MI836F

Intel® Atom® SoC
(x6000 Series)
Mini-ITX Motherboard

User's Manual

Version 1.0
(December 2022)

Compliance

CE

This is a class B product. 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 A 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 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 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

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, you can download the RMA form at http://www.ibase.com.tw/english/Supports/RMAService/. Fill out the form and contact your distributor or sales representative.

Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Specifications
- Block Diagram
- Product View
- Dimensions

1.1 Introduction

MI836F is a Mini-ITX motherboard based on the Atom x6000E series processors with either LVDS or eDP graphics interface support. Other graphics display ports available are VGA and HDMI 2.0b. Two DDR4 SO-DIMM sockets support up to 32GB of 3200MHz memory. Two 2.5G LAN are on board as well as 3x USB 3.1 and four USB 2.0 and M.2 Key E and mPCIe sockets. The board runs on +12V~24V DC power and operating temperature from -40C to 70C.

MI836F

1.2 Features

- 2 x DDR4 SO-DIMM with 32MB maximum support.
- 2x 2.5G LAN, 4x COM, 1x HDMI, 1x VGA
- 1x eDP or 1x 24-bit dual channel LVDS
- 3x USB 3.1, 2x SATA III
- PCIe (x1), M.2 E2230, M.2 M2280 (SATA only), mPCIe expansion slots
- Configurable watchdog timer and digital I/O
- Reserved firmware TPM (fTPM)

1.3 Packing List

Your product package should include the items listed below.

- Motherboard
- I/O Shield
- SATA Cable (SATA-3F)
- Disk (including chipset drivers)
- This User's Manual

1.4 Optional Accessories

IBASE provides the optional accessories listed below.

- Audio Cable (Audio-34)
- USB Cable (USB-29)
- USB Cable (USB2-4)
- COM Port Cable (PK1H)
- 60W Power Adaptor

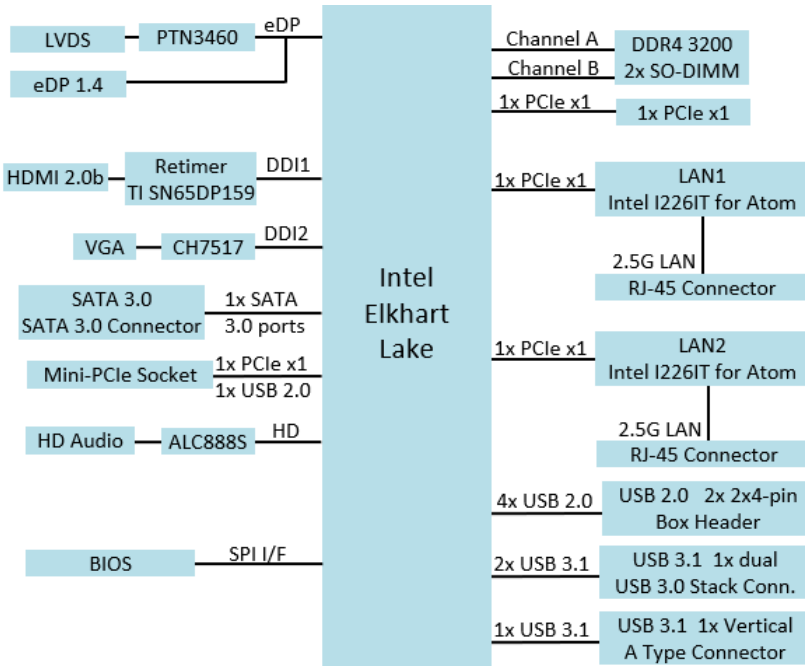
1.5 Specifications

Product Name	MI836F-6425E	MI836FE-6425E	MI836F-6413E	MI836FE-6211E
Intel Atom SoC	X6425E	X6425E	X6413E	X6211E
SoC Speed	2.0~3.0GHz	2.0~3.0GHz	1.5~3.0GHz	1.3~3.0GHz
LVDS or EDP	LVDS	eDP	LVDS	eDP
Memory	2 x DDR4 SO-DIMM 3200MHz, expandable up to 32GB			
LAN	2x 2.5G LAN (Intel)			
Network	1st LAN: Intel® I226IT 2.5GbE 2nd LAN: Intel® I226IT 2.5GbE			
Audio Codec	Built-in HD audio with Realtek ALC888S			
Super I/O	Fintek F81964D			
Digital I/O	4-In / 4-Out			
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec / min)			
BIOS	AMI BIOS			
TPM	Reserved firmware TPM (fTPM)			
EuP / ErP	Compliant			
Dimensions	170 x 170 mm (6.7” x 6.7”)			
RoHS	Yes			
Operating System	• Microsoft Windows 10 (64-bit) • Linux Ubuntu (64-bit)			
Certification	CE, FCC Class A			

I/O Ports	
Display	• 1 x HDMI 2.0b (4096 x 2160 at 60 Hz) • 1 x VGA (1920 x 1200 at 60 Hz) • 1 x eDP or 24-bit dual channel LVDS (1920 x 1080 at 60 Hz)
LAN	2 x RJ45 GbE LAN
USB	• 3 x USB 3.1 (I/O coastline connectors) • 4 x USB 2.0 (via an onboard pin-header)
Serial	**4 x COM ports:** • COM1 & COM2: RS-232/422/485 (I/O coastline connectors, jumper-less selection) • COM3 ~ COM4: RS-232 only (via onboard box-headers)
SATA	2 x SATA III
Audio Jack	1 x Line-In, 1 x Line-Out, 1 x Mic-In
Digital IO	4-In & 4-Out
Expansion Slots	• 1 x PCIe (x1) • 1 x M.2 Key M, type 2280, with SATA port • 1 x M.2 Key E, type 2230, with USB 2.0 / PCIe(x1) • mPCIe
Environment	
Temperature	• **Operating temperature:** -40 ~ 70 °C
Relative Humidity	0 ~ 90 %, non-condensing at 60 °C

All specifications are subject to change without prior notice.

