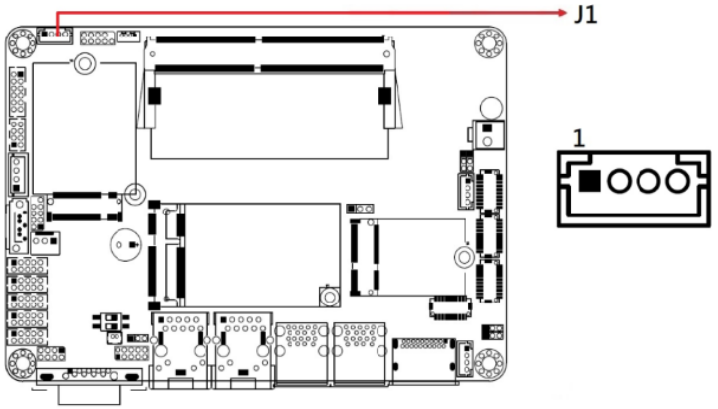
2.5.4 DP Connector (CN7)



2.5.5 SATA Connector (CN1)

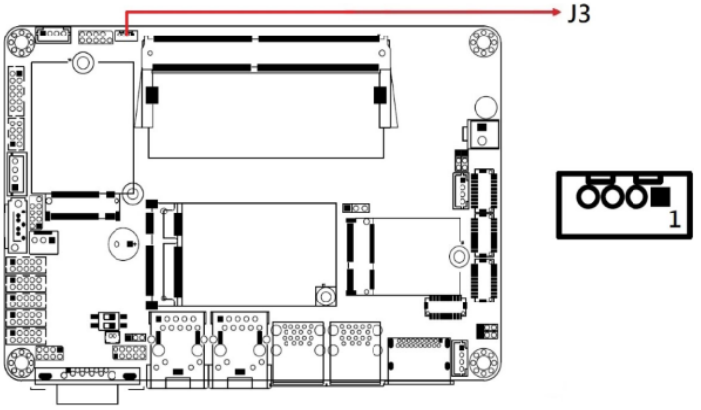


2.5.6 Amplifier Connector (J1)



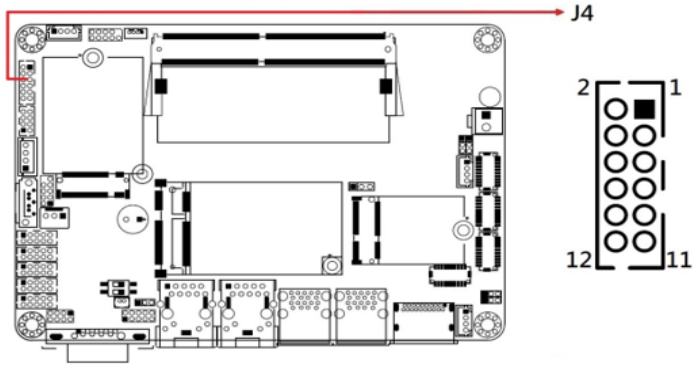
Pin	Assignment	Pin	Assignment
1	SPK_L+	3	SPK_R-
2	SPK_L-	4	SPK_R+

2.5.7 SMBUS Connector (J3)



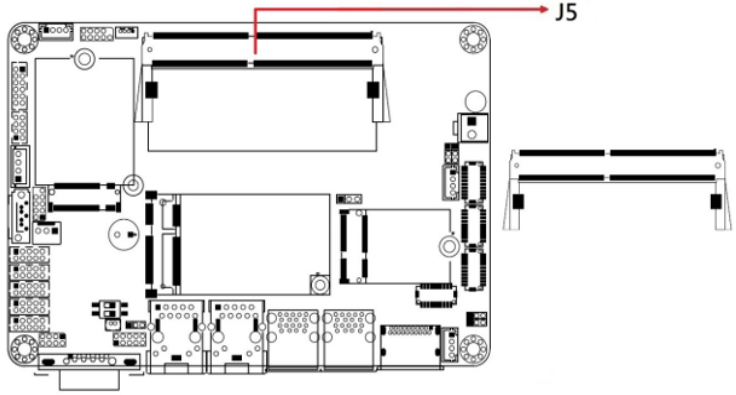
Pin	Assignment	Pin	Assignment
1	+3.3V	3	SMB_DATA
2	SMB_CLK-	4	Ground

2.5.8 Audio Connector (J4)

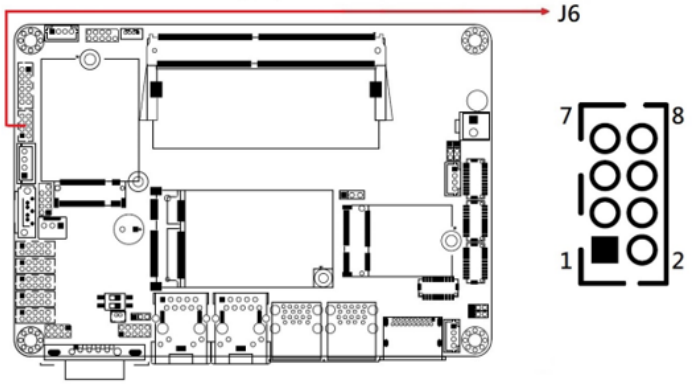


Pin	Assignment	Pin	Assignment
1	Lineout_L	2	Lineout_R
3	JD_FRONT	4	Ground
5	LINEIN_L	6	Linein_R
7	JD_LINEIN	8	Ground
9	MIC_L	10	MIC-R
11	JD_MIC1	12	Ground

2.5.9 DDR Connector (J5)

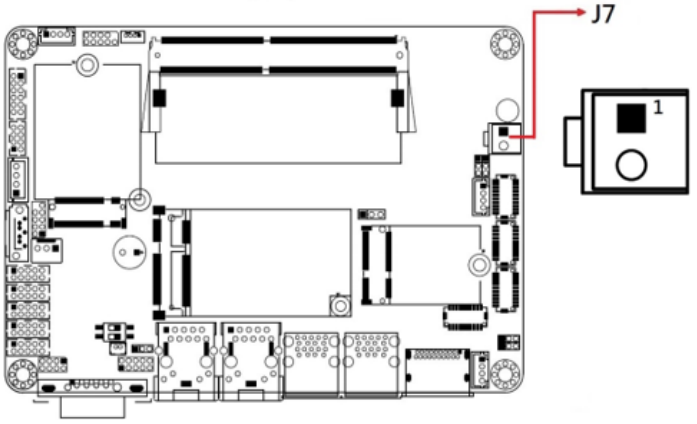


2.5.10 USB 2.0 Connector (J6)



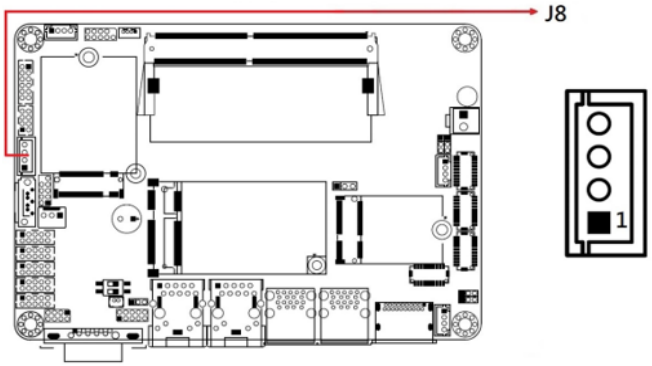
Pin	Assignment	Pin	Assignment
1	VCC	2	Ground
3	D0-	4	D1+
5	D0+	6	D1-
7	Ground	8	VCC

2.5.11 DC Power Input Connector (J7)



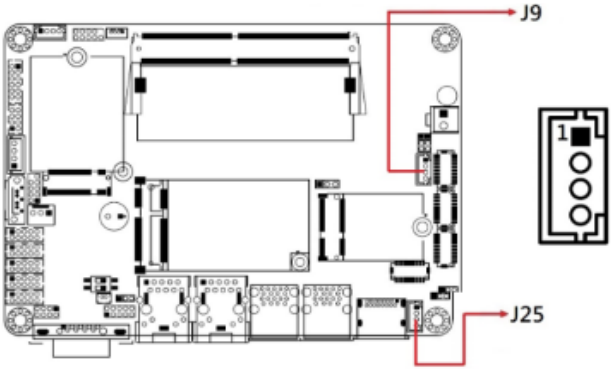
Pin	Assignment
1	+12V
2	Ground

2.5.12 SATA HDD Power Connector (J8)



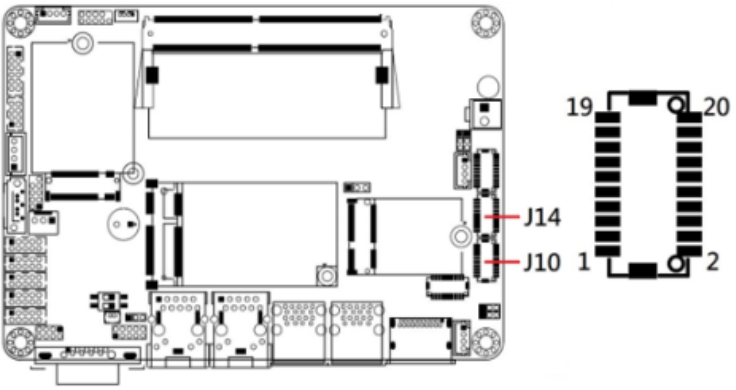
Pin	Assignment	Pin	Assignment
1	+5V	3	Ground
2	Ground	4	+12V

