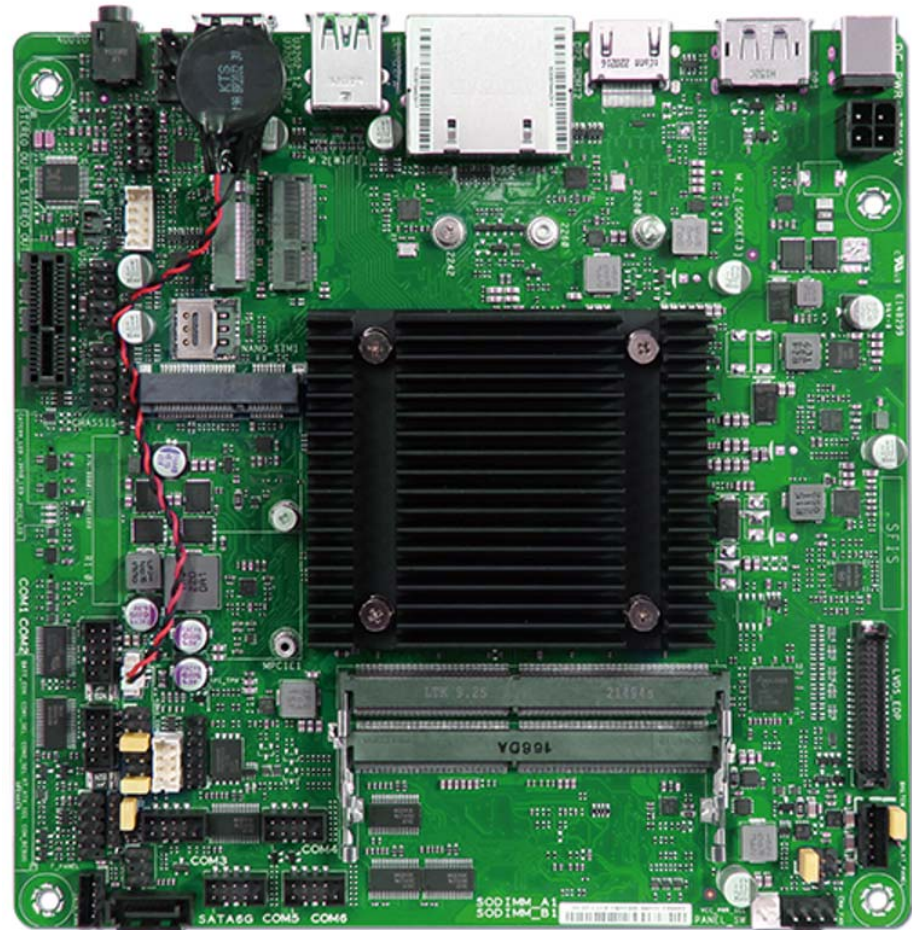


WADE-8173-J6412

WADE-8173-J6412

Industrial Mini-ITX Board

Version 1.0



Revision History

R1.0	Preliminary

Contents

1	Introduction	7
2	Specifications	8
	2.1 Supported Operating Systems	9
	2.2 Mechanical Dimensions	10
	2.3 Environmental Specifications	12
3	Block Diagram	13
4	Hardware Configuration	14
	4.1 Jumpers and Connector	14
	4.2 Jumpers Setting	15
5	Signal Descriptions	47
	5.1 Watch Dog Signal	47
	5.2 GPIO Signal	50
6	System Resources	55
	6.1 Intel® Elkhart Lake SoC	55
	6.2 Main Memory	55
	6.3 Installing the Single Board Computer	55
	6.3.1 Chipset Component Driver	56
	6.3.2 Intel® UHD Graphics	56
	6.3.3 RealtekRTL8111H Gigabit Ethernet Controller	56
7	BIOS Setup Items	57
	7.1 Introduction	57

- 7.2 BIOS Setup 57
 - 7.2.1 Main 59
 - 7.2.2 Advanced..... 60
 - 7.2.3 H/W Monitor 94
 - 7.2.4 Security 97
 - Secure Boot** 98
 - Key Management**..... 99
 - 7.2.5 Boot..... 101
 - 7.2.6 Exit..... 103
- 8 Troubleshooting 105
 - 8.1 Hardware Quick Installation 105
 - 8.2 BIOS Setting..... 106
 - 8.3 FAQ 107
- 9 Portwell Software Service 113
- 10 Industry Specifications..... 114
 - 10.1 Industry Specifications..... 114

Preface

This user's guide provides information about the components, features, connectors and BIOS Setup menus available on the WADE-8173-J6412. This document should be referred to when designing Mini-ITX application. The other reference documents that should be used include the following:

- ✧ Intel Elkhart Lake Design Guide
- ✧ Intel Elkgart Lake Specification

Please contact Portwell Sales Representative for above documents.

Disclaimer

The information contained within this user's guide, including but not limited to any product specification, is subject to change without notice. Portwell provides no warranty with regard to this user's guide or any other information contained herein and hereby expressly disclaims any implied warranties of merchantability or fitness for any particular purpose with regard to any of the foregoing. Portwell assumes no liability for any damages incurred directly or indirectly from any technical or typographical errors or omissions contained herein or for discrepancies between the product and the user's guide. In no event shall Portwell be liable for any incidental, consequential, special, or exemplary damages, whether based on tort, contract or otherwise, arising out of or in connection with this user's guide or any other information contained herein or the use thereof.

Trademarks

Product names, logos, brands, and other trademarks featured or referred to within this User's guide or the Portwell website, are the property of their respective trademark holders. These trademark holders are not affiliated with Portwell, our products, or our website.

Warranty

Portwell makes no representation, warranty or guaranty, express or implied regarding the products except its standard form of limited warranty ("Limited Warranty"). Portwell may in its sole discretion modify its Limited Warranty at any time and from time to time.

Beginning on the date of shipment to its direct customer and continuing for the published warranty period, Portwell represents that the products are new and warrants that each product failing to function properly under normal use, due to a defect in materials or workmanship or due to non conformance to the agreed upon specifications, will be repaired or exchanged, at Portwell's option and expense.

Certification

Portwell is certified to DIN EN ISO 9001:2000 standard.



Technical Support

Portwell technicians and engineers are committed to providing the best possible technical support for our customers so that our products can be easily used and implemented.

We request that you first visit our website at <http://www.portwell.com.tw/support/> for the latest documentation, utilities and drivers, which have been made available to assist you. If you still require assistance after visiting our website then contact our technical support department by email at tsd@mail.portwell.com.tw for further assistance. Thank you!

1 Introduction

The WADE-8173-J6412, designed with Elkhart Lake Intel Celeron J6412 processor, features two DDR4 3200 MHz SO-DIMM socket equipped with up to 32GB DDR4 non-ECC memory.

Celeron solution is still popular in the market of Kiosk, Panel PC, Digital Security and Digital Signage which can fulfill most of these applications; therefore, with high performance and high-end specifications, Elkhart Lake SoC is our first generation Celeron chip architecture on Mini-ITX line.

2 Specifications

Main Processor	◆Intel® Elkhart lake SoC J6412 Processors
System BIOS	◆AMI UEFI BIOS
Main Memory	◆Up to 32 GB in 2 slots DDR4 SO-DIMM sockets. ◆Supports dual channel DDR43200 MHz SDRAM
Graphics	◆Controller: Intel®UHD Graphics ◆DP: Support 2xDP ports, resolution up to 4096x2160 (DP2 colay with HDMI) ◆HDMI: Support HDMI, resolution up to 3840x2160 (Default) ◆LVDS/eDP: Support LVDS/eDP, LVDS resolution up to 1920x1200 (Default) and eDP: resolution up to 4096x2160 (colay with LVDS) ◆Triple displays: HDMI+DP+LVDS, HDMI+DP+eDP, DP+DP+LVDS, DP+DP+eDP
Expansion Interface	◆One PCIe x1 Gen 3 ◆One M.2 Key E 2230 with PCIe x1 and USB 2.0 for Wireless ◆One M.2 Key M 2242/2260/2280 with PCIe x2 and SATA signal for SSD ◆One full/half size Mini PCIe socket with PCIe x1(with SIM holder) ◆One Full size SD card slot
SATA Interface	◆One SATA ports(SATA Gen3.06Gb/s)
Input/Output	◆Serial Ports:5x RS-232 on board &1x RS-232/422/485 on board ◆USB Port: 3x USB 3.2 Gen2 on rear I/O,1x USB 2.0 on rear I/O and 4x USB2.0 on board header ◆Audio Interface: Line-In and Line-Out