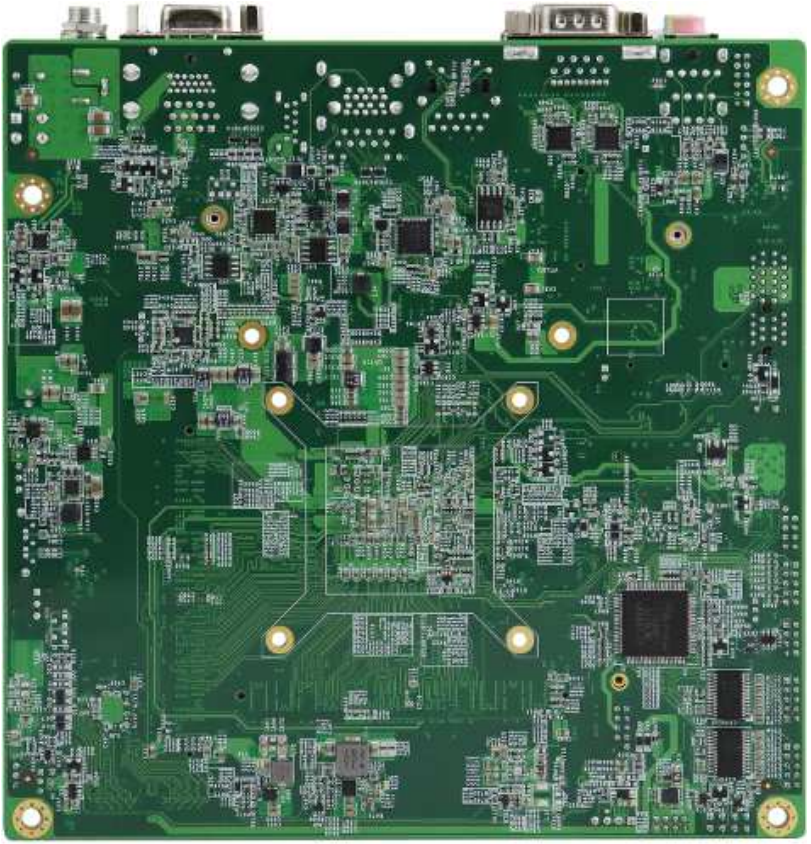
1.6 Block Diagram



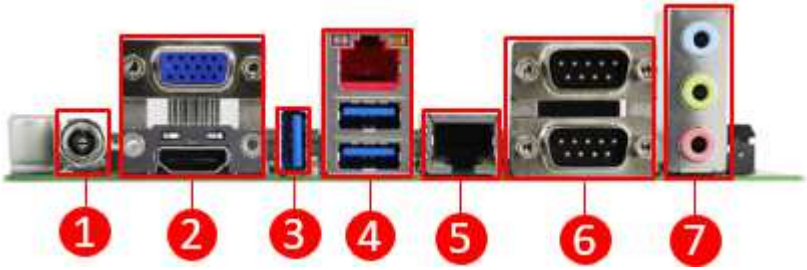
1.7 Product View

Top View

Bottom View

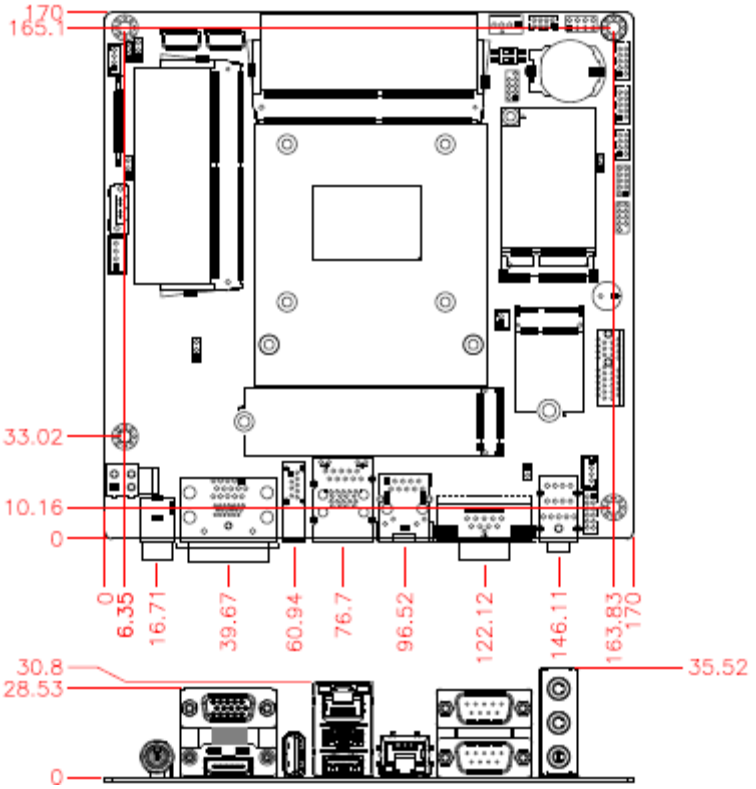


I/O View



No.	Name	No.	Name
1	CN3 DC Power Input	5	CN7 LAN Port
2	CN4 VGA & HDMI Ports	6	CN8 COM1/COM2 Ports
3	CN5 USB 3.1 Port	7	CN9 Audio (Line-out, Line-in, Mic)
4	CN6 LAN & 2x USB 3.1 Ports		

1.8 Dimensions



Chapter 2
Hardware Configuration

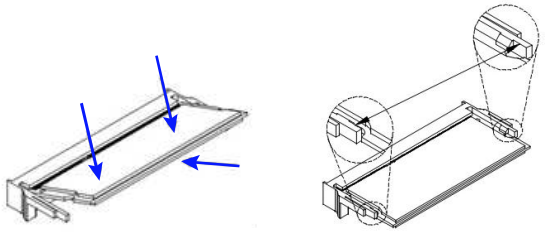
This section provides information on jumper settings and connectors on the board in order to set up a workable system. The topics covered are:

- Memory installation
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Installations

2.1.1 Installing the Memory

To install the modules, locate the memory slot on the board and perform the following steps:



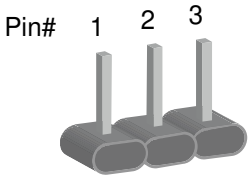
1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

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

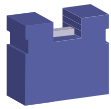
2.1.2 Setting the Jumpers

Set up and configure your product 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.

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.

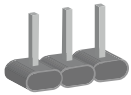
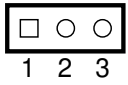
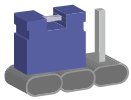
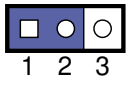
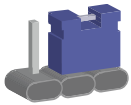
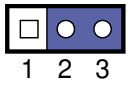


A 3-pin jumper



A jumper cap

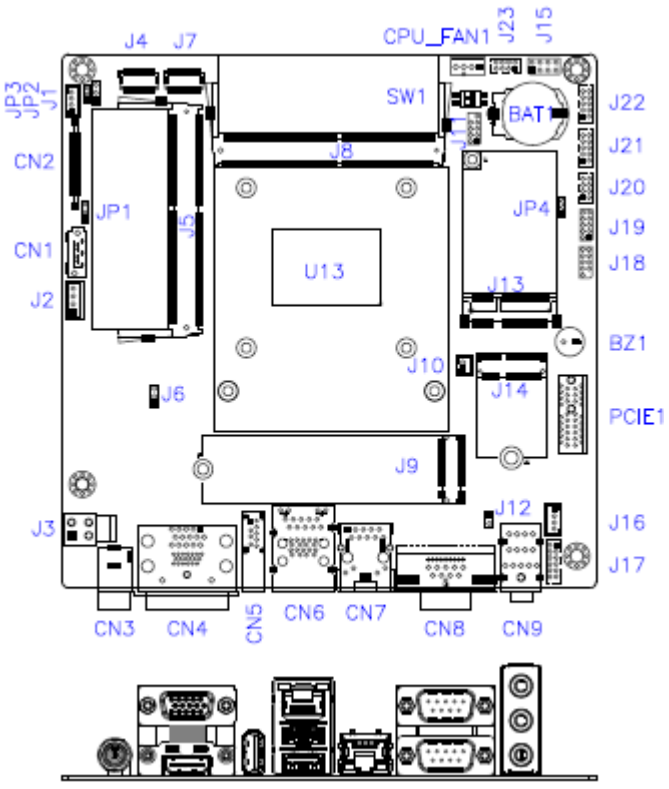
Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Illustration
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**.

2.2 Jumper & Connector Locations



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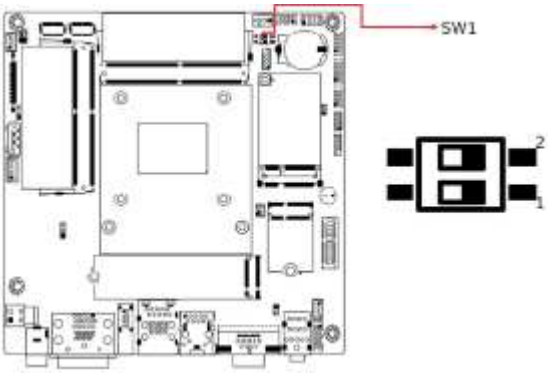
Jumpers Quick Reference

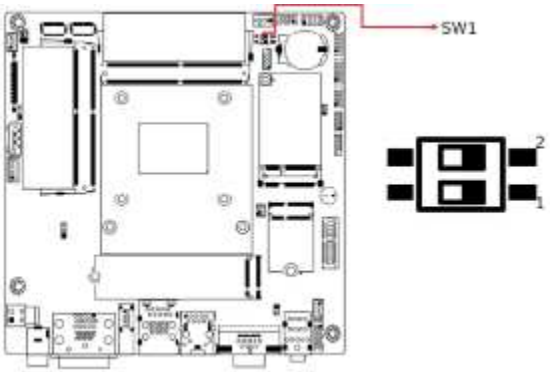
Switch/Jumper	Function	Page
SW1	Clear CMOS Data	15
SW1	Clear ME Register	16
JP1	EDP Panel Power Select	17
JP2	LVDS Panel Brightness Select	18
JP3	LVDS Panel Power Select	19
JP4	ATX / AT Power Select	20

2.2.1 Clear CMOS Data (SW1)



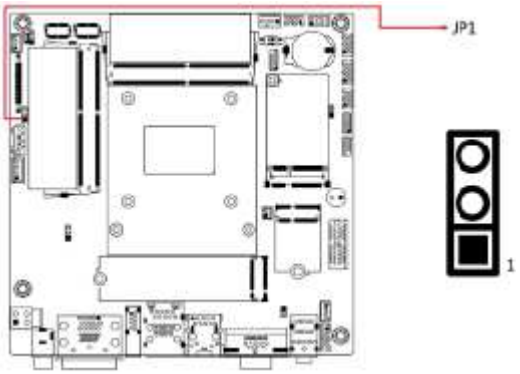
Function	Pin closed
Normal (default)	P1-OFF
Clear CMOS	P1-ON

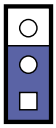
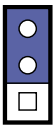
2.2.2 Clear ME Register (SW1)



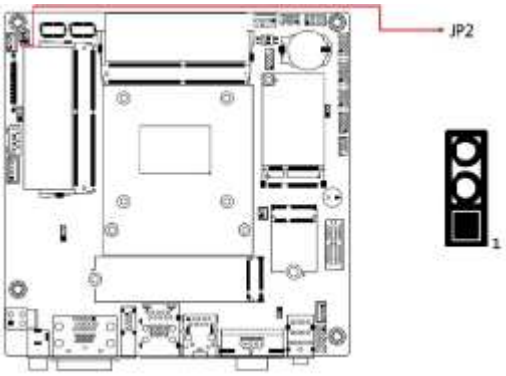
Function	Pin closed
Normal (default)	P2-OFF
Clear ME	P2-ON