2.5.13 LCD Backlight Connector (J9, J25)



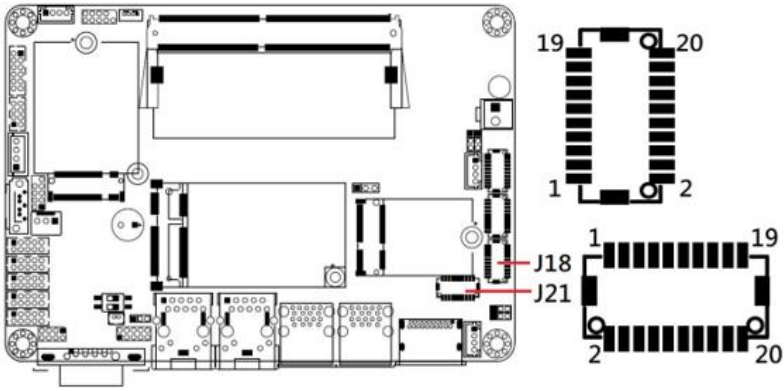
Pin	Assignment	Pin	Assignment
1	+12V	3	Brightness Control
2	Backlight Enable	4	Ground

2.5.14 LVDS1 Connector (J14: CH1, J10: CH2)



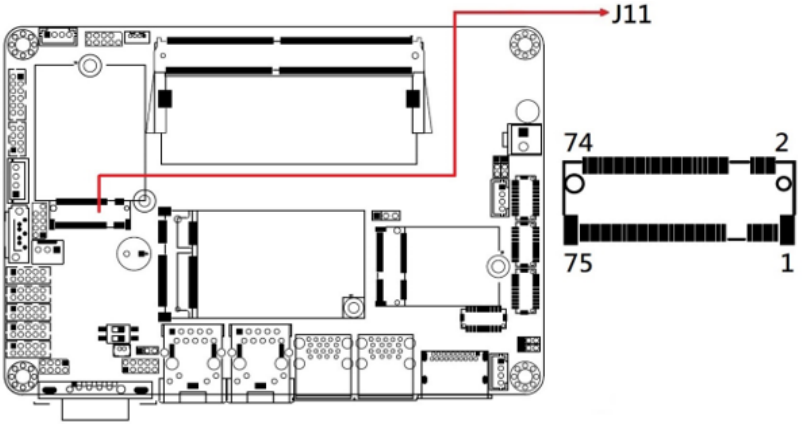
Pin	Assignment	Pin	Assignment
1	TX0P	2	TX0P
3	Ground	4	Ground
5	TX1P	6	TX1P
7	Ground	8	Ground
9	TX2P	10	TX2P
11	Ground	12	Ground
13	CLKP	14	CLKP
15	Ground	16	Ground
17	TX3P	18	TX3P
19	VDD	20	VDD

2.5.15 LVDS2 Connector (J21: CH1, J18: CH2)

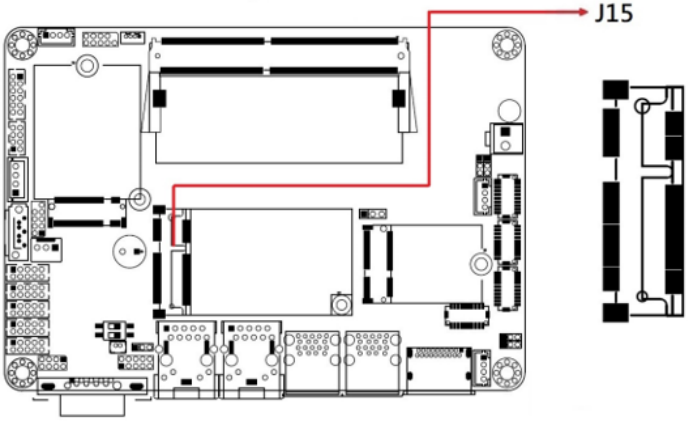


Pin	Assignment	Pin	Assignment
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	VDD	20	VDD

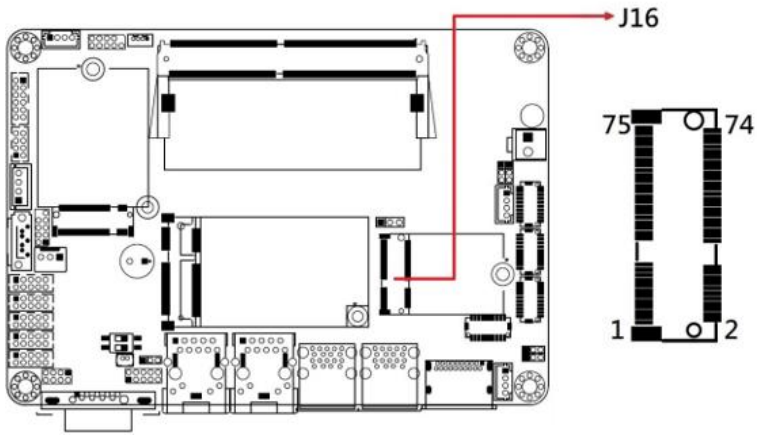
2.5.16 M.2 B-Key Connector (J11)



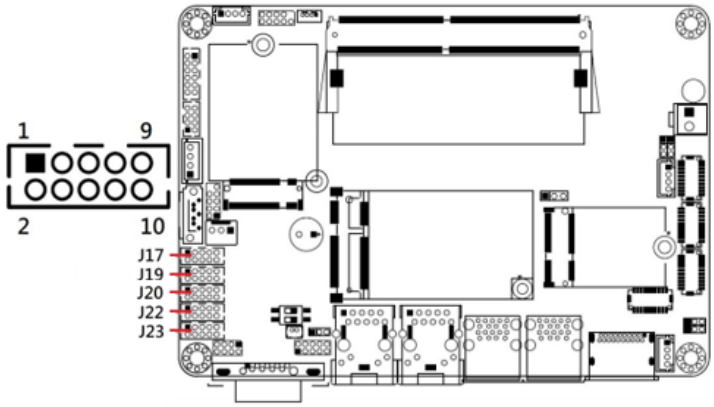
2.5.17 Mini PCIE Connector (J15)



2.5.18 M.2 E-Key Connector (J16)

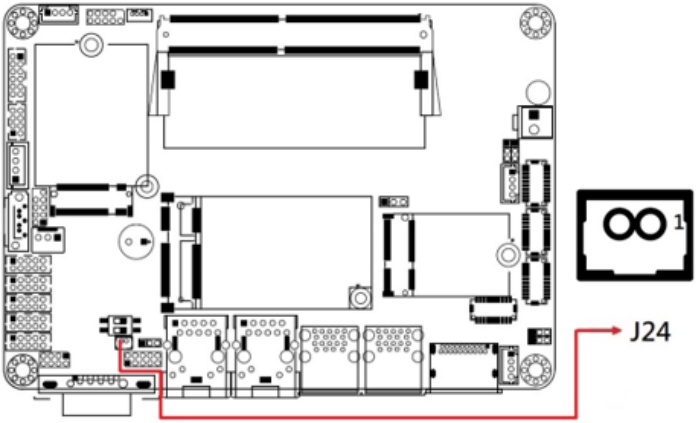


2.5.19 COM2, COM3, COM4, COM5, COM6 RS-232 Ports (J23, J17, J19, J20, J22)



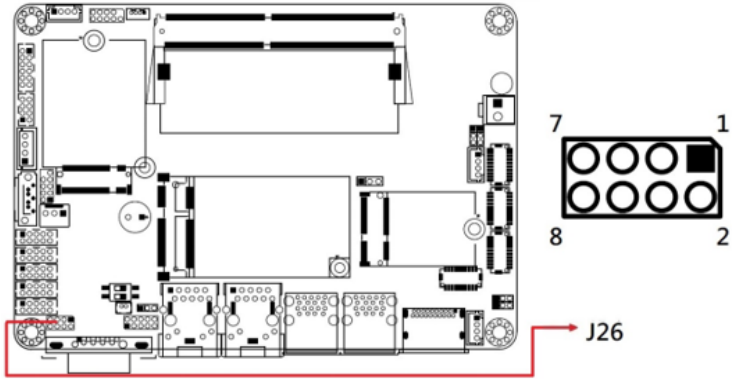
Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	2	RXD, Receive data
3	TXD, Transmit data	4	DTR, Data terminal ready
5	Ground	6	DSR, Data set ready
7	RTS, Request to send	8	CTS, Clear to send
9	RI, Ring indicator	10	Not Used

2.5.20 Battery Connector (J24)



Pin	Assignment
1	Battery+
2	Ground

2.5.21 Front Panel Connector (J26)



Pin	Assignment	Pin	Assignment
1	Ground	2	PWR_BTN
3	3.3V	4	HDD Active
5	Ground	6	Reset
7	+5V	8	Ground

J26 is utilized for system indicators to provide light indication of the computer activities and switches to change the computer status. It provides interfaces for the following functions.