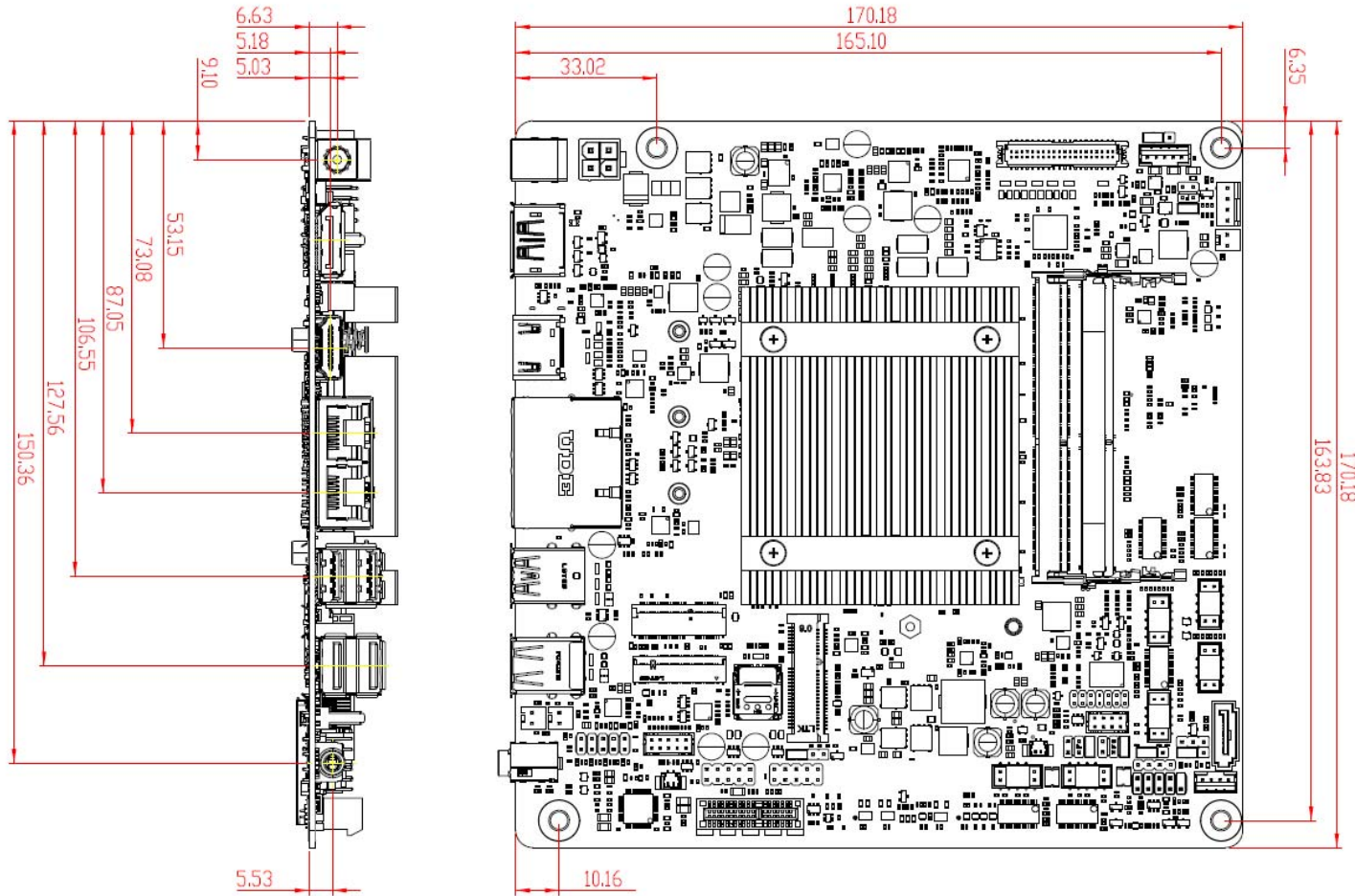
Ethernet	◆ Supports dual 10/100/1000 Mbps Ethernet port (s) via PCI Express x1
High Drive GPIO	◆ One pin-header for GPIO(8bit in &8bit out)
Mechanical and environmental specifications	◆ Operating temperature: 0 ~ 60° C ◆ Storage temperature:-20 ~ 80° C ◆ Humidity: 5 ~ 95% non-condensing ◆ Board size: 170mm x 170 mm
Safety	◆ CE, FCC

2.1 Supported Operating Systems

The WADE-8173-J6412 supports the following operating systems.

- ✧ Windows 10* (64 bit), IoT Core(32/64bit)
- ✧ Wind River* 8.0 Linux Distribution(64 bit)
- ✧ Yocto* Tool-based Embedded Linux Distribution (64 bit)
- ✧ Android* 6.0(64bit)

2.2 Mechanical Dimensions



Power Consumption

Test Configuration	
CPU Type	Intel® Celeron® CPU J6412 @ 2.00GHz
SBC BIOS	WADE-81731.02.00
Memory	DDR4 SO-DIMM 3200/3000 16GB *2
VGA Card	Intel®UHD Graphic
VGA Driver	Intel® Display Driver; V30.0.101.1340
LAN Card	Realtek 8111 PCI-E Gigabit Ethernet
LAN Driver	Realtek driver version: v10.50.511.2021
LAN Card	Realtek 8111 PCI-E Gigabit Ethernet
LAN Driver	Realtek driver version: v10.50.511.2021
Audio Card	Realtek ALC897
Audio Driver	Realtek High Definition Audio v6.0.9313.1
Chip Driver	Intel® Chipset Device Software Version: V10.1.18768.8273
USB3.0 Driver	Intel® USB 3.0 eXtensible Host Controller :V10.1.18768.8273
Power Supply	12V DC-in

Power consumption	
DC-in type 120W	Power Consumption (W)
CPU	J6412
Full Loading(Run Prime95 small FFT's item)	44.3 (Burn-in test CPU 100% HDD 100%, Media Player Set Vol. Max)
S1(Monitor Auto Off)	N/A
S3(Sleep mode) <5Watt	1.076
S5(Shut down)	0.313(ErP enable), 0.925(ErP Disable)