2.2.3 EDP Panel Power Selection (JP1)



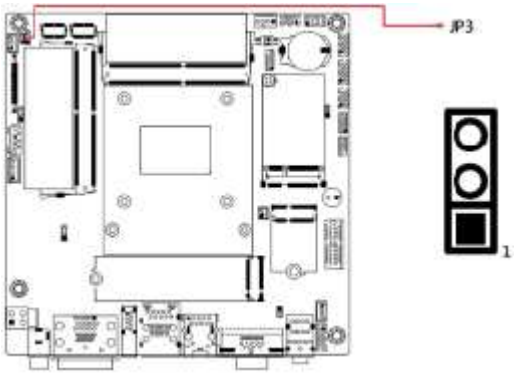
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

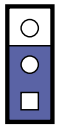
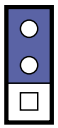
2.2.4 LVDS Panel Brightness Selection (JP2)



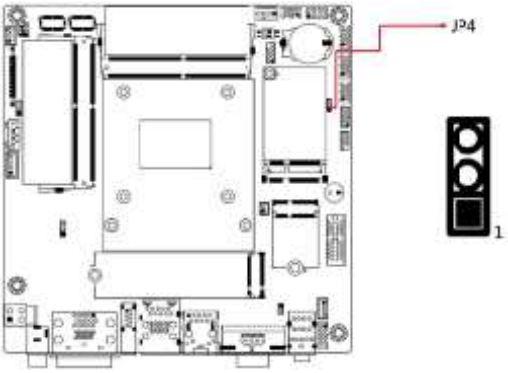
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

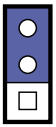
2.2.5 LVDS Panel Power Selection (JP3)



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

2.2.6 ATX & AT Power Mode Selection (JP4)

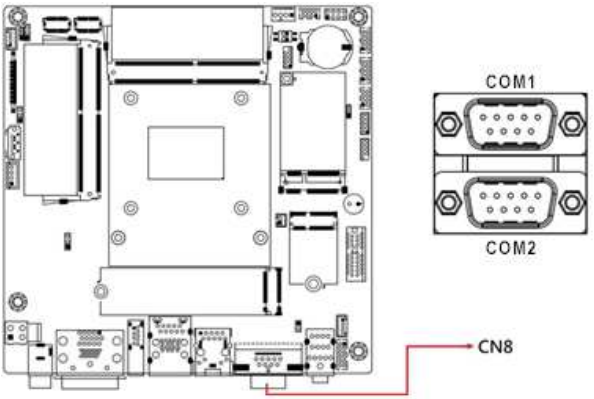


Function	Pin closed	Illustration
ATX Mode (default)	1-2	
AT Mode	2-3	

2.3 Connectors Quick Reference

Function	Connector	Page
COM1 & COM2 RS-232/422/485 Ports	CN8	22, 9
COM3 & COM4 RS-232 Ports	J22, J21	23
eDP Connector	CN2	24
DC Power Input Connector	CN3	25, 9
LCD Backlight Connector	J1	25
SATA HDD Power Connector	J2	26
DC Power Input Connector	J3	26
LVDS Connector	J4-CHA, J7-CHB)	27
SUS CLK-OUT	J10	28
Audio SPDIF-Out	J12	28
Front Panel Settings Connector	J15	29
Audio Amplifier Connector	J16	30
Audio Connector	J17	31
Digital I/O	J19	32
USB 2.0 Connector	J20, J23	33
CPU PWM Fan Power Connector	CPU_FAN1	33
VGA & HDMI Ports	CN4	9
USB 3.1 Port	CN5	9
LAN & 2x USB 3.1 Ports	CN6	9
LAN Port	CN7	9
Audio (Line-out, Line-in, Mic)	CN9	9

2.3.1 COM1 & COM2 RS-232/422/485 Ports (CN8)

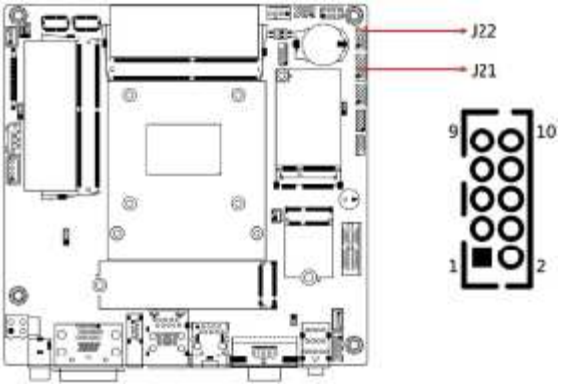


Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

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

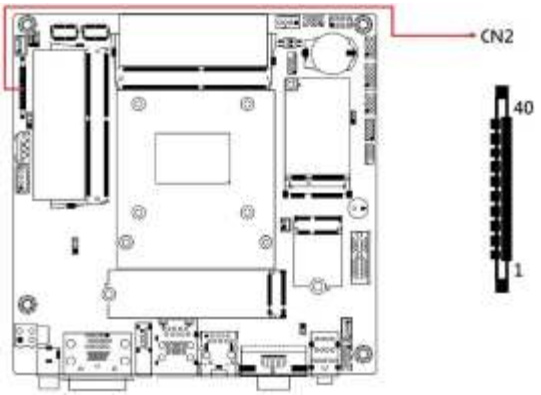
*COM1 & COM2 support jumperless setting, via BIOS setting.

2.3.2 COM3 & COM4 RS-232 Ports (J22, J21)



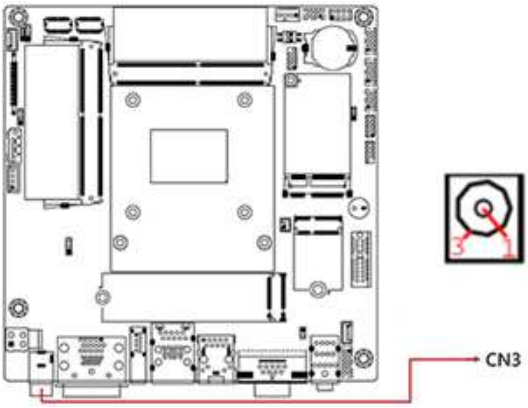
Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	2	RXD, Receive data
3	TXD, Transmit data	4	DTR, Data terminal ready
5	Ground	6	DSR, Data set ready
7	RTS, Request to send	8	CTS, Clear to send
9	RI, Ring indicator	10	NC

2.3.3 eDP Connector (CN2)



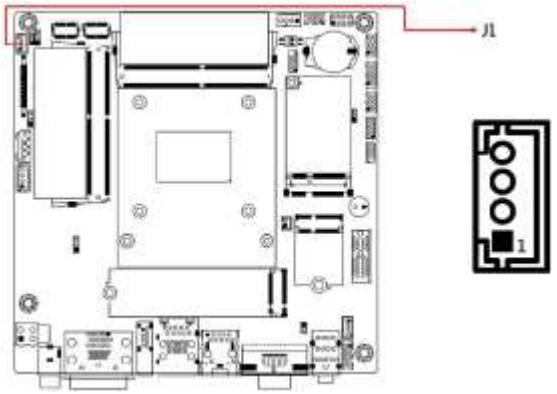
Pin	Signal Name	Pin	Signal Name
1	VDD_EDP	2	VDD_EDP
3	VDD_EDP	4	VDD_EDP
5	VDD_EDP	6	GND
7	GND	8	GND
9	GND	10	EDP_HDP
11	GND	12	TXN3
13	TXP3	14	GND
15	TXN2	16	TXP2
17	GND	18	TXN1
19	TXP1	20	GND
21	TXN0	22	TXP0
23	GND	24	AUXP
25	AUXN	26	NC
27	VCC3	28	BL_PWR1
29	NC	30	GND
31	VCC5	32	NC
33	BKLT_CTRL	34	BKLT_EN
35	BL_PWR2	36	VCC3
37	GND	38	EDP_CK
39	EDP_DATA	40	NC

2.3.4 DC Power Input Connector (CN3)



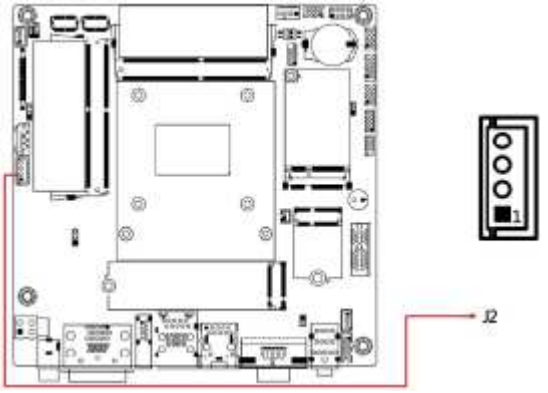
Pin	Signal Name
1	+12V~24V
3	Ground

2.3.5 LCD Backlight Connector (J1)



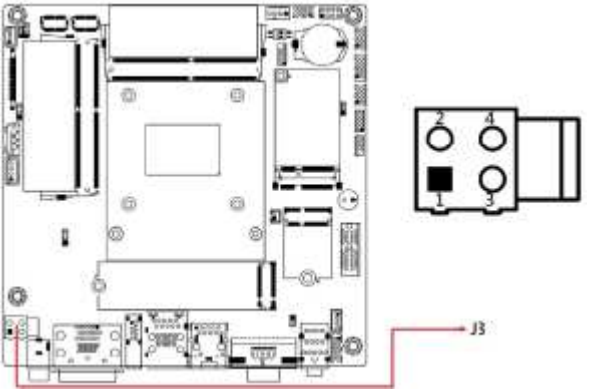
Pin	Signal Name	Pin	Signal Name
1	+12V	3	Brightness Control
2	Backlight Enable	4	Ground