- **ATX Power ON Switch (Pins 1 and 2)**

  The 2 pins makes an “ATX Power Supply On/Off Switch” for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.

- **Hard Disk Drive LED Connector (Pins 3 and 4)**

  This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

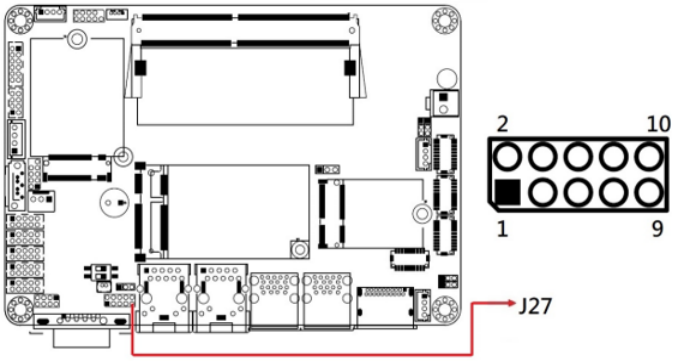
- **Reset Switch (Pins 5 and 6)**

  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

- **Power LED: Pins 7 and 8**

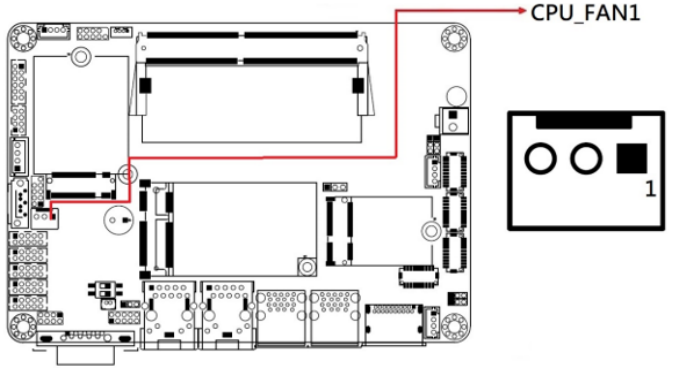
  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

2.5.22 Digital I/O Connector (J27)



Pin	Assignment	Pin	Assignment
1	Ground	2	VCC
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.23 CPU Fan Power Connector (CPU_FAN1)



Pin	Assignment
1	Ground
2	+12V
3	Rotation detection

Chapter 3
Drivers Installation

This chapter introduces installation of the following drivers:

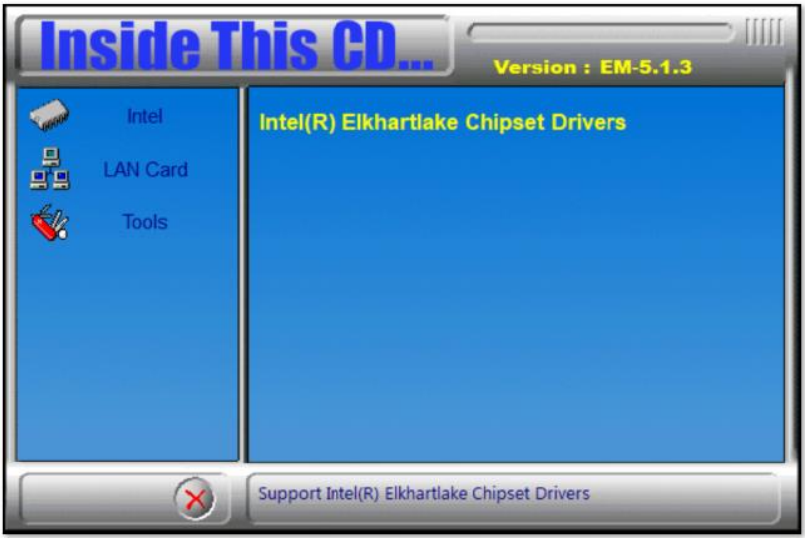
- Intel® Chipset Software Installation Utility
- VGA Driver
- HD Audio Driver
- LAN Driver
- Intel® Management Engine Drivers Installation

3.1 Intel® Chipset Software Installation Utility

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

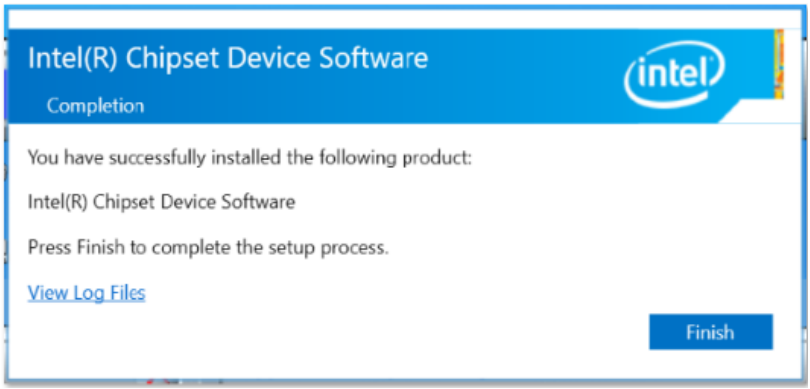
The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for Intel chipset components.

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. Click **Intel** on the left pane and then **Intel(R) Elkhartlake Chipset Drivers** on the right pane.



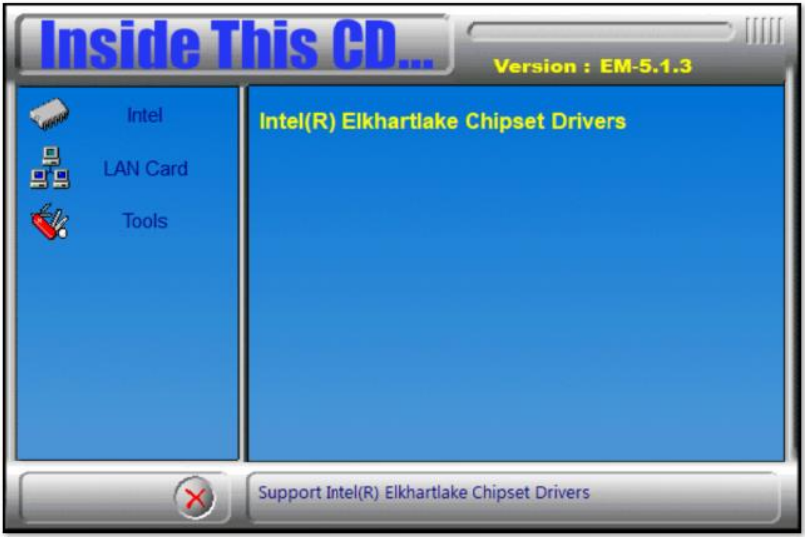
2. Click **Intel(R) Chipset Software Installation Utility**.

3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next**.
4. Accept the software license agreement and proceed with the installation process.
5. On the *Readme File Information* screen, click **Install**.
6. After the installation, press **Finish** to complete the setup process.



3.2 VGA Driver Installation

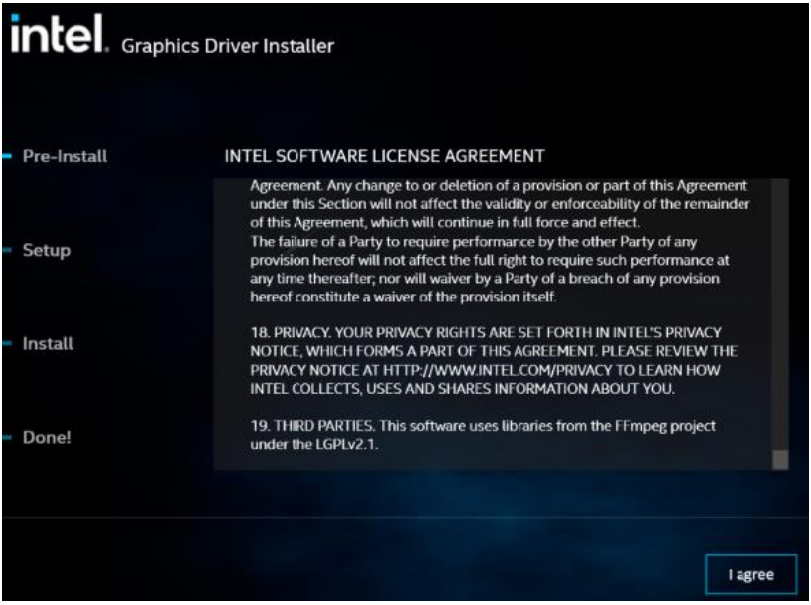
1. Click **Intel** on the left pane and then **Intel(R) Elkhartlake Chipset Drivers** on the right pane.