2.3 Environmental Specifications

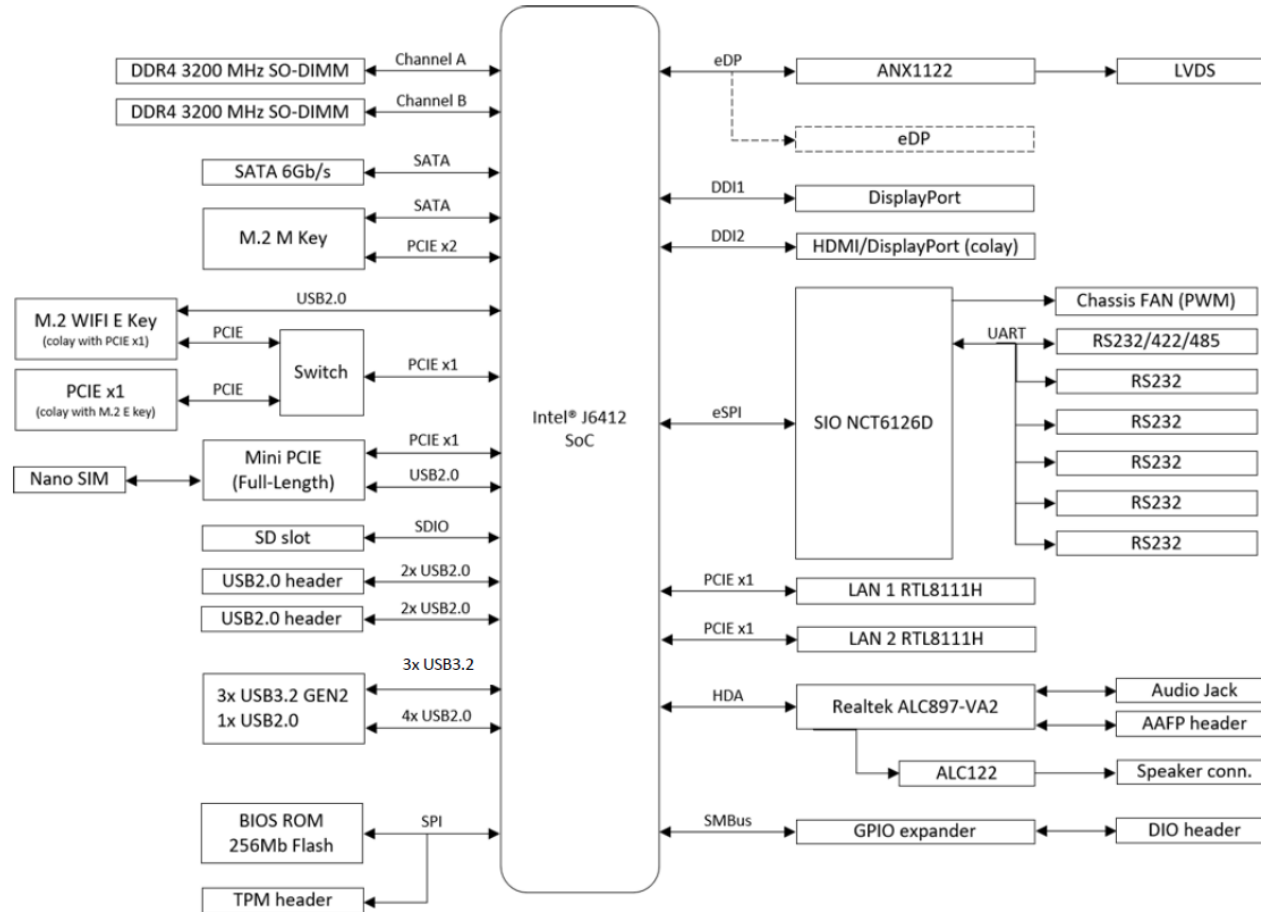
Storage Temperature : -20~80°C

Operation Temperature : 0~60°C

Storage Humidity : 5~95%

Operation Humidity: 10~90%

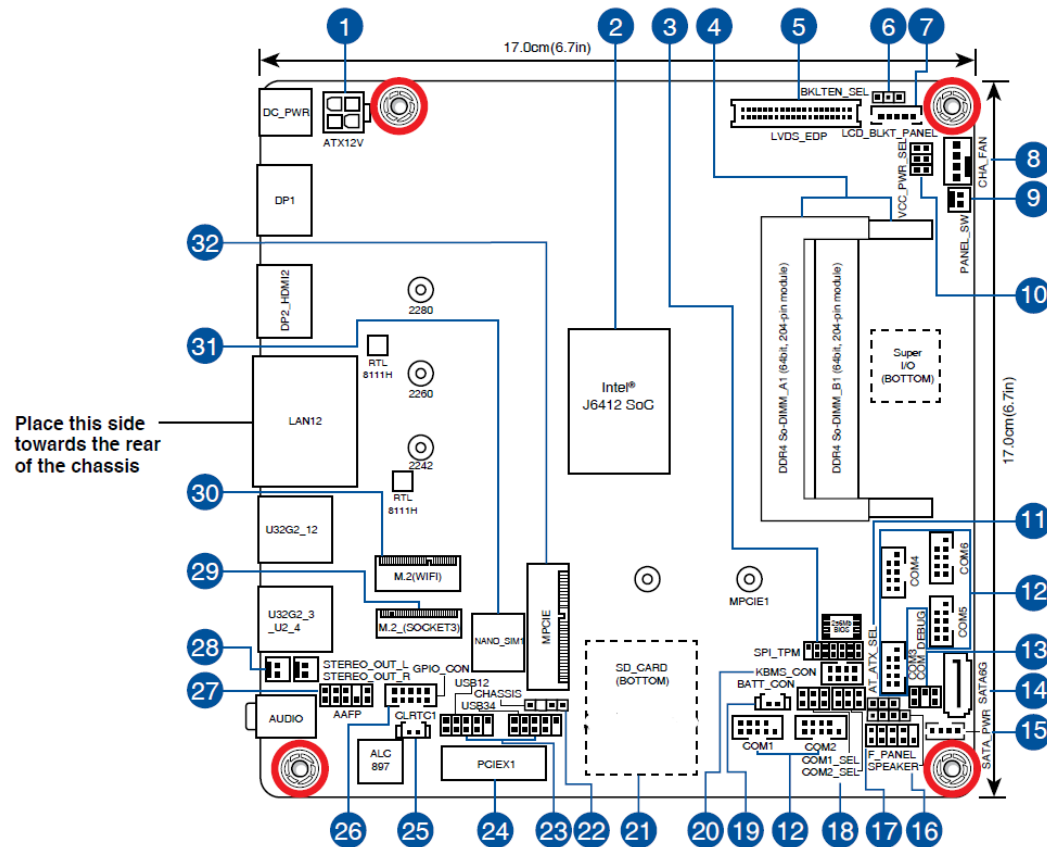
3 Block Diagram



4 Hardware Configuration

4.1 Jumpers and Connector

This chapter indicates jumpers', headers' and connectors' locations. Users may find useful information related to hardware settings in this chapter.



4.2 Jumpers Setting

For users to customize WADE-8173-J6412's features. In the following sections, Short means covering a jumper cap over jumperpins; Open or N/C (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 1 for the Jumper allocations.

Jumper Table

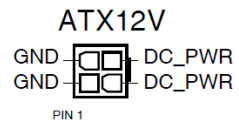
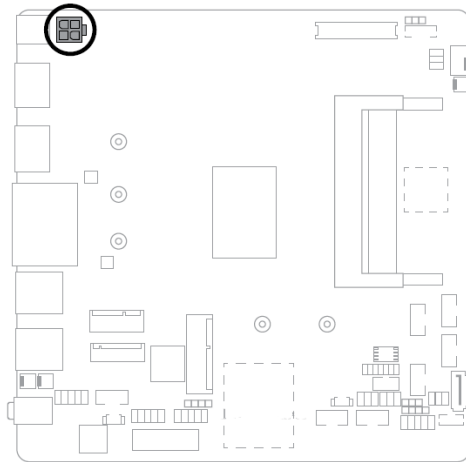
The jumper settings are schematically depicted in this manual as follows:

Jumper Function List	
1	ATXPowerconnector(4-pinATX12V)
2	Built-inIntel®Celeron®Quad-coreProcessorJ6412
3	SPI_TPMheader(14-1pinSPI_TPM)
4	DDR4SO-DIMMslots
5	LVDS/EDPheader(40-pinLVDS_EDP)
6	LVDSPanelBacklightEnableSignalSelection(BKLTEN_SEL)
7	LVDSBacklightPanelheader(5-pinLCD_BLK_PANEL)
8	Chassisfanheader(4-pinCHA_FAN)
9	LCDPanelmonitorswitchheader(2-pinPANEL_SW)
10	LVDSPanelVCCPowerSelectionjumper(6-pinVCC_PWR_SEL)
11	AT/ATXmodeselectionjumper(3-pinAT_ATX_SEL)
12	COMPortheaders(10-1pinCOM1~COM6)
13	SATA6.0Gb/sport(7-pinSATA6G)
14	SATAPowerconnector(SATA_PWR)

15	Speakerheader(4-1pinSPEAKER)
16	SystemPanelheader(10-1pinF_PANEL)
17	COMRING/+5V/+12Vselectionjumpers(6-pinCOM1_SEL,COM2_SEL)
18	RTCBatteryheader(2-pinBATT_CON)
19	PS/2KeyboardandMouseheader(8-pinKBMS_CON)
20	SDCardslot(SD_CARD)
21	ChassisIntrusionheader(4-pinCHASSIS)
22	USB2.0headers(10-1pinUSB_12,USB_34)
23	PCIe3.0/2.0x1slot(PCIEX1)
24	ClearRTC RAM(2-pinCLRTC)
25	GeneralPurposeInput/outputheader(GPIO_CON)
26	FrontPanelAudioheader(10-1pinAAFP)
27	InternalStereoSpeakerheader(2-pinSTEREO_OUT_L,STEREO_OUT_R)
28	M.2socket3(M.2_SOCKET3)
29	M.2Wi-Fi slot
30	NanoSIMCardslot
31	MPCIecombo slot(MPCI E)