2.3.6 SATA HDD Power Connector (J2)



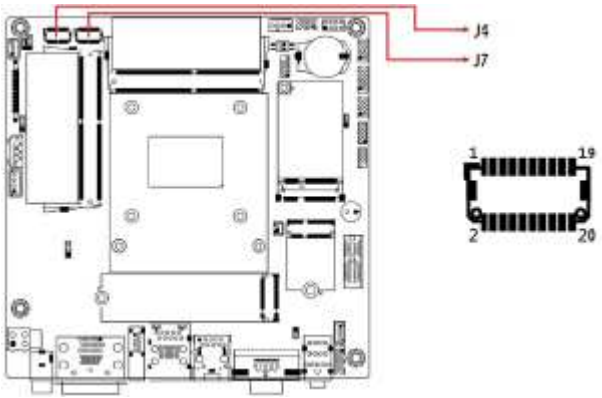
Pin	Signal Name	Pin	Signal Name
1	+5V	3	Ground
2	Ground	4	+12V

2.3.7 DC Power Input Connector (J3)



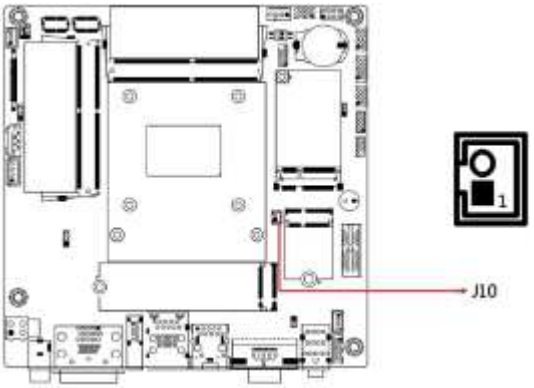
Pin	Signal Name	Pin	Signal Name
1	Ground	3	12V~24V
2	Ground	4	12V~24V

2.3.8 LVDS Connector (J4-CHA, J7-CHB)



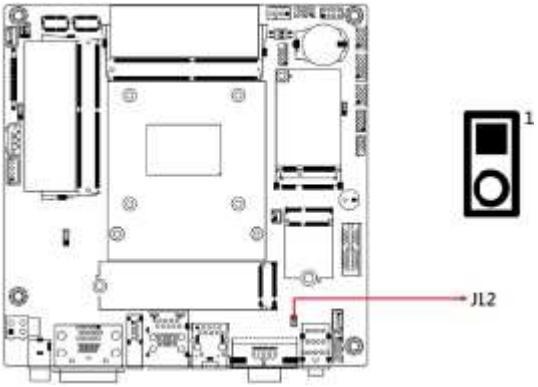
Pin	Signal Name	Pin	Signal Name
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	Power	20	Power

2.3.9 SUS_CLK-OUT (J10)



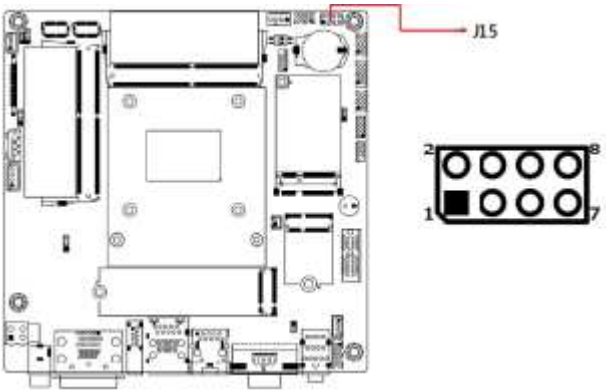
Pin	Signal Name
1	SUS_CLK-OUT
2	Ground

2.3.10 Audio SPDIF-OUT (J12)



Pin	Signal Name
1	SPDIF-OUT
2	Ground

2.3.11 Front Panel Settings Connector (J15)



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

J15 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.

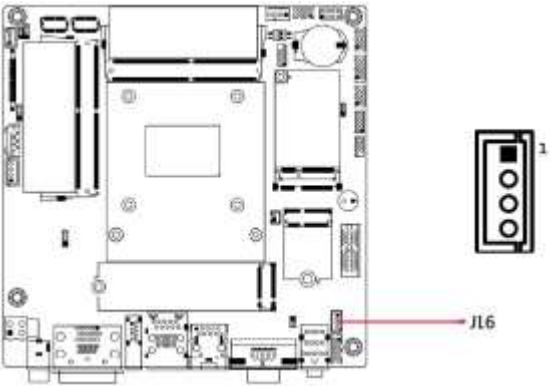
- **Reset Switch (Pins 5 and 6)**

  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)**

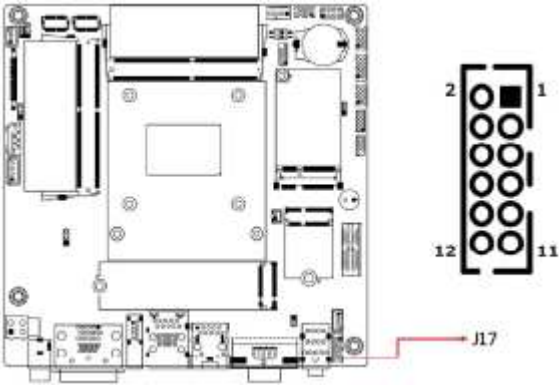
  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

2.3.12 Audio Amplifier Connector (J16)



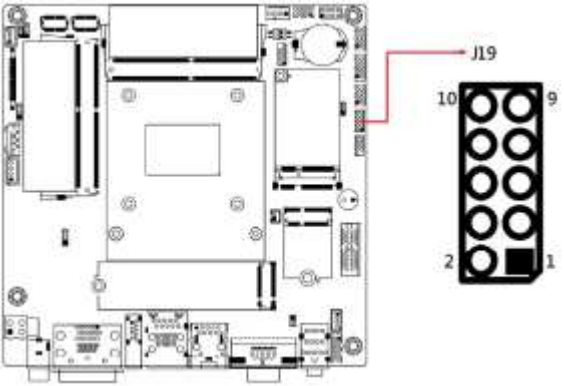
Pin	Signal Name
1	SPK_L+
2	SPK_L-
3	SPK_R-
4	SPK_R+

2.3.13 Audio Connector (J17)



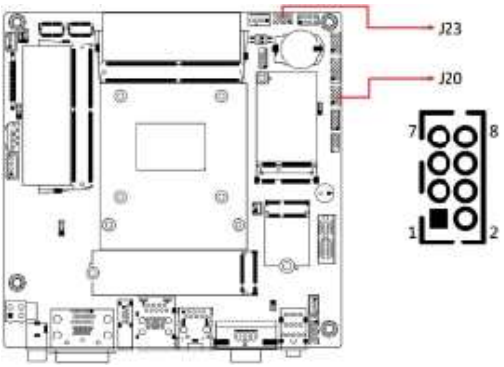
Pin	Signal Name	Pin	Signal Name
1	Lineout_L	2	Lineout_R
3	JD_FRONT	4	Ground
5	LINEIN_L	6	Linein_R
7	JD_LINEIN	8	Ground
9	MIC_L	10	MIC-R
11	JD_MIC1	12	Ground

2.3.14 Digital I/O Connector (J19)



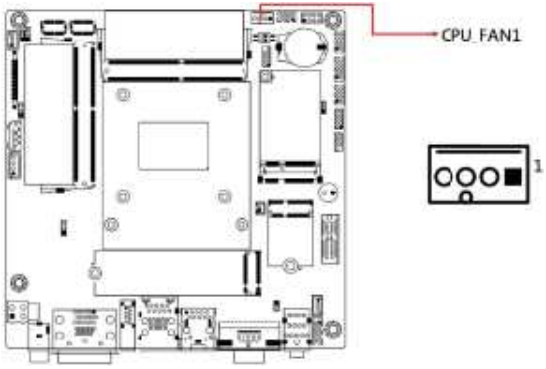
Pin	Signal Name	Pin	Signal Name
1	Ground	2	+5V
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

2.3.15 USB 2.0 Connector (J20, J23)



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

2.3.16 CPU PWM Fan Power Connector (CPU_FAN1)



Pin	Signal Name	Pin	Signal Name
1	Ground	3	Rotation detection
2	+12V	4	Control

Remarks: PWM only

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Chapter 3
Drivers Installation

This chapter introduces installation of the following drivers:

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

3.1 Introduction

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find anything missing, please contact the distributor where you made the purchase. The contents of this section include the following:

Note:

1. After installing your 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. Insert the disk enclosed in the package with the board. 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** to continue.
4. Accept the software license agreement.
5. On the *Readme File Information* screen, click **Install**.
6. When you have completed the setup process, click **Fiinish**.