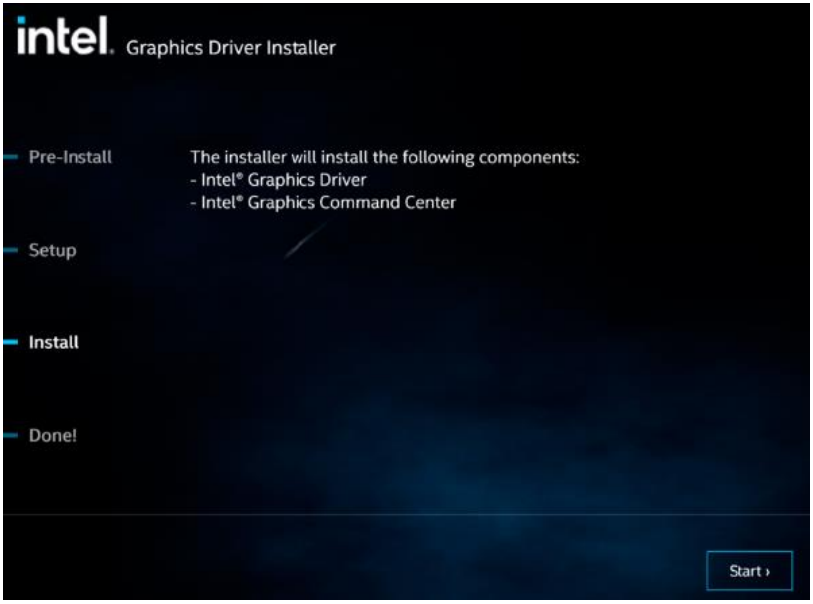
2. Click **Intel(R) Elkhartlake Graphics Driver**.

3. On the intel Graphics Driver Installer screen, click **Begin installation**.

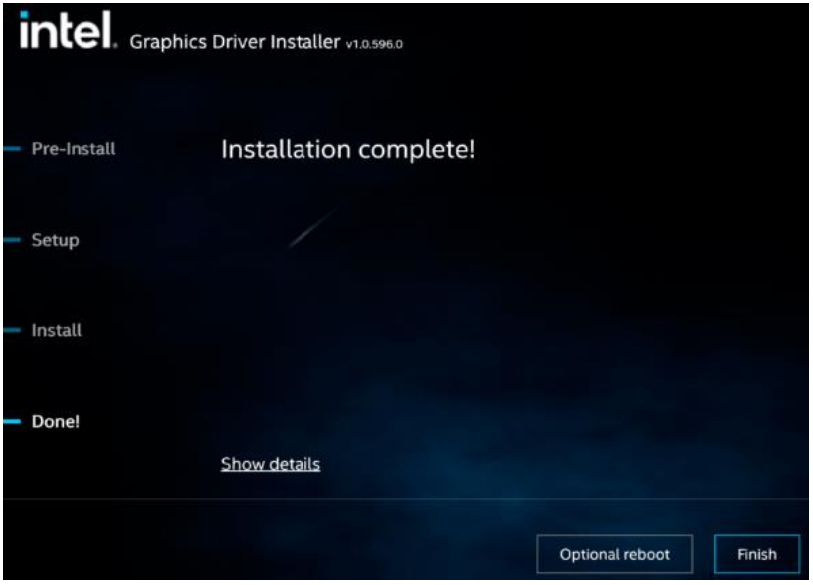
4. Click **I agree**.



5. Click **Start**.



6. Click **Finish**.

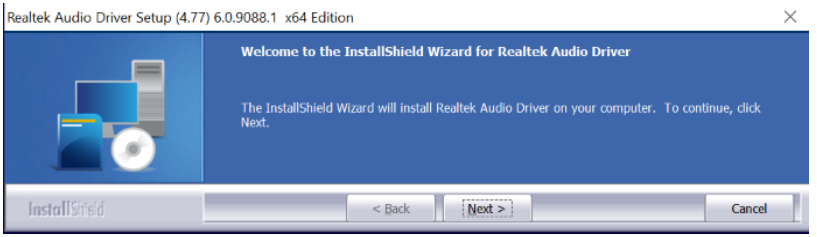


3.3 HD Audio Driver Installation

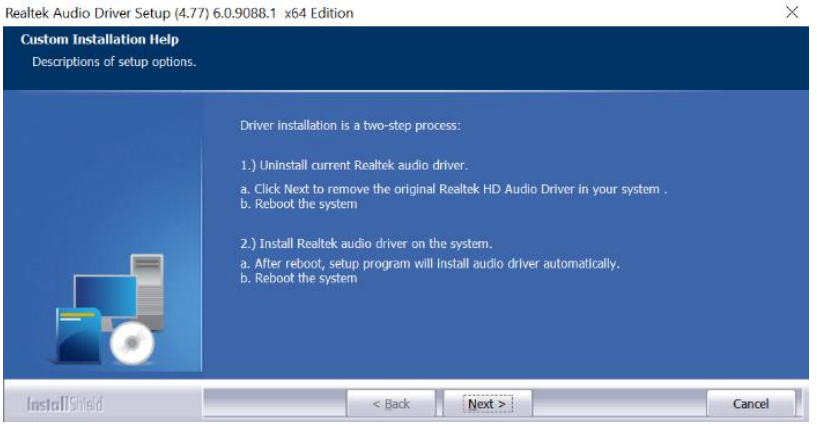
1. Click Intel on the left pane and then **Intel(R) Elkhartlake Chipset Drivers** on the right pane.

2. Click **Realtek High Definition Audio Driver**.

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



4. On the Custom Installation Help screen, click **Next**.

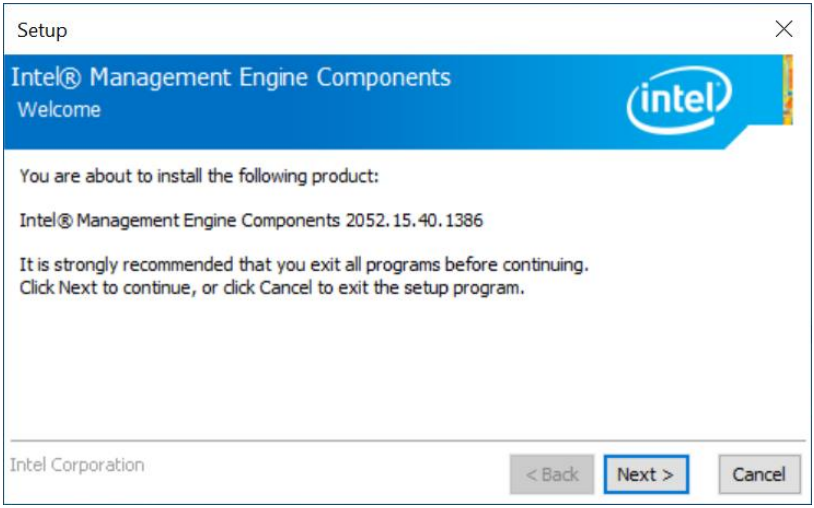


5. When InstallShield Wizard has finished the installation, click **Finish**.

3.4 Intel® ME Drivers Installation

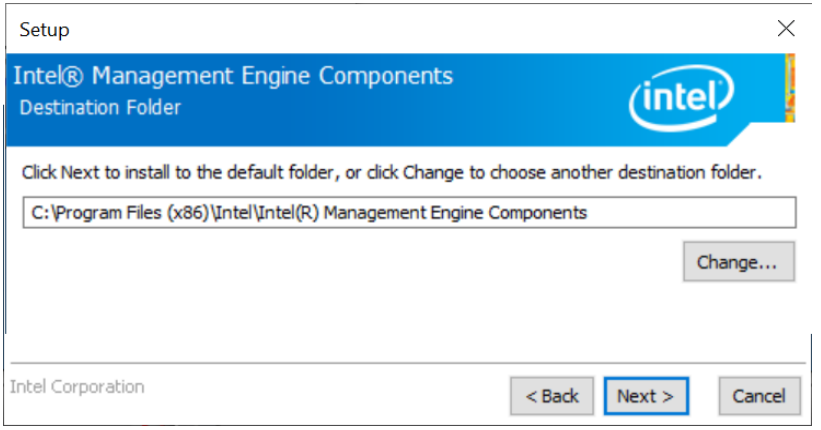
1. Click Intel on the left pane and then **Intel(R) ME Drivers**.

2. On the Welcome screen to the Intel® Management Engine Components, click **Next**.

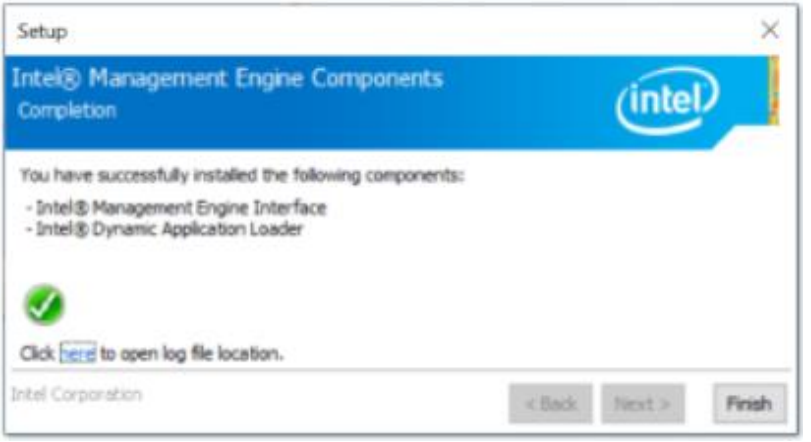


3. Accept the license agreement and click **Next**.

4. On the *Setup's Destination Folder* screen, click **Next** to install to the default folder, or click **Change** to choose another destination folder.