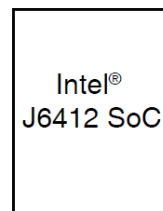
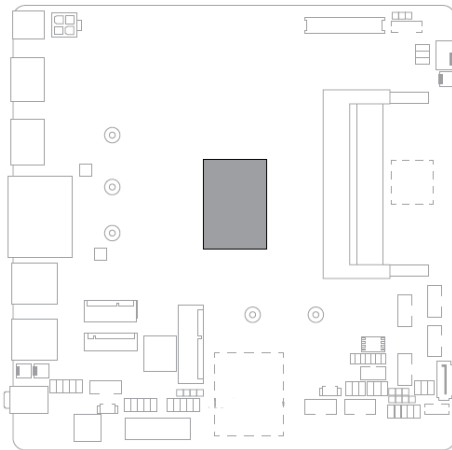
WADE-8173-J6412

1 :ATX Power connector (4-pin ATX12V)



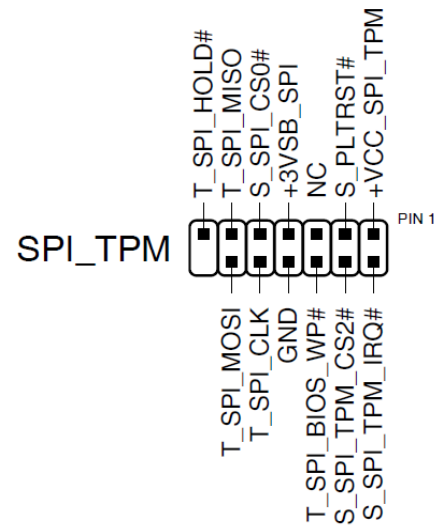
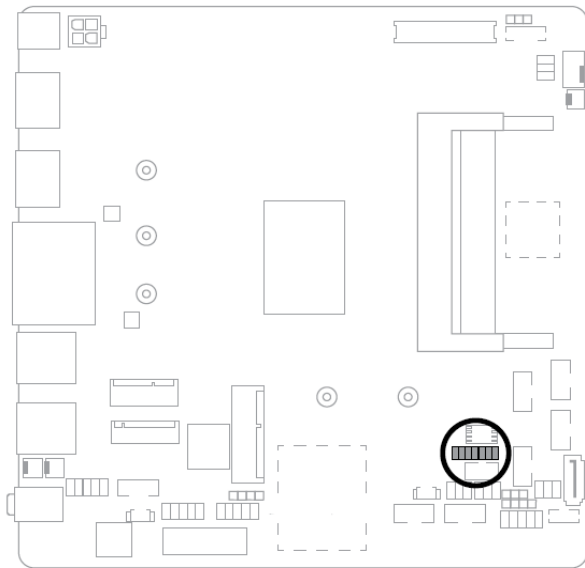
2 :Built-in Intel® Celeron® Quad-core Processor J6412

The motherboard comes with an onboard Intel® processor J6412.



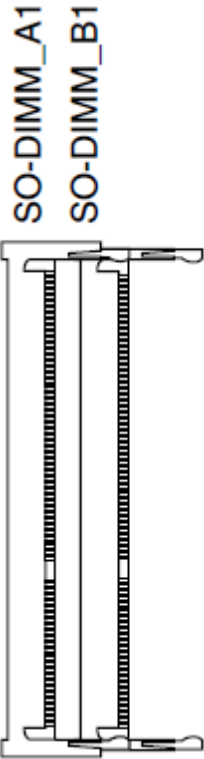
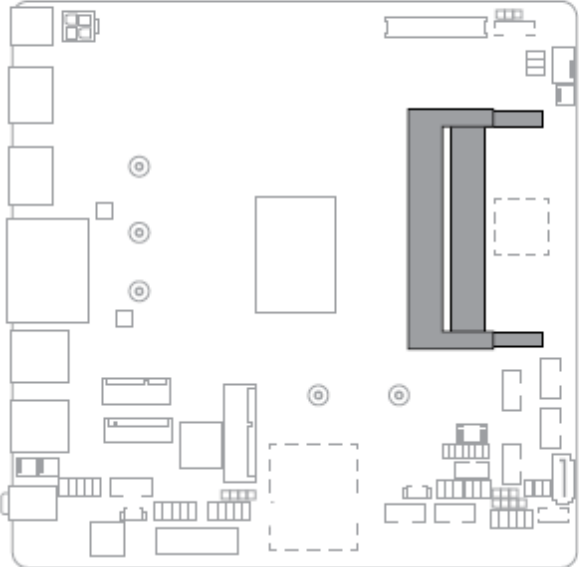
3 :SPI_TPM header (14-1 pin SPI_TPM)

This header supports a Trusted Platform Module (TPM) system with a Serial Peripheral Interface (SPI), allowing you to securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