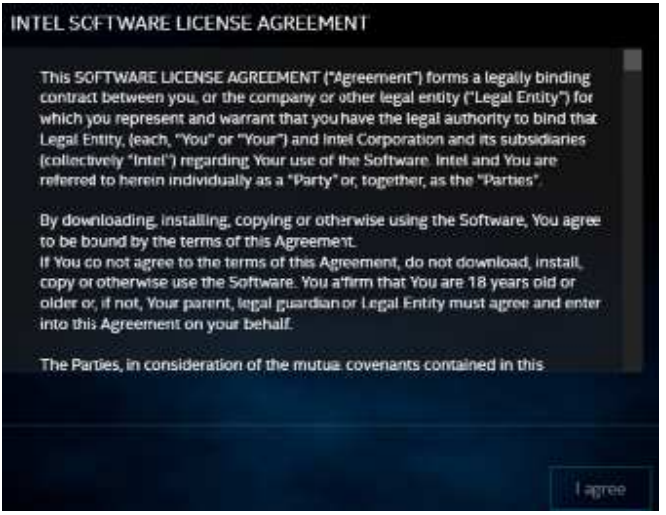
3.3 HD Graphics Driver Installation

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

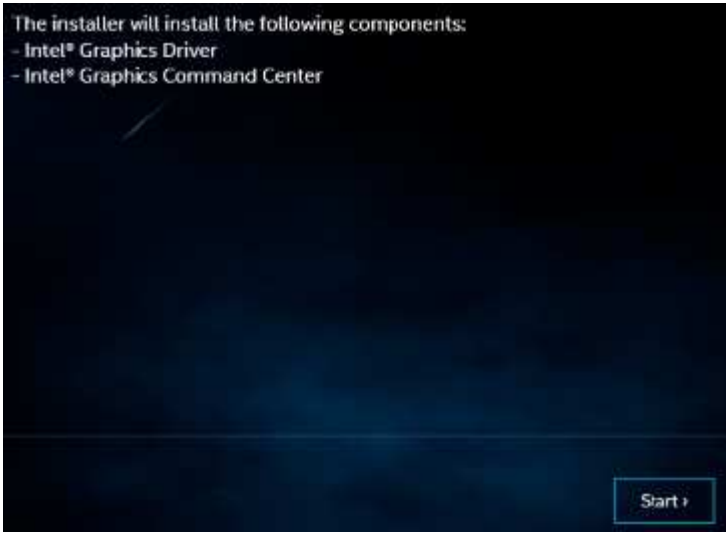
2. Click **Intel(R) Elkhartlake Graphics Driver**.

3. Click **Begin Installation**.

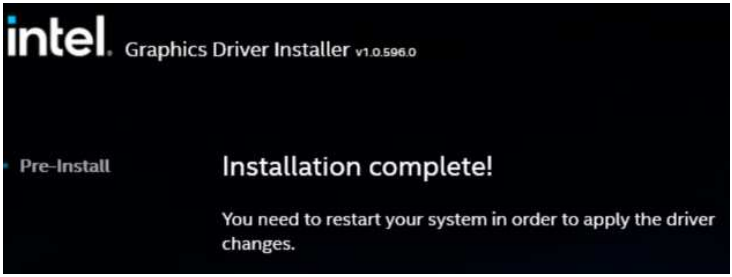
4. Click **I agree**.



5. Click **Start** to begin installing the new graphics driver.



6. When installation is complete, restart your system in order to apply the driver changes.



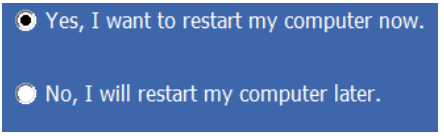
3.4 HD Audio Driver Installation

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

2. Click **Realtek High Definition Audio Driver** on the right pane.

3. The InstallShield Wizard will start installation of the **Realtek Audio Driver**.

4. When the installation has been completed, restart the computer.



3.5 Intel® Management Engine Drivers Installation

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

2. Click **Intel(R) ME 12.x Drivers**.

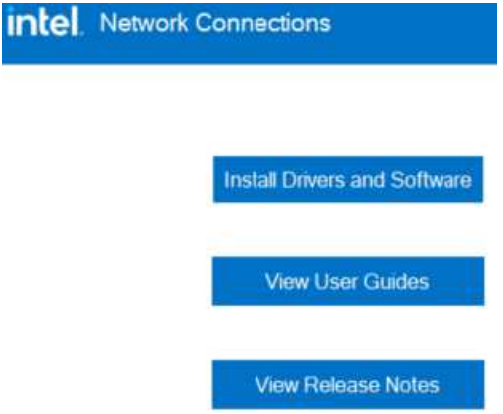
3. When the *Welcome* screen appears, click **Next**.
4. Accept the license agreement, click **Next**.
5. To install to the default folder, click **Next** or click **Change** to choose another destination folder.
6. When the components have been successfully installed, click **Finish**.

3.6 LAN Driver Installation

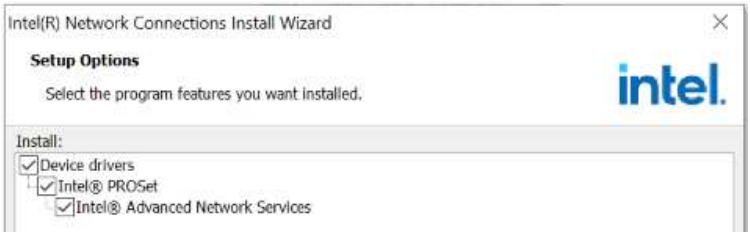
1. Click **LAN Card** on the left pane and then **Intel LAN Controller Drivers** on the right pane.

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

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

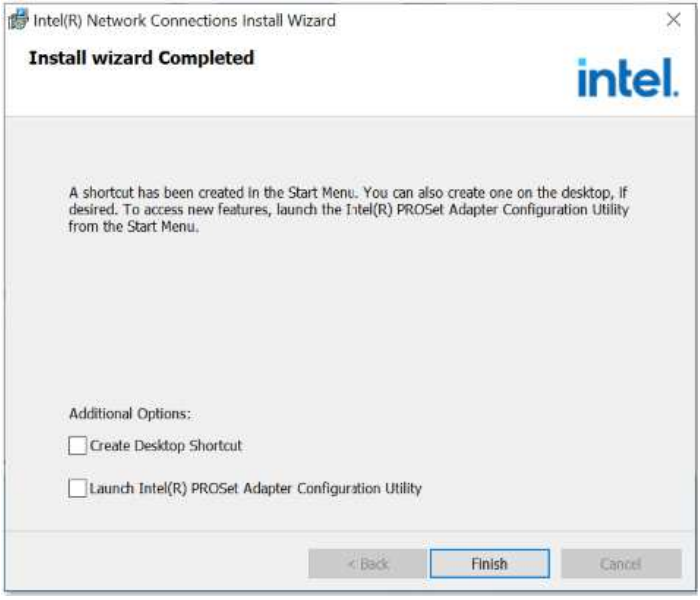


4. When the *Welcome* screen appears, click **Next**.
5. Accept the license agreement and click **Next**.
6. On the *Setup Options* screen, select the desired program features and click **Next**.



7. The wizard is ready for installation. Click **Install**.

8. 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
- Boot Settings
- Security 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. You can also press <F7> to have the Boot menu pop up immediately.