5. After the Intel® Management Engine Components have been installed, click **Finish**.



3.5 LAN Driver Installation

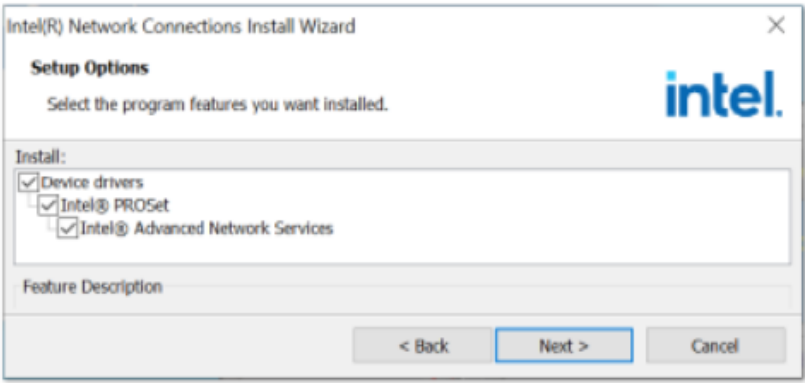
1. Click **LAN Card** on the left pane and then **Intel LAN Controller Drivers** on the right pane.

2. Choose **Intel(R) I21x/ I22x Gigabit Network Drivers**.

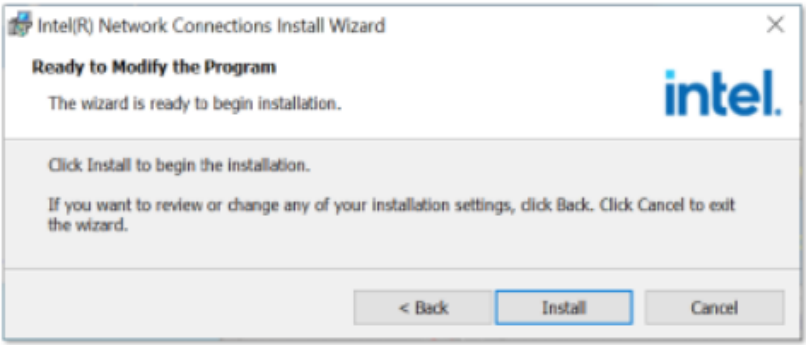
3. Click **Install Drivers and Software**.

4. On the welcome screen to the install wizard for Intel(R) Network Connections, click **Next**.

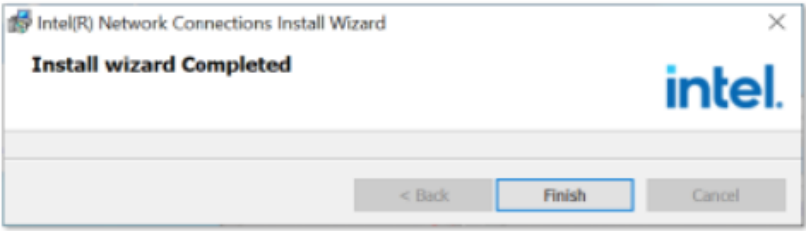
5. On the Setup Options screen, click **Next**.