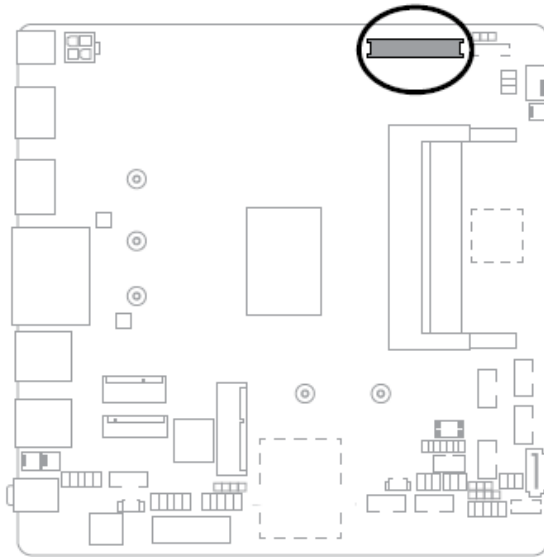
*Connector Type: 2.00mm pitch

4 :DDR4 SO-DIMM slots

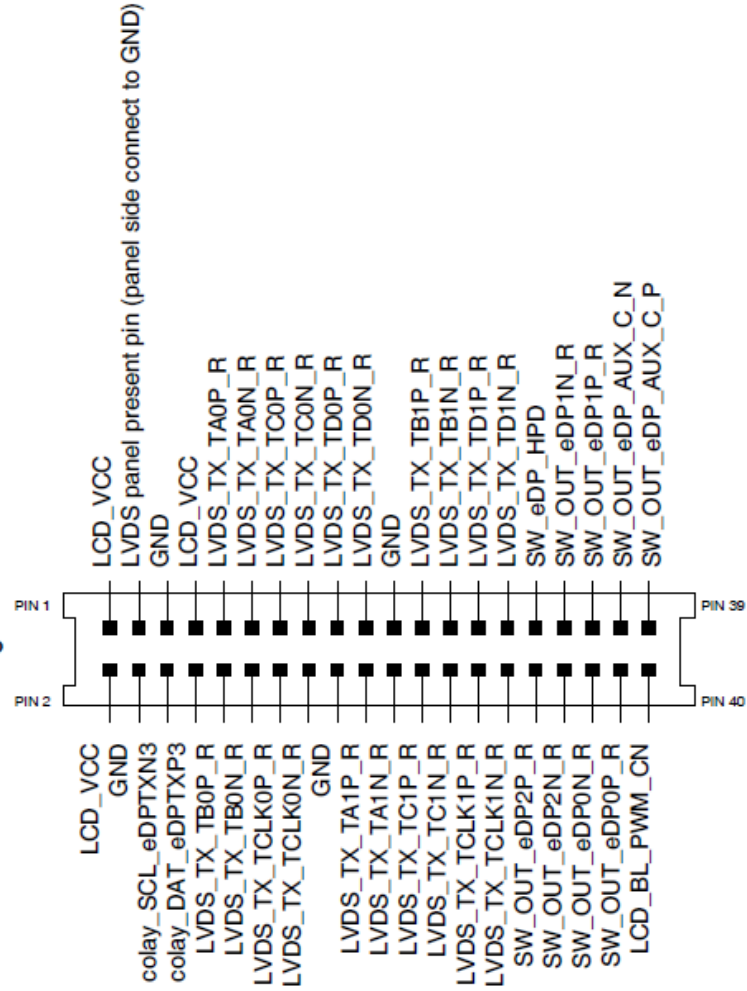


Channel	Sockets
Channel A	DIMM_A1
Channel B	DIMM_B1

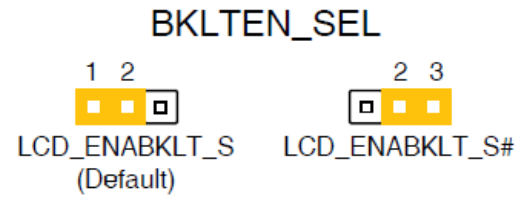
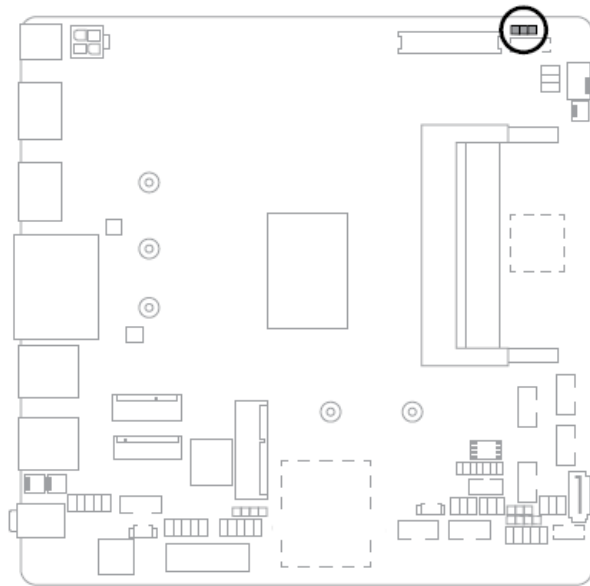
5 :LVDS/EDP header (40-pin LVDS_EDP)



LVDS_EDP



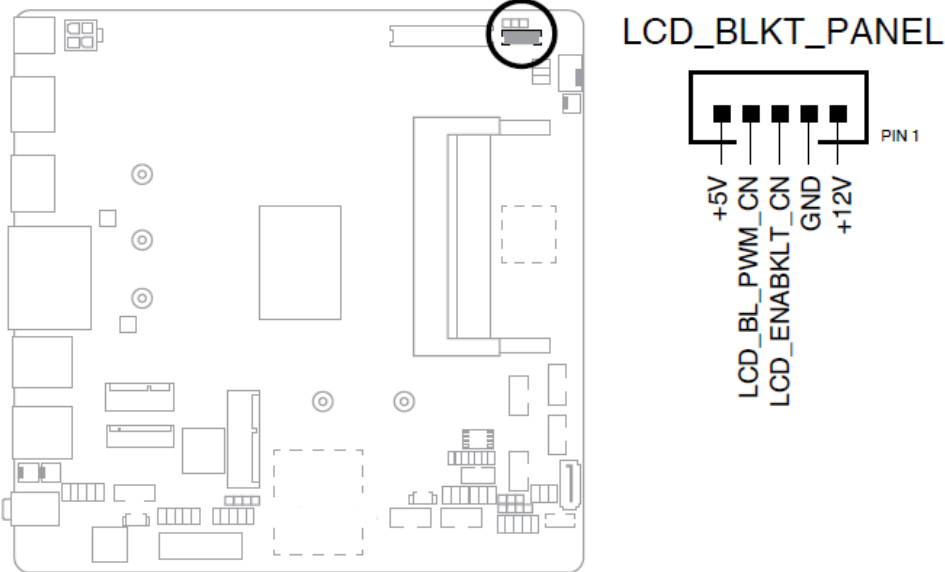
6 :LVDS Panel Backlight Enable Signal Selection (BKLTEN_SEL)



PIN No.	Description
1-2	12V(Default)
2-3	5V

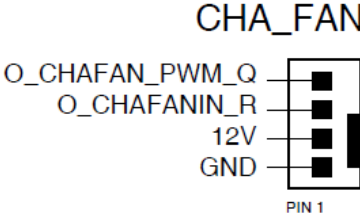
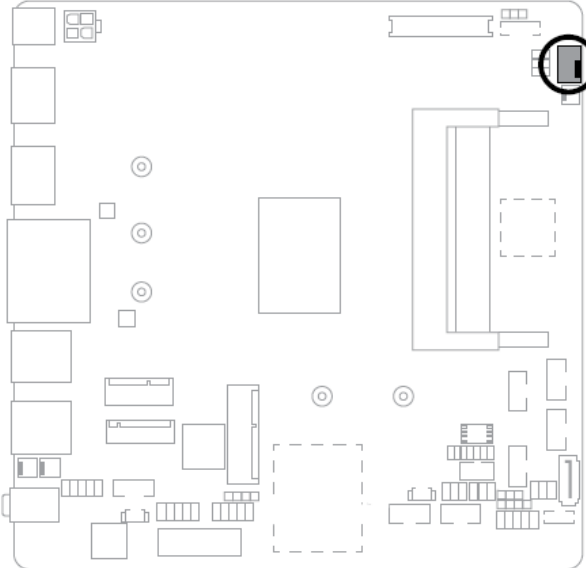
*Connector Type: 2.54mm pitch

7 :LVDS Backlight Panel header (5-pin LCD_BLK_PANEL)



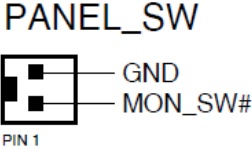
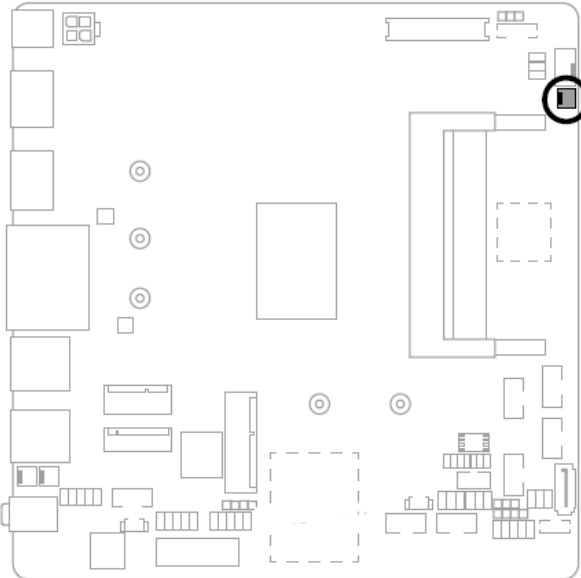
*Connector Type: 2.00mm pitch

8 :Chassis fan header (4-pin CHA_FAN)



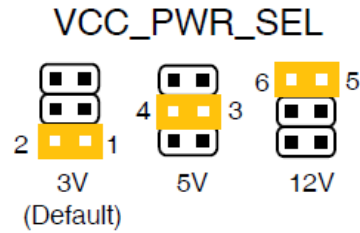
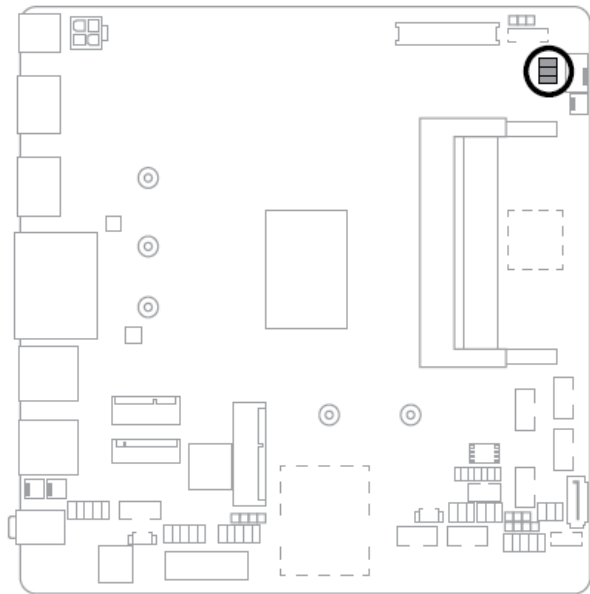
*Connector Type: 2.54mm pitch

9 :LCD Panel monitor switch header (2-pin PANEL_SW)