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
```

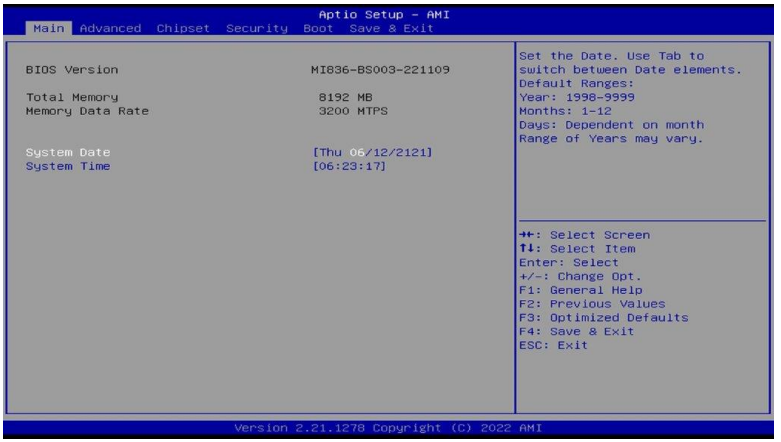
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

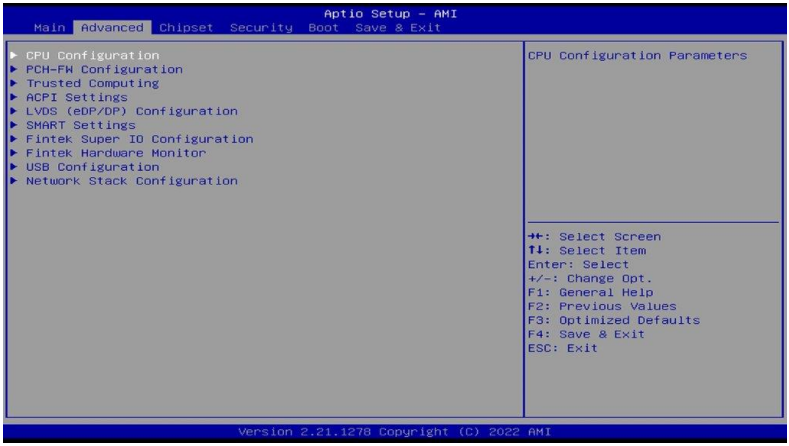
4.3 Main Settings



BIOS Setting	Description
System Language	Chooses the system default language.
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

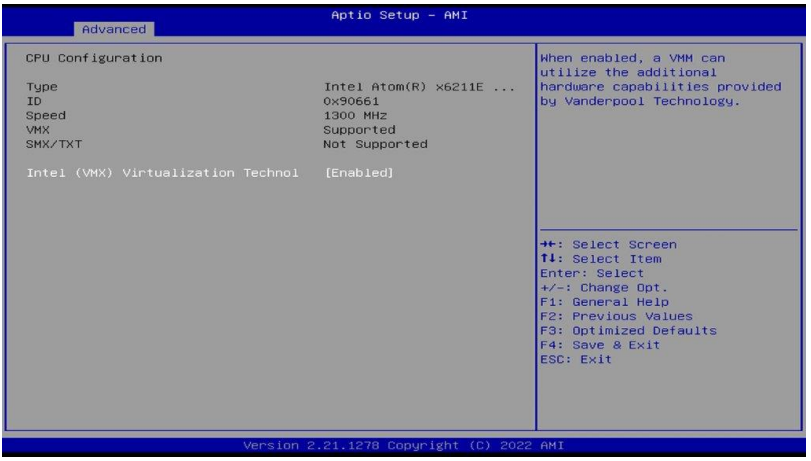
This section allows you to configure, improve your system and allows you to set up some system features according to your preference.



BIOS Setting	Description
CPU Configuration	Displays CPU configuration parameters.
PCH-FW Configuration	Configures management engine technology parameters.
Trusted Computing*	Trusted computing settings.
ACPI Settings	Displays system ACPI parameters.
LVDS (eDP/DP) Configuration [1]	Configures LVDS (eDP/DP).
SMART Settings	System SMART Settings
Fintek Super IO Configuration	Displays super IO chip parameters.
Fintek Super IO Hardware Monitor	Shows super IO monitor hardware status.
USB Configuration	Displays USB configuration parameters.
Network Stack Configuration	Netowrk Stack settings.

[1]: LVDS (eDP/DP) Configuration is available depending on the motherboard model.

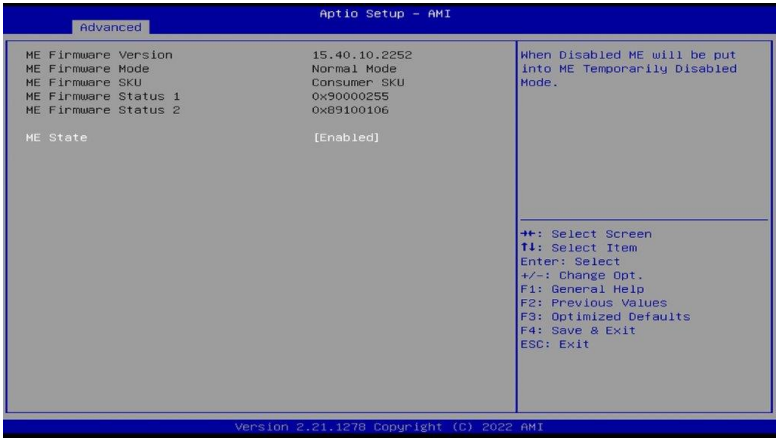
4.4.1 CPU Configuration



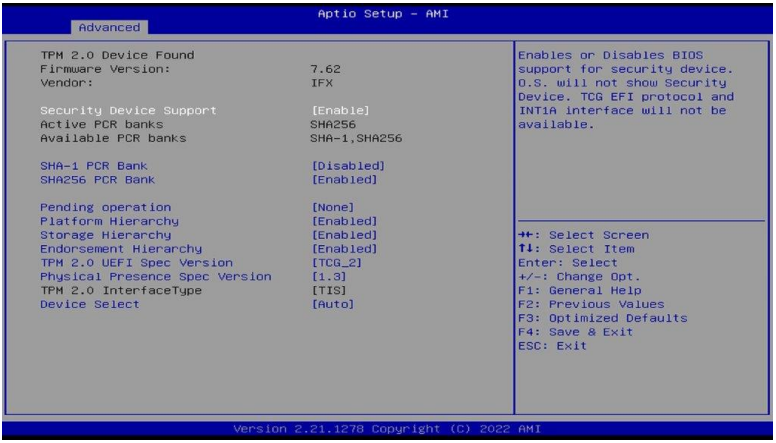
BIOS Setting	Description
Intel (VMX) Virtualization Technology	Enables / Disables a VMM to utilize the additional hardware capabilities provided by Vanderpool Technology.

4.4.2 PCH-FW Configuration

Configure Management Engine Technology Paramters.



4.4.3 Trusted Computing



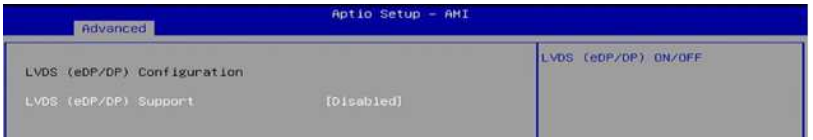
BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INTIA interface will not be available.
SHA-1 PCR Bank	Enables / Disables SHA-1 PCR Bank.

BIOS Setting	Description
SHA256 PCR Bank	Enables / Disables SHA256 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.
TPM2.0 UEFI Spec Version	Selects the supported TCG version based o your OS. • **TCG_1_2:** supports Windows 8 /10. • **TCG_2:** supports new TCG2 protocol and event format for Windows 10 or later.
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

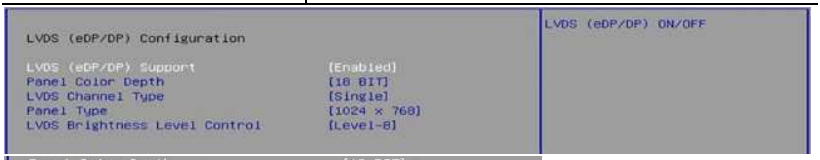
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state where the system will enter when the Suspend button is pressed. Options: Suspend Disabled, S3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

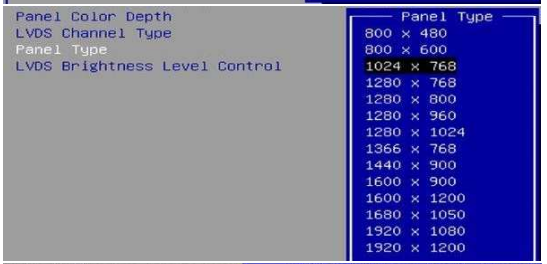
4.4.5 LVDS (eDP/DP) Configuration

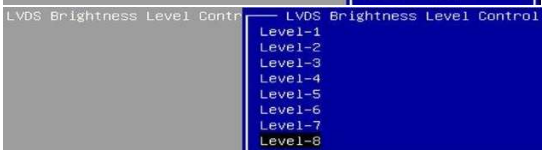


Note: LVDS (eDP/DP) configuration is only available for MI836F series and MI836EF.

BIOS Setting	Description
LVDS (eDP/DP) Support	Enables / Disables LVDS (eDP/DP).



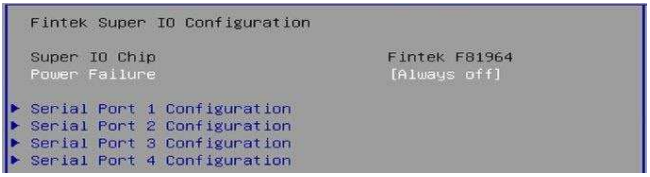




4.4.6 SMART Settings

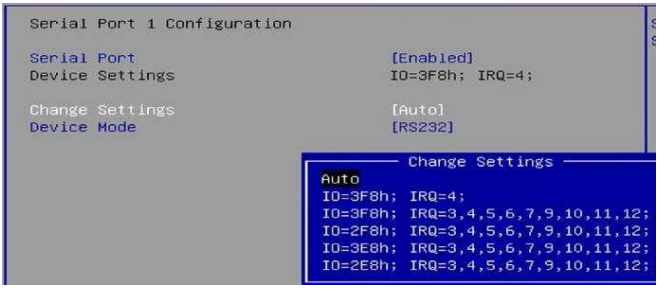
BIOS Setting	Description
SMART Self Test	Run SMART Self Test on all HDDs during POST.

4.4.7 Fintek Super IO Configuration

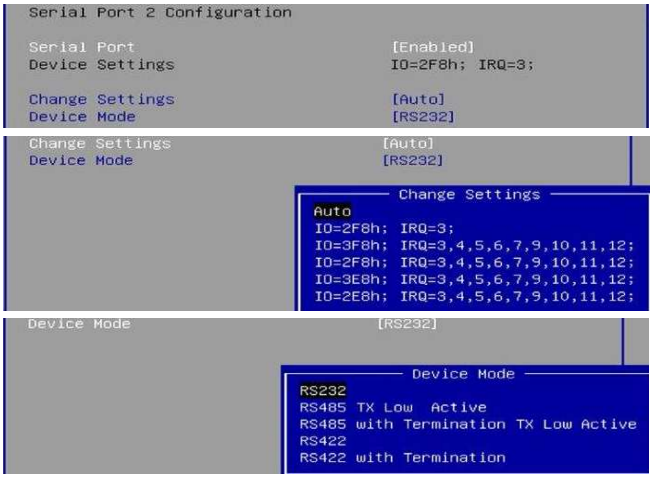


BIOS Setting	Description
Power Failure	Options: Always on, Always off
Serial Port Configuration	Sets parameters of Serial Ports.

4.4.7.1. Serial Port 1 Configuration

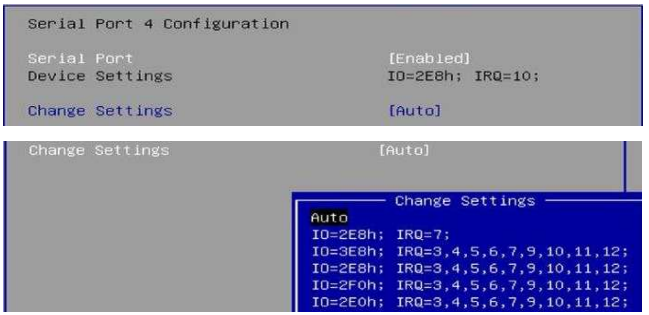


4.4.7.2. Serial Port 2 Configuration

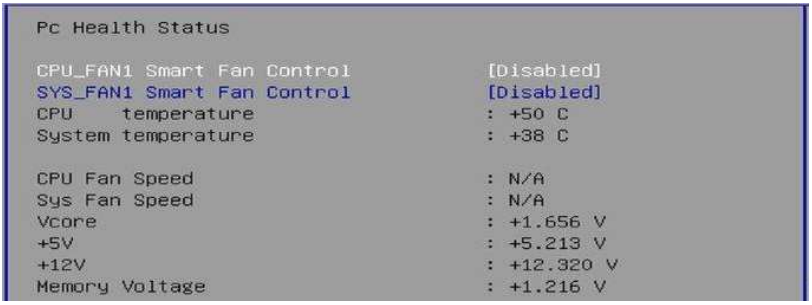


4.4.7.3. Serial Port 3 Configuration

4.4.7.4. Serial Port 4 Configuration

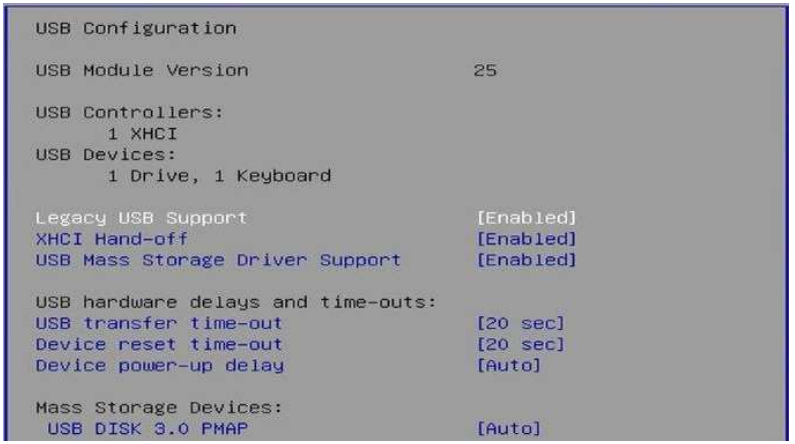


4.4.8 Fintek Super IO Hardware Monitor



BIOS Setting	Description
CPU Smart Fan Control	Enables / Disables the CPU smart fan feature. Options: Disabled / 50 °C / 60 °C / 70 °C / 80 °C
System Smart Fan Control	Enables / Disables the system smart fan feature. Options: Disabled / 50 °C / 60 °C / 70 °C / 80 °C
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.
CPU Shutdown Temperature	Options: Disabled / 70 °C / 75 °C / 80 °C / 85 °C / 90 °C / 95 °C

4.4.9 USB Configuration



BIOS Setting	Description
Legacy USB Support	Enables Legacy USB support. **Auto** disables legacy support if there is no USB device connected. **Disable** 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 for control, bulk, and Interrupt transfers. Options: 1 sec / 5 sec / 10 sec / 20 sec
Device reset time-out	Seconds of delaying execution of start unit command to USB mass storage device. Options: 10 sec / 20 sec / 30 sec / 40 sec
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. Options: Auto / Manual
USB DISK 3.0 PMAP	Mass storage device emulation type. AUTO enumerates devices according to their media format. Optical drives are emulated as CDROM drives with no medial will be emulated according to a drive type.

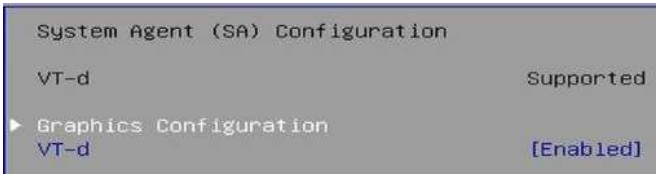
4.4.10 Network Configuration

BIOS Setting	Description
Network Stack	Enables / Disables UEFI Network Stack.
Ipv4 PXE Support	Enable/Disable Ipv4 PXE boot support. If disabled, Ipv4 PXE boot support will not 逼 available.
Ipv6 PXE Support	Enable/Disable Ipv6 PXE boot support. If disabled, Ipv6 PXE boot support will not 逼 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.
Nedua detect ciybt	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

4.5 Chipset Settings

BIOS Setting	Description
System Agent (SA) Configuration	System Agent (SA) parameters
PCH-IO Configuration	PCH parameters

4.5.1 System Agent (SA) Configuration



BIOS Setting	Description
Graphics Configuration	Configures the graphics settings.
VT-d	Checks if VT-d function on MCH is supported.

4.5.1.1. Graphics Configuration

BIOS Setting	Description
Primary Display	Select which of IGFX/PEG/PCI Graphics device should be primary display or select HG for Hybrid Gfx. Options: Auto, IGFX, PEG, PCI
Internal Graphics	Keep IGFX enabled based on the setup options. Options: Auto, Disabled, Enabled
GTT Size	Sets the GTT size as 2 MB, 4 MB, or 8 MB.
Aperture Size	Sets the aperture size as 128 MB, 256 MB, 512 MB, 1024 MB or 2048 MB. **Note:** Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, disable CSM support.

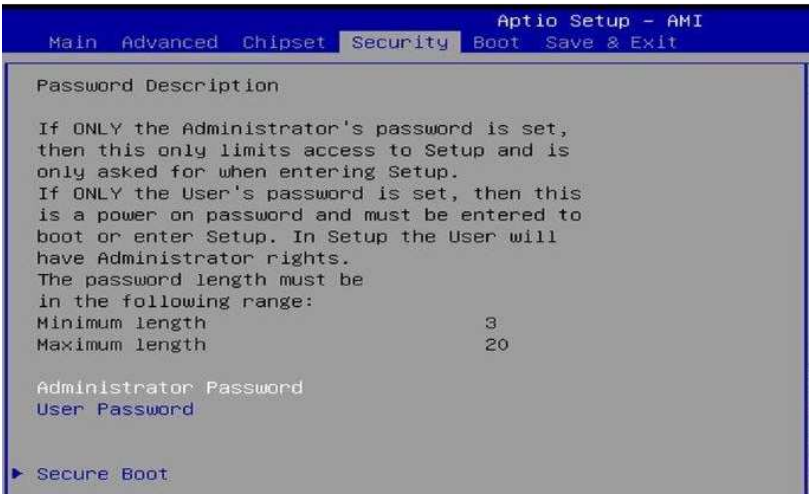
4.5.2 PCH-IO Configuration

BIOS Setting	Description
SATA Configuration	SATA Device Options Settings

4.5.2.1. SATA and RST Configuration:

BIOS Setting	Description
SATA Controller(s)	Enables / Disables the SATA device.
SATA Mode Selection	Determines how SATA controller(s) operate. Options: AHCI
Serial ATA Ports	Enables / Disables serial ports.
SATA Ports Hot Plug	Designate the port as Hot Pluggable.

4.6 Security Settings



BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Configures Secure Boot.

4.6.1 Secure Boot

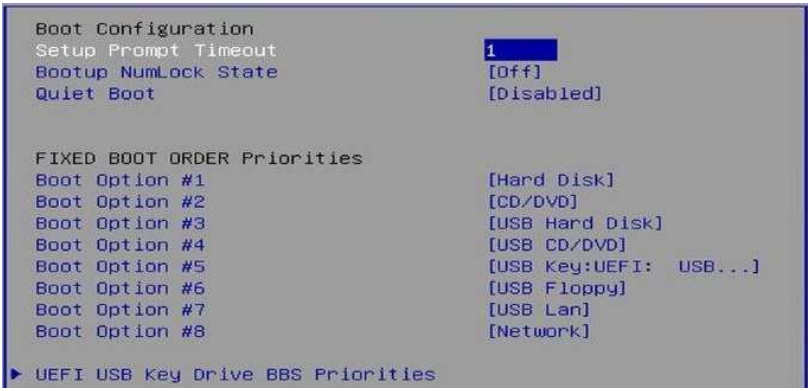
BIOS Setting	Description
Secure Boot	Secure Boot feature is Active if Secure Boot is enabled. Platform Key (PK) Is enrolled and system is in User mode. The mode change requires platform reset.

BIOS Setting	Description