6. Click **Install**.



7. When Install wizard has completed the installation, click **Finish**.



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
```

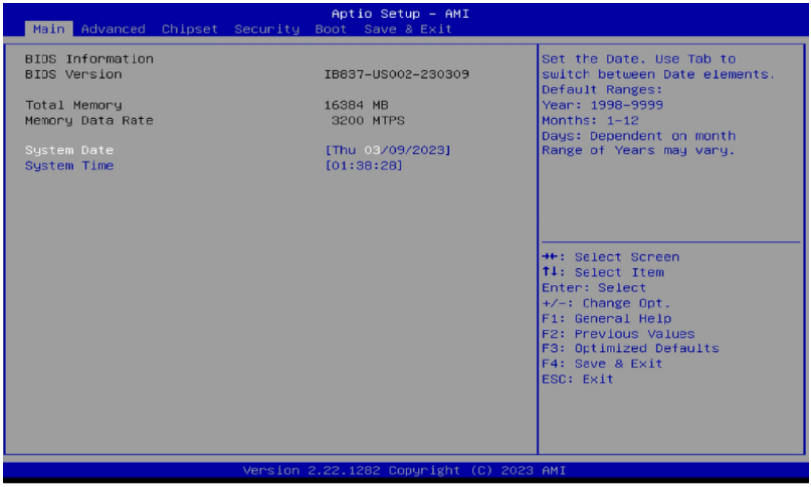
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

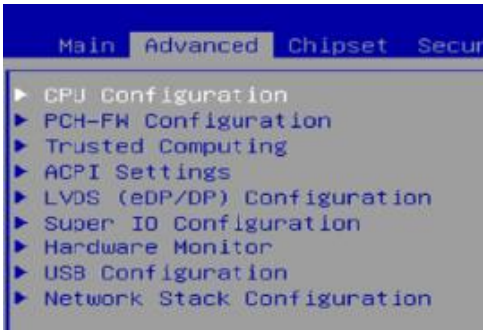
4.3 Main Settings



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.

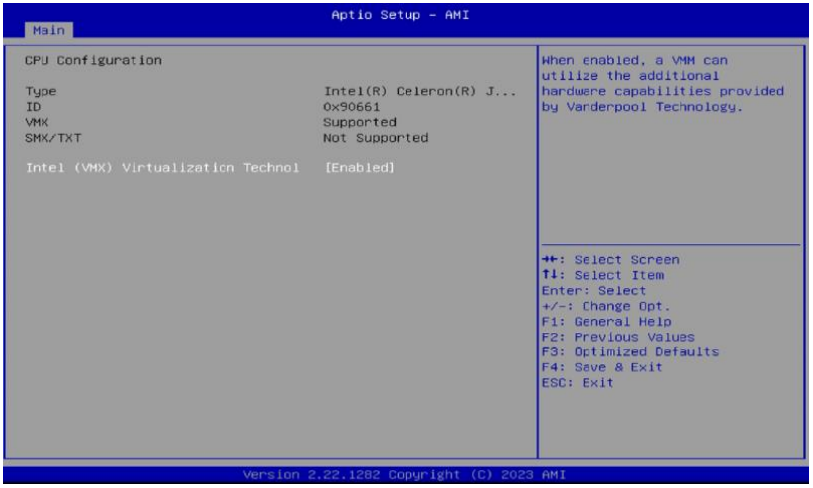
4.4 Advanced Settings

This section allows you to configure, improve your system and allows you to set up some system features according to your preference.

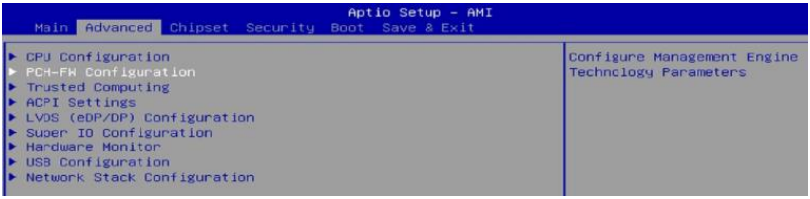


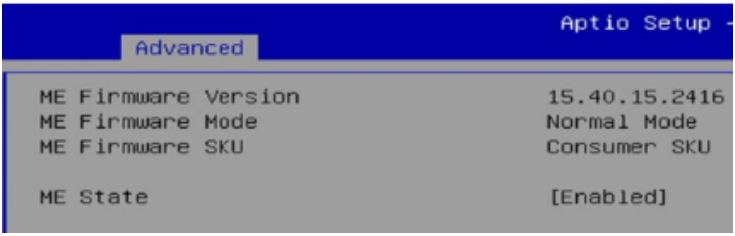
4.4.1 CPU Configuration

Displays CPU configuration parameters.



4.4.2 PCH-FW Configuration



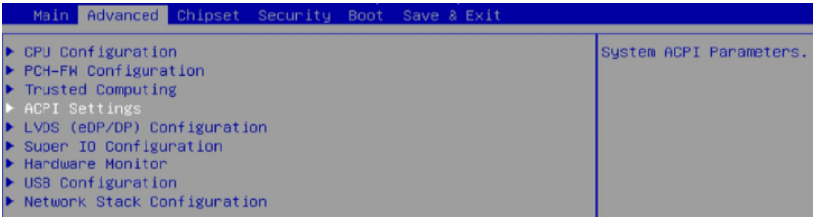


BIOS Setting	Description
ME State	When disabled ME will be put into ME Temporarily Disabled Mode.

4.4.3 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 INTIA interface will not be available.
SHA-1 PCR Bank	Enables / Disables SHA-1 PCR Bank.
SHA256 PCR Bank	Enables / Disables SHA256 PCR Bank.
SHA384 PCR Bank	Enables / Disables SHA384 PCR Bank.
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	Selects to show the PPI Spec Version (1.2 or 1.3) that the OS supports. **Note:** Some HCK tests might not support 1.3.
Device Select	• **TPM 1.2** will restrict support to TPM 1.2 devices only. • **TPM 2.0** will restrict support to TPM 2.0 devices only. • **Auto** will support both with the default being set to TPM 2.0 deices if not found, and TPM 1.2 device will be enumerated.

4.4.4 ACPI Settings



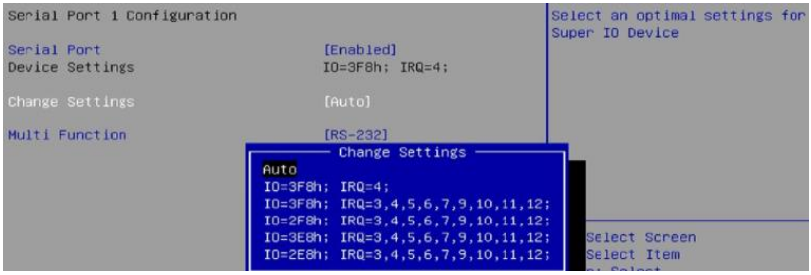
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state (Suspend Disabled or S3) where the system will enter when the Suspend button is pressed.

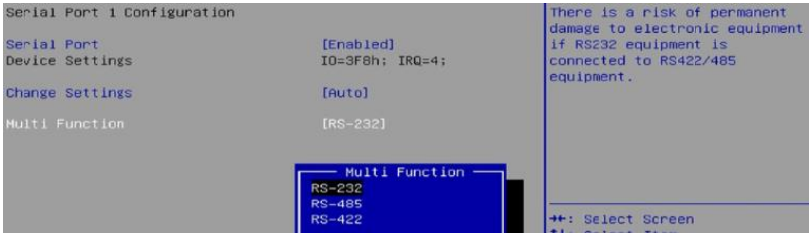
4.4.5 LVDS (eDP/DP) Configuration

BIOS Setting	Description
LVDS (eDP/DP) Support	Enables / Disables LVDS.
Panel Color Depth	Selects the panel collor depth. Options: 18 bit, 24 Bit (VESA), 24 bit (JEIDA)
LVDS Channel Type	Chooses the LVDS as single or dual channel.
LCD Panel Type	Selects LCD panel used by Intel Graphics Device by selecting the appropriate setup item. Resolution Options: VBIOS Default, 800 x 480, 800 x 600, 1024 x 768, 1280 x 768, 1280 x 800, 1280 x 960, 1280 x 1024, 1366 x 768, 1440 x 900, 1600 x 900, 1600 x 1200, 1680 x 1050, 1920 x 1080, 1920 x 1200
LVDS Brightness Level Control	Options: Level-1 to Level-8

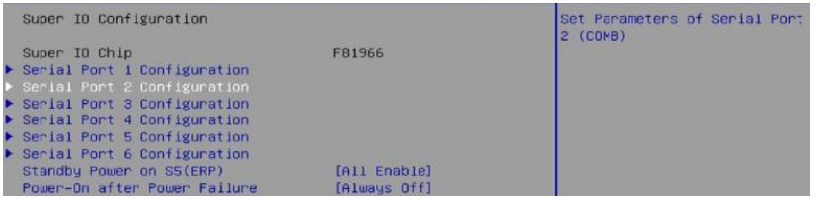
4.4.6 Super IO Configuration

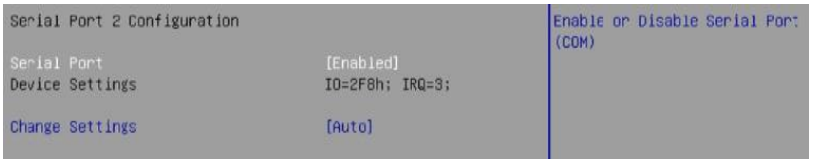
Serial Port 1 Configuration

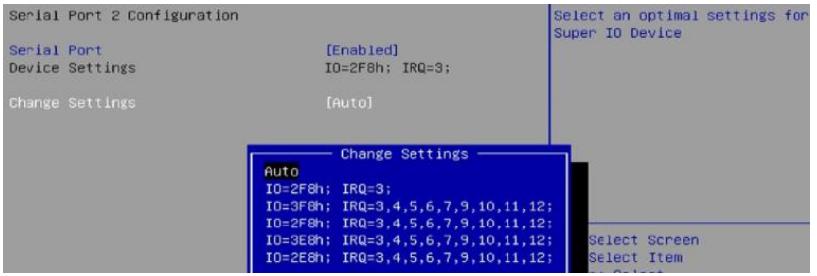




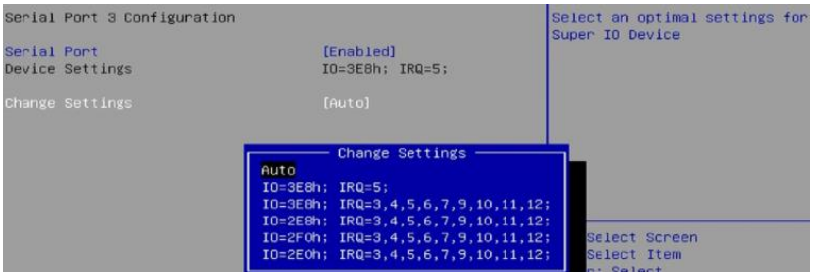
Serial Port 2 Configuration



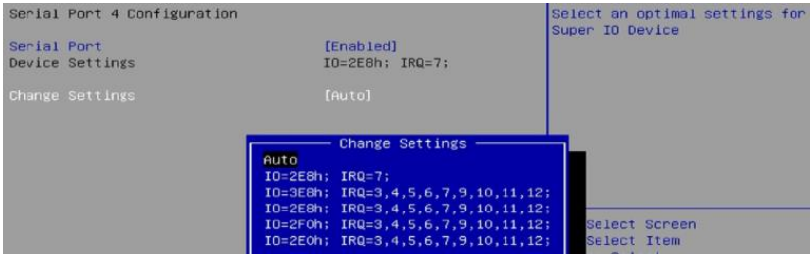




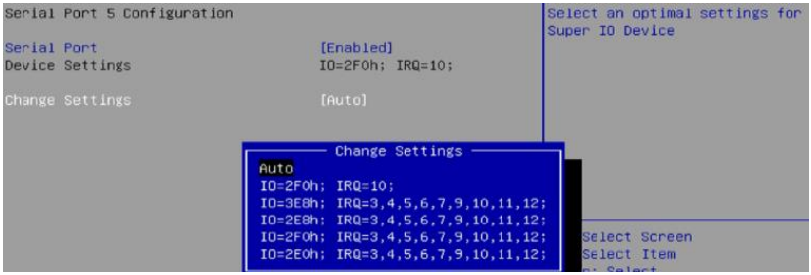
Serial Port 3 Configuration