*Connector Type: 2.54mm pitch

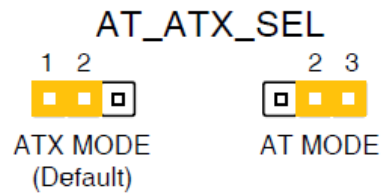
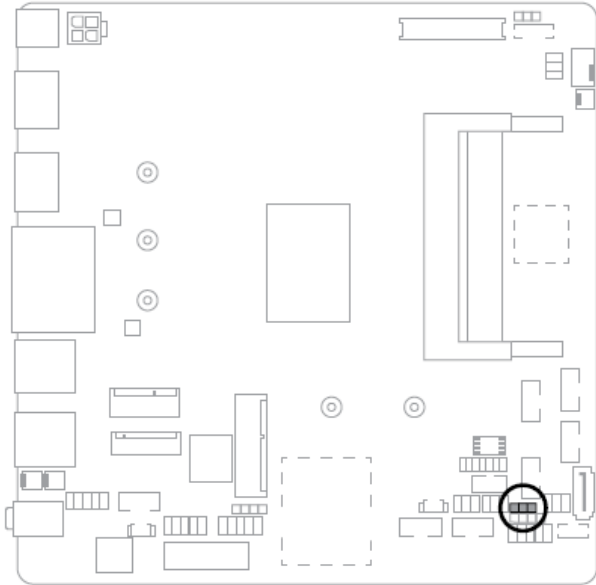
10 :LVDS Panel VCC Power Selection jumper (6-pin VCC_PWR_SEL)



PIN No.	Description
1.4.5-6	12V
1.4.5-3	5V
1.4.5-2	3V(Default)

*Connector Type: 2.54mm pitch

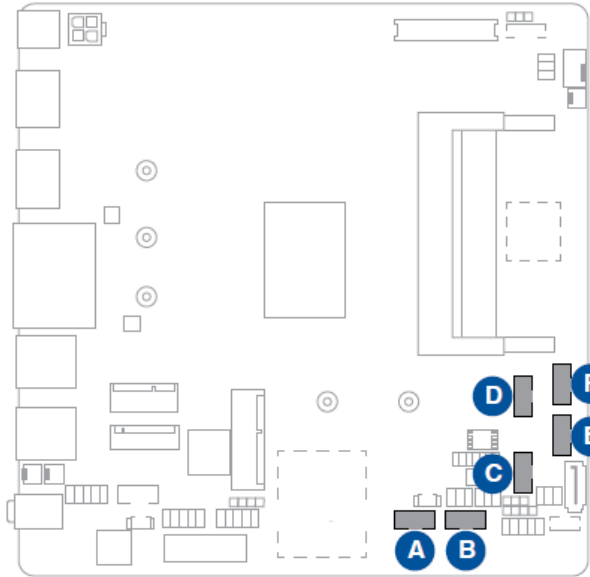
11 :AT/ATX mode selection jumper (3-pin AT_ATX_SEL)



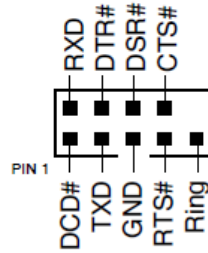
PIN No.	Description
1-2(Default)	ATX mode
2-3	AT mode

*Connector Type: 2.54mm pitch

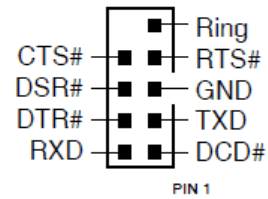
12 :COM Port headers (10-1 pin COM1~COM6)



- A** COM1
- B** COM2



- C** COM3
- D** COM4
- E** COM5
- F** COM6

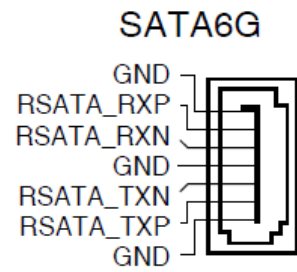
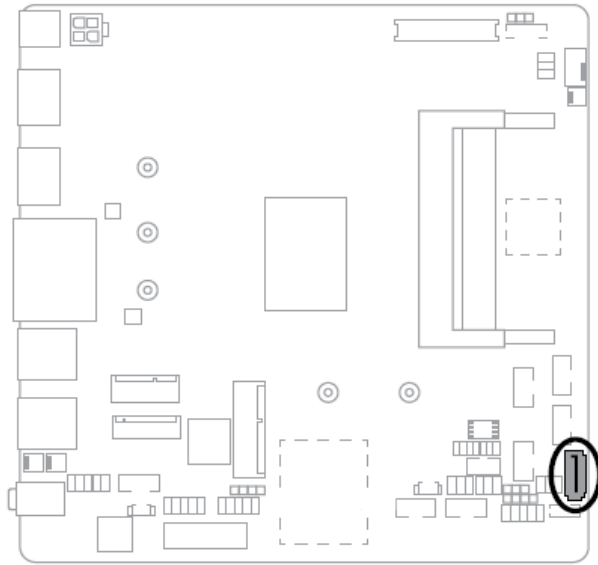


*Connector Type: 2.00mm pitch

WADE-8173-J6412

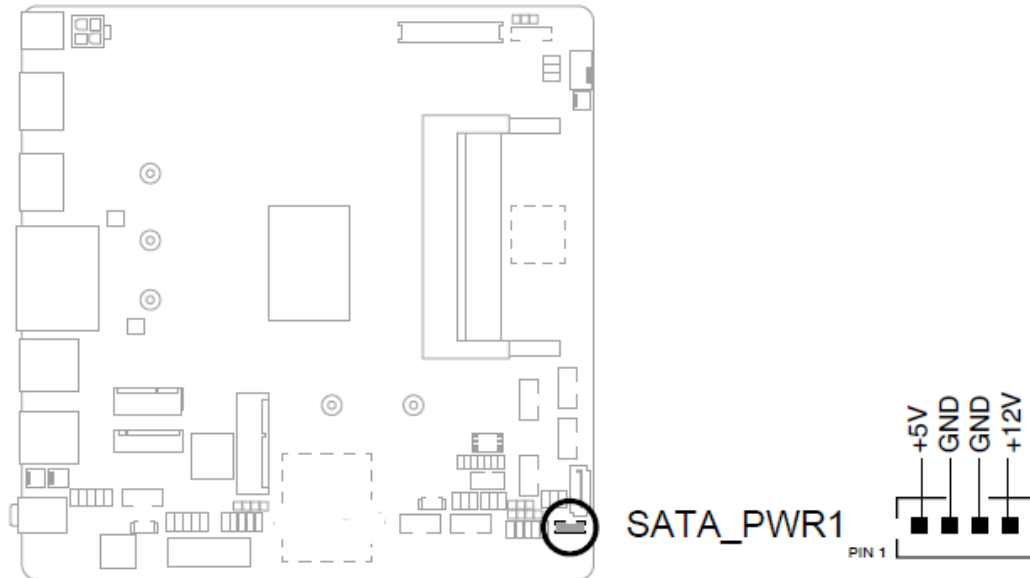
13 :SATA 6.0 Gb/s port (7-pin SATA6G)

This port connects to a SATA 6.0 Gb/s hard disk drive or an optical drive via a SATA 6.0 Gb/s signal cable.



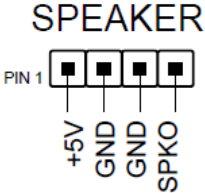
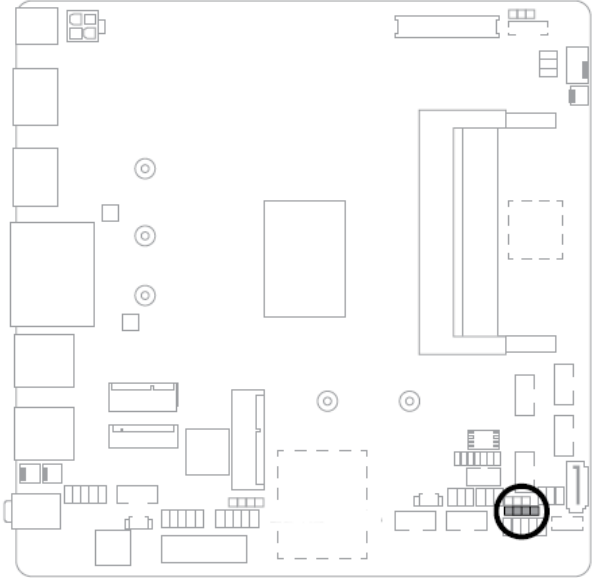
14 :SATA Power connector (SATA_PWR)

This connector is for the SATA power cable. The power cable plug is designed to fit this connector in only one orientation. Find the proper orientation and push down firmly until the connector completely fits.