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.
Restore Factory Keys	Forces system to user mode. Install factory default Secure Boot key databases.
Key Management	Enables expert users to modify Secure Boot Policy variables without full authentication.

4.6.1.1. Key Management

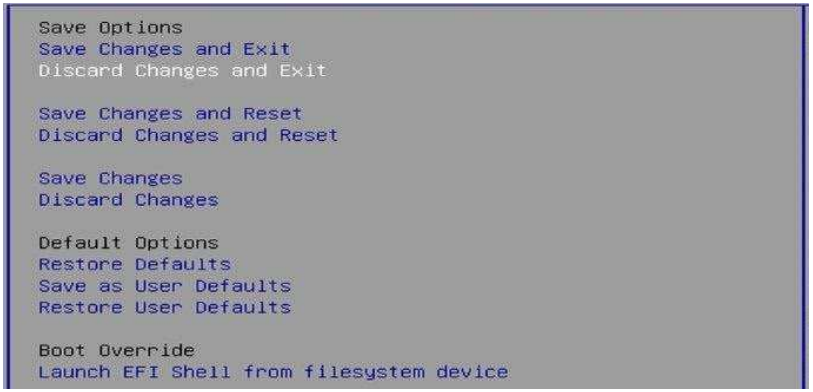
BIOS Setting	Description
Factory Key Provision	Install factory default Secure Boot keys after the platform reset and while the system is in Setup mode.
Restore Factory Keys	Forces system to use mode. Install factory default Secure Boot Key databases.
Enroll Efi Image	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).
Restore DB defaults	Restore DB variable to factory defaults.
Secure Boot variable	Enroll factory defaults or load certificates from a file. 1. Public key certificate: EFI_SIGNATIRE_LIST, EFI_CERT_X509 (DER), EFI_CERT_RSA2048 (bin), EFI_CERT_SHAXXX 2. Authenticated UEFI Variable 3. EFI PE/COFF image (SHA256) Key source: factory, external, mixed

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.

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.

Appendix

This section provides the mapping addresses of peripheral devices, the sample code of watchdog timer configuration, and types of on-board connectors.

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)
0x00001800-0x000018FE	Motherboard resources
0x00003090-0x00003097	Standard SATA AHCI Controller
0x00003080-0x00003083	Standard SATA AHCI Controller
0x00003060-0x0000307F	Standard SATA AHCI Controller
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller

Address	Device Description
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	Intel(R) SMBus Controller - 4B23
0x00002000-0x000020FE	Motherboard resources
0x00003000-0x0000303F	Intel(R) UHD Graphics
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 16	High Definition Audio Controller
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 10	Communications Port (COM4)
IRQ 4294967294	Standard SATA AHCI Controller
IRQ 4294967293	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 55~204	Microsoft ACPI-Compliant System
IRQ 256~511	Microsoft ACPI-Compliant System
IRQ 4294967291	Intel(R) Management Engine Interface #1
IRQ 4294967292	Intel(R) UHD Graphics
IRQ 0	System timer

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 "F81866.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 81866 watch dog program\n");
        SIO = Init_F81866();
        if (SIO == 0)
        {
                printf("Can not detect Fintek 81866, 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_F81866_Reg(0x2B);
        bBuf &= (~0x20);
        Set_F81866_Reg(0x2B,   bBuf);          //Enable WDTO

        Set_F81866_LD(0x07);                   //switch to logic device 7
        Set_F81866_Reg(0x30,   0x01);          //enable timer

        bBuf = Get_F81866_Reg(0xF5);
        bBuf &= (~0x0F);
        bBuf |= 0x52;
        Set_F81866_Reg(0xF5,   bBuf);          //count mode is second

        Set_F81866_Reg(0xF6,   interval);      //set timer

        bBuf = Get_F81866_Reg(0xFA);
        bBuf |= 0x01;
        Set_F81866_Reg(0xFA,   bBuf);          //enable WDTO output

        bBuf = Get_F81866_Reg(0xF5);
        bBuf |= 0x20;
        Set_F81866_Reg(0xF5,   bBuf);          //start counting
}
//-----------------------------------------------------------------------
void DisableWDT(void)
{
        unsigned char bBuf;

        Set_F81866_LD(0x07);                   //switch to logic device 7

        bBuf = Get_F81866_Reg(0xFA);
        bBuf &= ~0x01;
        Set_F81866_Reg(0xFA,   bBuf);          //disable WDTO output

        bBuf = Get_F81866_Reg(0xF5);
        bBuf &= ~0x20;
        bBuf |= 0x40;
        Set_F81866_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 "F81866.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int F81866_BASE;
void Unlock_F81866 (void);
void Lock_F81866 (void);
//---------------------------------------------------------------------------
unsigned int Init_F81866(void)
{
        unsigned int result;
        unsigned char ucDid;

        F81866_BASE = 0x4E;
        result = F81866_BASE;

        ucDid = Get_F81866_Reg(0x20);
        if (ucDid == 0x07)                      //Fintek 81866
        {       goto Init_Finish;               }

        F81866_BASE = 0x2E;
        result = F81866_BASE;

        ucDid = Get_F81866_Reg(0x20);
        if (ucDid == 0x07)                      //Fintek 81866
        {       goto Init_Finish;               }

        F81866_BASE = 0x00;
        result = F81866_BASE;

Init_Finish:
        return (result);
}
//---------------------------------------------------------------------------
void Unlock_F81866 (void)
{
        outportb(F81866_INDEX_PORT, F81866_UNLOCK);
        outportb(F81866_INDEX_PORT, F81866_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81866 (void)
{
        outportb(F81866_INDEX_PORT, F81866_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81866_LD( unsigned char LD)
{
        Unlock_F81866();
        outportb(F81866_INDEX_PORT, F81866_REG_LD);
        outportb(F81866_DATA_PORT, LD);
        Lock_F81866();
}
```

```
//---------------------------------------------------------------------------
void Set_F81866_Reg( unsigned char REG, unsigned char DATA)
{
                Unlock_F81866();
                outportb(F81866_INDEX_PORT, REG);
                outportb(F81866_DATA_PORT, DATA);
                Lock_F81866();
}
//---------------------------------------------------------------------------
unsigned char Get_F81866_Reg(unsigned char REG)
{
                unsigned char Result;
                Unlock_F81866();
                outportb(F81866_INDEX_PORT, REG);
                Result = inportb(F81866_DATA_PORT);
                Lock_F81866();
                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   F81866_H
#define   F81866_H                          1
//---------------------------------------------------------------------------
#define         F81866_INDEX_PORT       (F81866_BASE)
#define         F81866_DATA_PORT        (F81866_BASE+1)
//---------------------------------------------------------------------------
#define         F81866_REG_LD           0x07
//---------------------------------------------------------------------------
#define         F81866_UNLOCK           0x87
#define         F81866_LOCK             0xAA
//---------------------------------------------------------------------------
unsigned int Init_F81866(void);
void Set_F81866_LD( unsigned char);
void Set_F81866_Reg( unsigned char,
unsigned char); unsigned char
Get_F81866_Reg( unsigned char);
//---------------------------------------------------------------------------
#endif  //   F81866_H
```