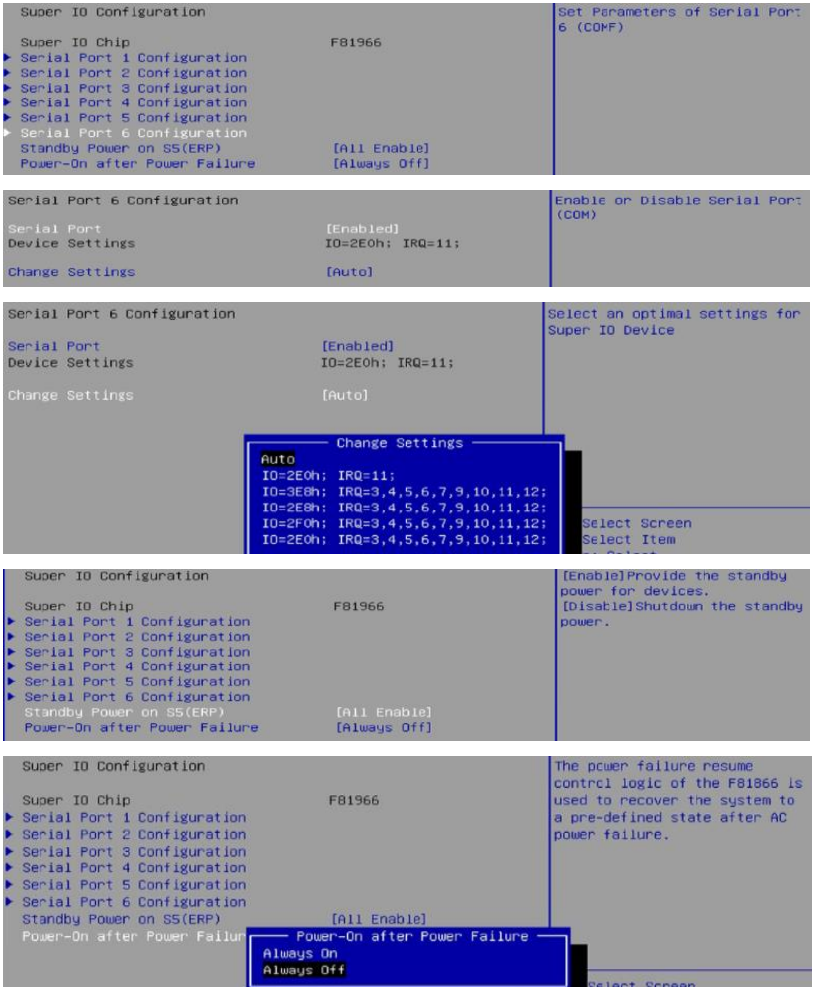
Serial Port 4 Configuration



Serial Port 5 Configuration

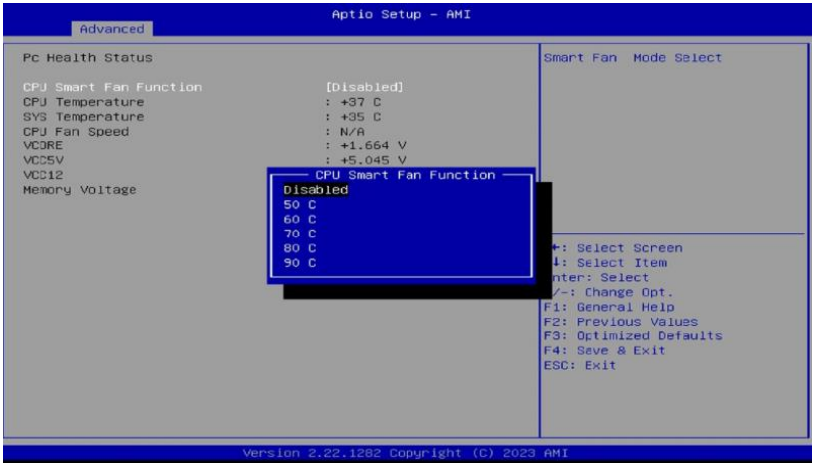


Serial Port 6 Configuration



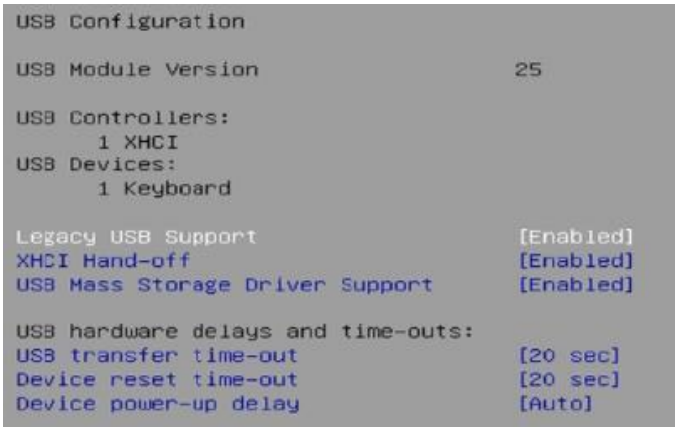
BIOS Setting	Description
Serial Ports Configuration	Sets parameters of serial ports.
Standby Power on S5(ERP)	This setting enables or shutdown the standby power for devices.
Power on after Power Failure	Options: Always on, Always off

4.4.7 Hardware Monitor



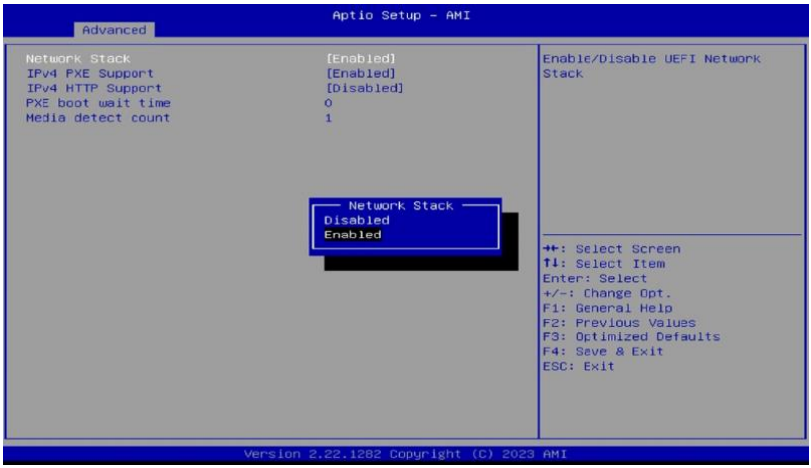
BIOS Setting	Description
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.8 USB Configuration



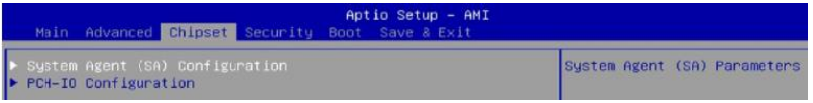
BIOS Setting	Description
Legacy USB Support	• **Enabled** enables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disabled** keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. 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	Gives seconds (10 / 20 / 30 / 40 secs) to delay execution of Start Unit command to USB mass storage device.
Device power-up delay	The maximum 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. But for a Hub port, the delay is taken from Hub descriptor.

4.4.9 Network Stack Configuration

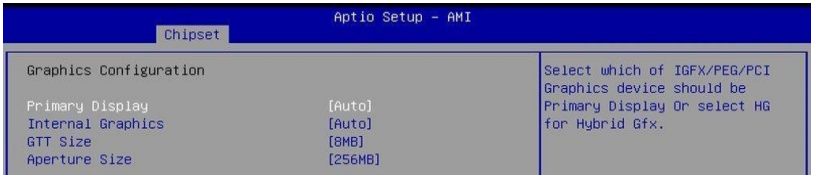


BIOS Setting	Description
Network Stack	Enable/Disable UEFI Network Stack
IPv4 PXE Support	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
Ipv4 HTTP Support	Enable/Disable Ipv4 HTTP boot support. If disabled, Ipv4 HTTP boot support will not be available.
PXE boot wait time	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

4.5 Chipset Settings

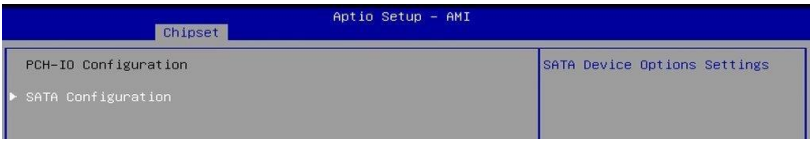


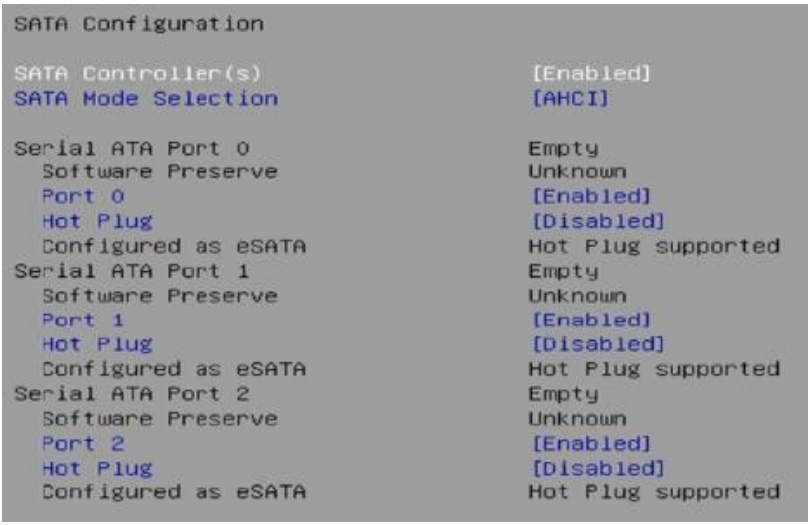
4.5.1 System Agent (SA) Configuration



BIOS Setting	Description
Primary display	Select which of IGFX/PEG/PCI Graphics device should be Primary Display or select HG for Hybrid Gfx
Internal Graphics	Keep IGFX enabled based on the setup options
GTT Size	Options: 2MB, 4MB, 8MB
Aperture Size	Select the Aperture Size. Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support
VT-d	Enable/Disable VT-d capability

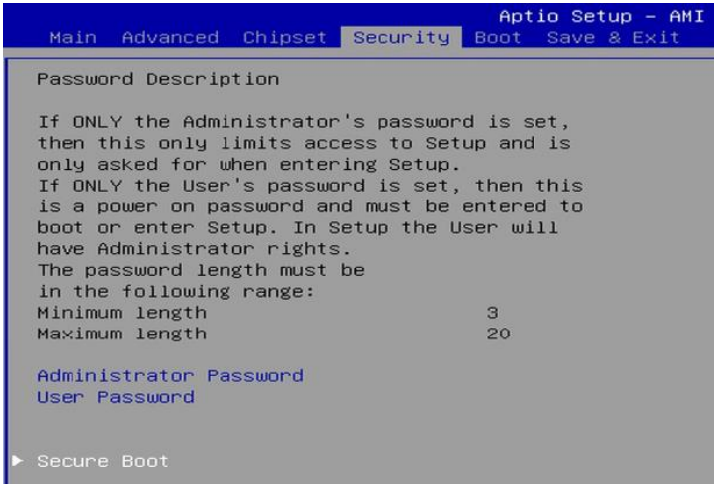
4.5.2 PCH-IO Configuration





BIOS Setting	Description
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 0~1.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.

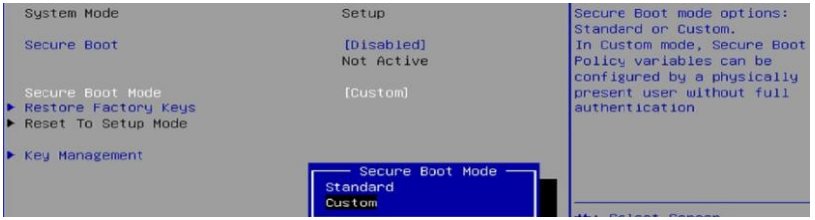
4.6 Security Settings



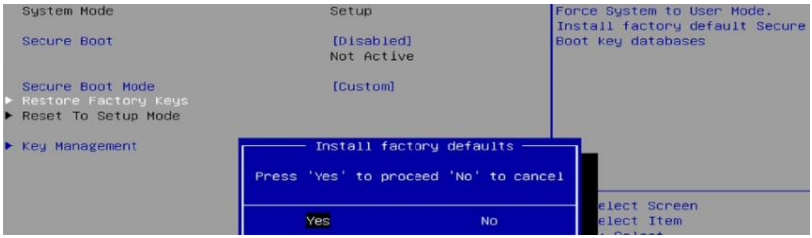
BIOS Setting	Description
Setup Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Secure Boot feature is Active if Secure Boot is Enabled. Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset

Secure Boot

Secure Boot Mode



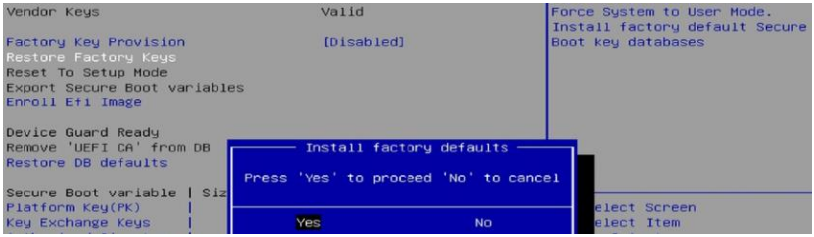
Restore Factory Keys



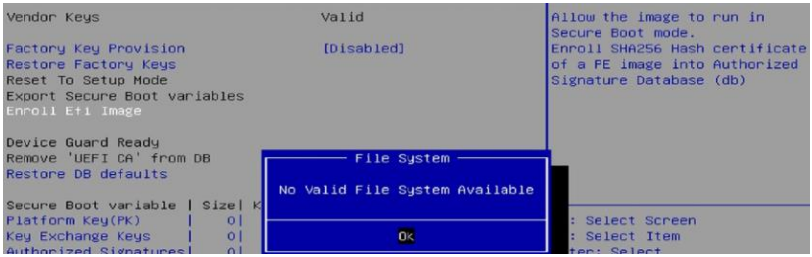
Key Management

Factory Key Provision

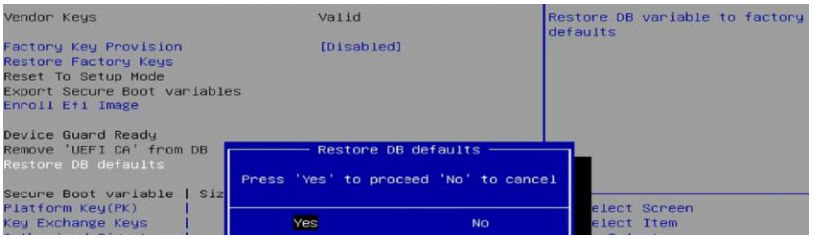
Restore Factory Keys