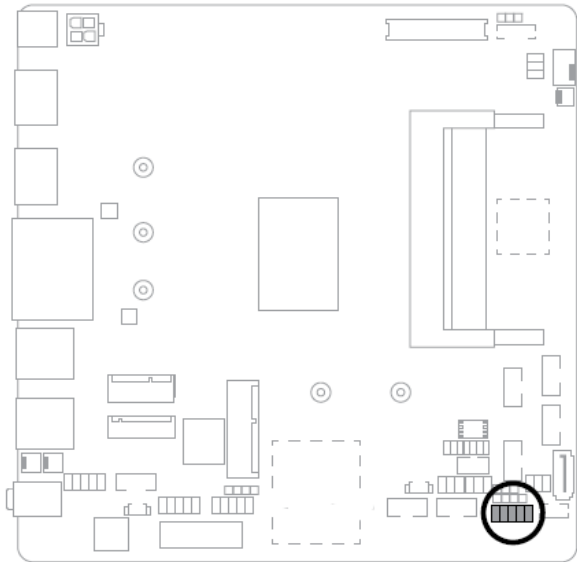
The SATA power connector supports 1A current to the maximum.

15 :Speaker header (4-1 pin SPEAKER)

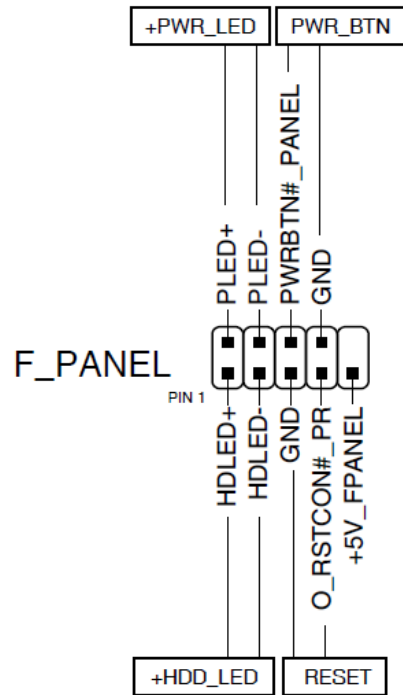


*Connector Type: 2.54mm pitch

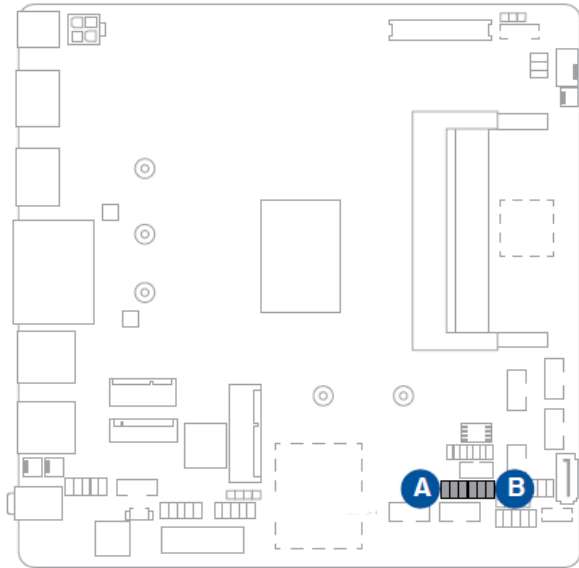
16 :System Panel header (10-1 pin F_PANEL)



*Connector Type: 2.54mm pitch



17 :COM RING/+5V/+12V selection jumpers (6-pin COM1_SEL, COM2_SEL)



A COM1_SEL
B COM2_SEL

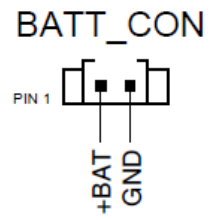
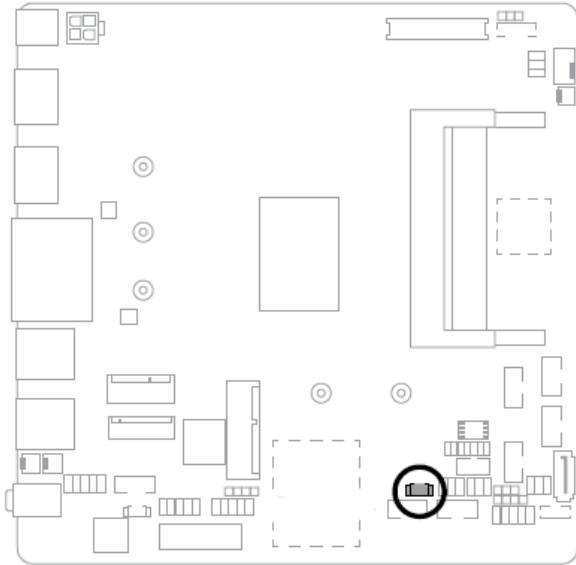


PIN No.	Description
1-2	12V
3-4	5V
5-6	Ring(Default)

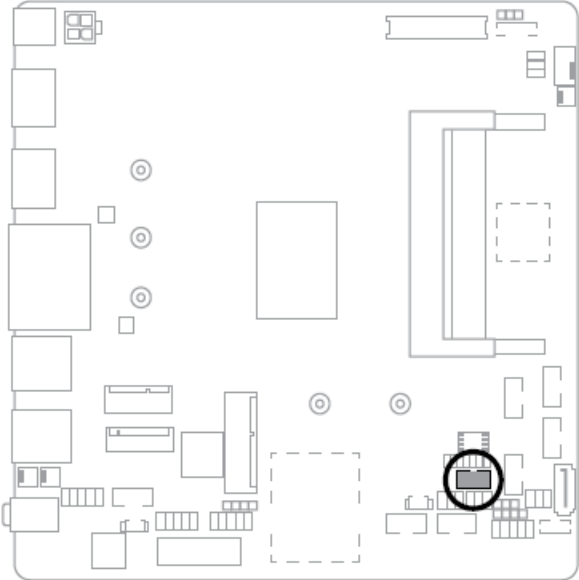
WADE-8173-J6412

18 :RTC Battery header (2-pin BATT_CON)

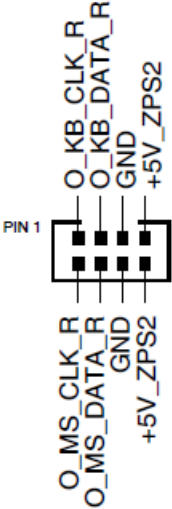
This header is for the lithium CMOS battery.



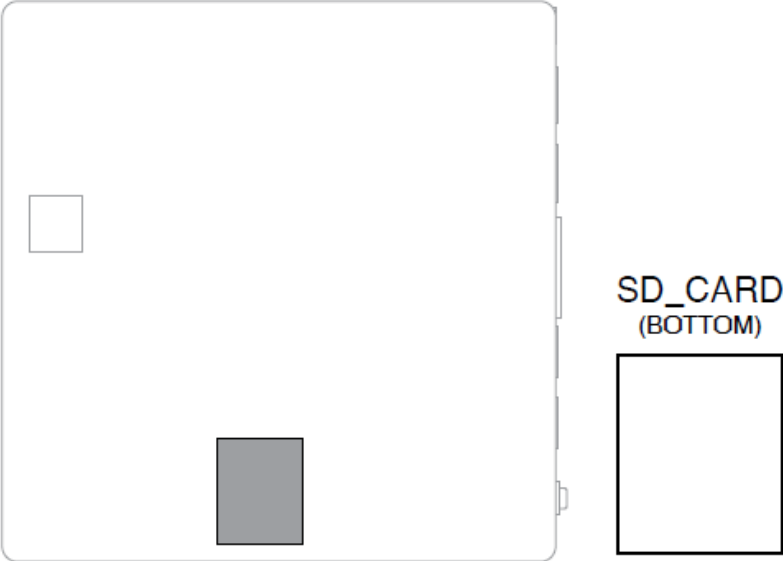
19 :PS/2 Keyboard and Mouse header (8-pin KBMS_CON)