D. On-Board Connector Types

Function	Connector Name	Onboard Type	Mating Type
COM1 & COM2 RS-232/422/485 Ports	CN8	YIMTEX 40909AANSABR	D-SUB 9P (female)
COM3 & COM4 RS-232 Ports	J22 (COM3), J21 (COM4)	HRS DF11-10DP-2DSA	HRS DF11-10DS-2C
eDP Connector	CN2	KEL SSL00-40S	KEL SSL20-40S
Digital I/O Connector	J19	E-call 0196-01-200-100	Dupont 10P 2mm-pitch (female)
USB 2.0 Connector	J20, J23	HRS DF11-8DP-2DSA	HRS DF11-8DS-2C
Front Panel Settings Connector	J15	E-call 0126-01-203-080	Dupont 8P 2.54 mm-pitch (female)
LVDS Connector	J4-CHA, J7-CHB	HRS DF20F-20DP-1V	HRS DF20A-20DS-1C
Fan Power Connector	CPU_FAN1	TECHBEST W2-03I104132S1WT(A)-L	Molex 47054-1000
SATA HDD Power	J2	E-CALLI 0110-071-040	JST XHP-4
LCD Backlight	J1	E-CALL 0110-161-040	JST PHR-4.
Audio	J17	HRS DF11-12DP-2DSA	Hirose DF11-12DS-2C
Audio Amplifier	J16	E-CALL 0110-161-040	JST PHR-4.