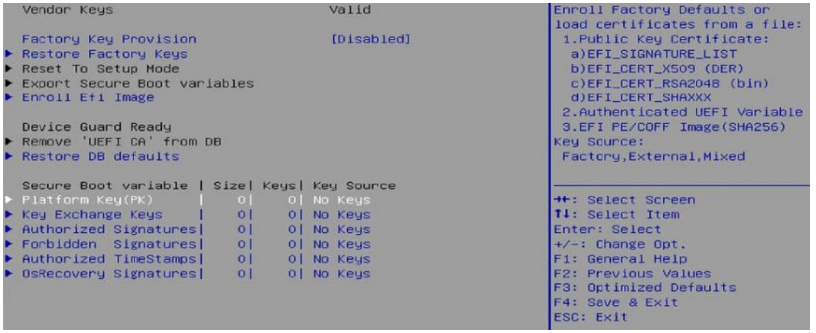
Enroll Efi Image



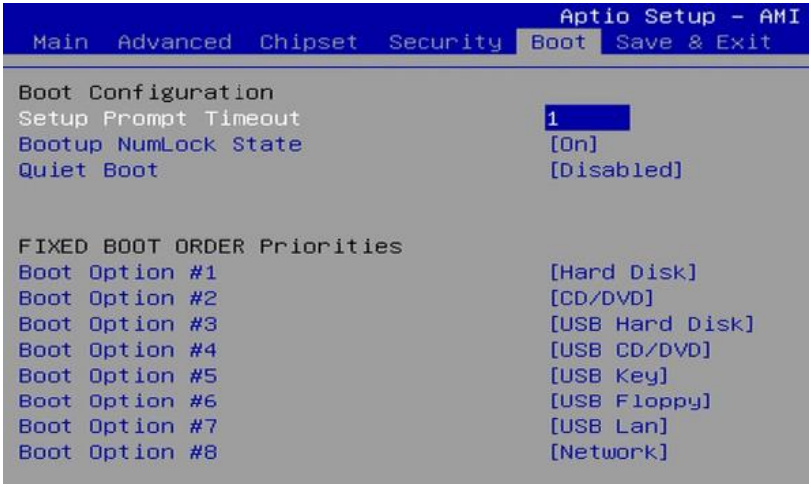
Restore DB defaults



Secure Boot Variables

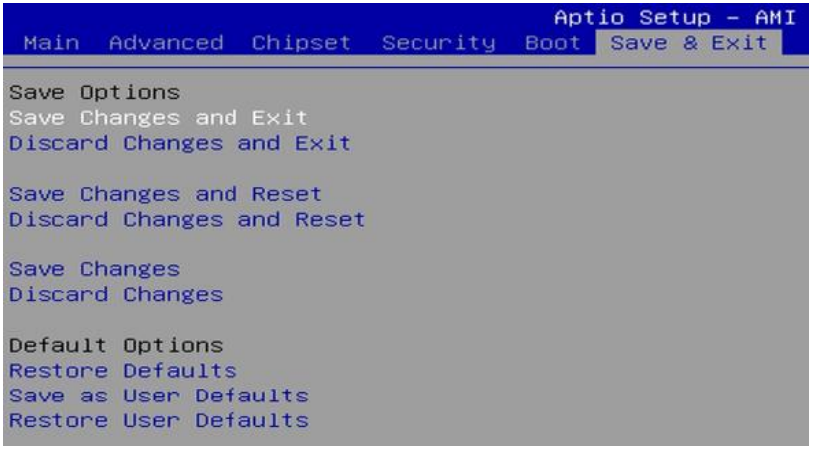


4.7 Boot Settings



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.
Boot Option Priorities	Sets the system boot order priorities for hard disk, CD/DVD, USB, Network.

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 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.

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
0x00000A20-0x00000A2F	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
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F0-0x000002F7	Communications Port (COM5)
0x000002E0-0x000002E7	Communications Port (COM6)
0x00001800-0x000018FE	Motherboard resources
0x00003090-0x00003097	Standard SATA AHCI Controller
0x00003080-0x00003083	Standard SATA AHCI Controller
0x00003060-0x0000307F	Standard SATA AHCI Controller

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
0x00001854-0x00001857	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000EFA0-0x0000EFBF	SM Bus Controller
0x00002000-0x000020FE	Motherboard resources
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00003000-0x0000303F	Microsoft Basic Display Adapter
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer

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 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 10	Communications Port (COM5)
IRQ 11	Communications Port (COM6)
IRQ 12	Microsoft PS/2 Mouse
IRQ 16	High Definition Audio Controller
IRQ 55~IRQ 204	Microsoft ACPI-Compliant System
IRQ 256~IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967282~86	Intel(R) Ethernet Controller I226-V #3
IRQ 4294967287	Intel(R) Management Engine Interface #1
IRQ 4294967288~92	Intel(R) Ethernet Controller I226-V #2
IRQ 4294967293	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967294	Standard SATA AHCI Controller

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 Connector	J4	Hao Guo Xing Ye DF11-12S-PA66H	Hirose DF11-12DS-2C
SATA HDD Power Connector	J8	E-call 0110-071-040	JST XHP-4
Front Panel Setting Connector	J26	Dupont 2.54 mm-pitch pin header (Male)	Dupon 2.54 mm-pitch (Female)
USB 2.0 Connector	J6	Hao Guo Xing Ye DF11-8S-PA66H	Hirose DF11-8DS-2C
Battery Connector	J24	Molex 53047-0210	Molex 51021-0200
COM 2, COM3, COM4 RS-232 Ports	J23, J17, J19	Hao Guo Xing Ye DF11-10S-PA66H	Hirose DF11-10DS-2C
DC Power Input Connector	J7	Hao Guo Xing Ye WAFER396-2S-WV	JST VHR-2N
Digital I/O Connector	J27	Dupont 2.00 mm-pitch pin header (Male)	Dupon 2.00 mm-pitch (Female)
LCD Backlight Connector	J9, J25	E-CALL 0110-161-040	JST PHR-4
LVDS Connectors	J14, J21	Hirose DF20G-20DP-1V	Hirose DF20A-20DS-1C

E. IB837 USB Power Control Bit Mapping.

Function	Connector	Software Mapping
USB 3.1	CN5 (A,B)	bit_0
USB 3.1	CN6 (A,B)	bit_1