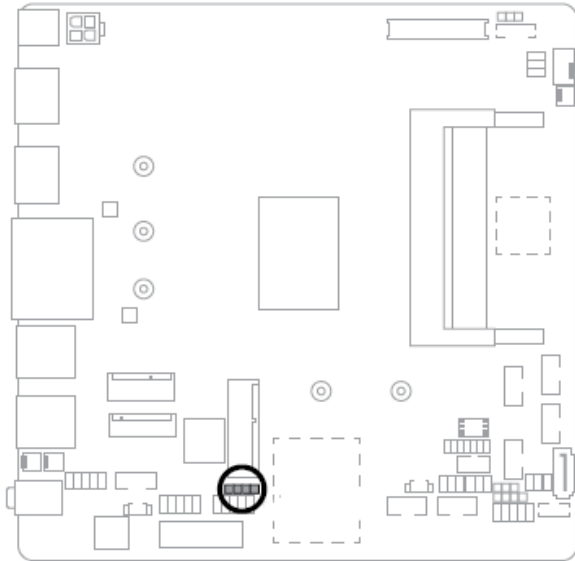
KBMS_CON



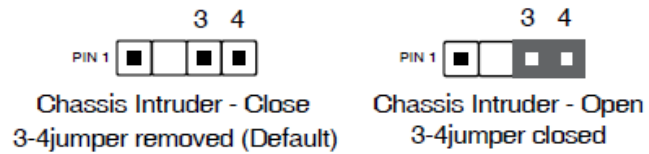
20 :SD Card slot (SD_CARD)



21 :Chassis Intrusion header (4-pin CHASSIS)



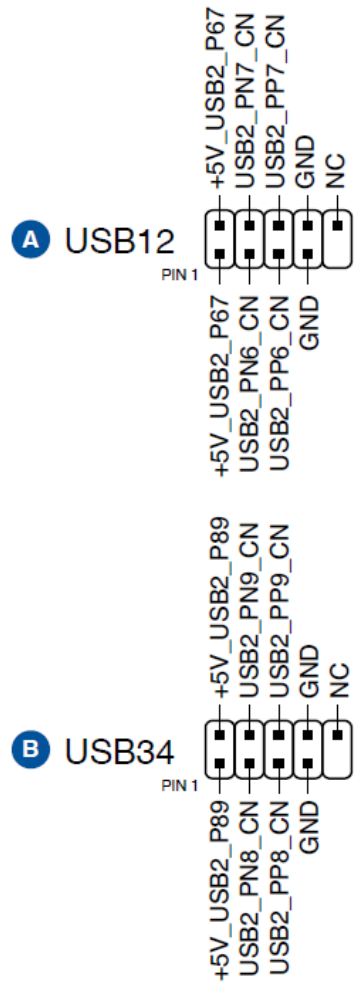
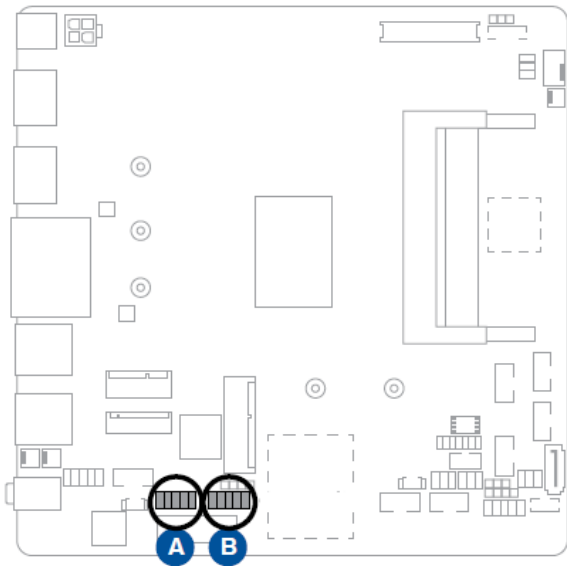
CHASSIS



*Connector Type: 2.54mm pitch

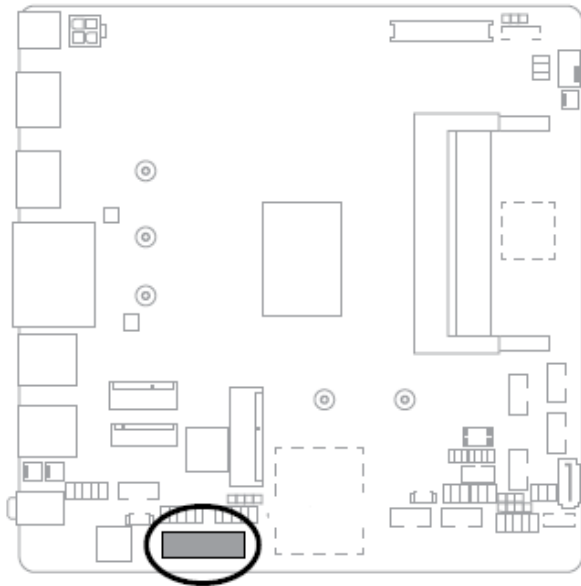
WADE-8173-J6412

22 :USB 2.0 headers (10-1pin USB_12, USB_34)

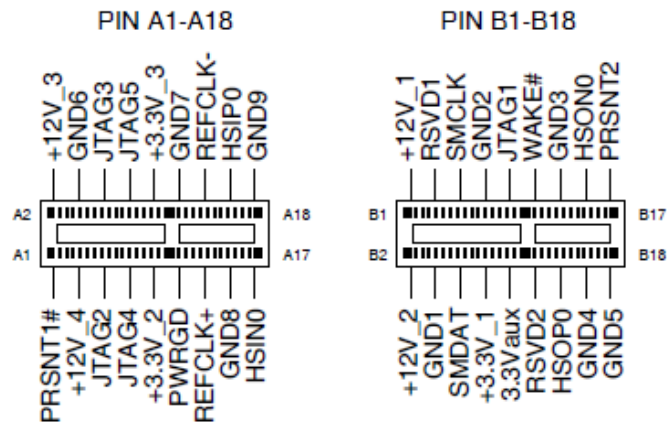


*Connector Type: 2.54mm pitch

23 :PCIe 3.0/2.0 x1 slot (PCIEX1)

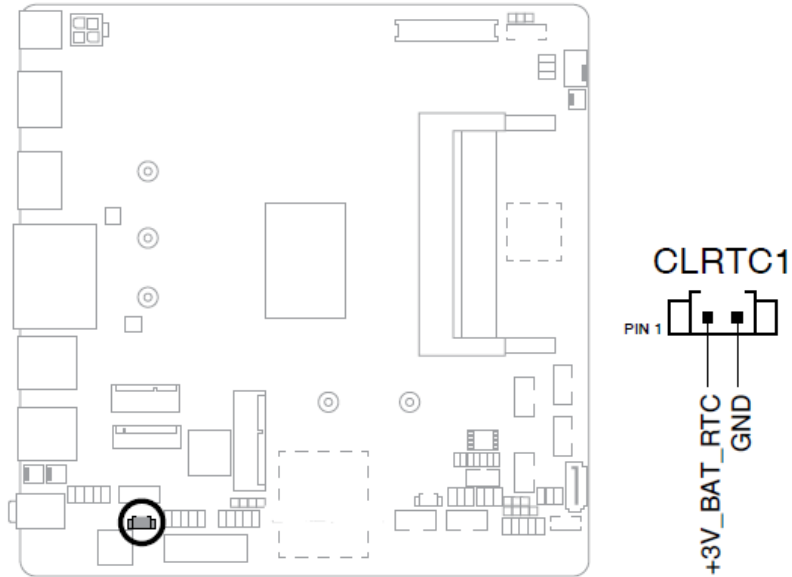


PCIEX1



24 :Clear RTC RAM (2-pin CLRTC)

This header allows you to clear the CMOS RTC RAM data of the system setup information such as date, time, and system passwords.

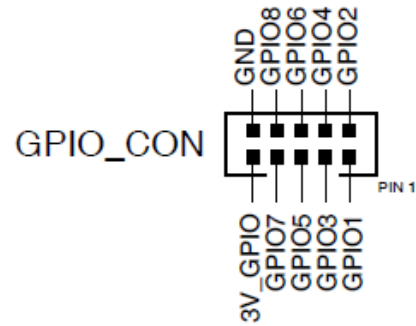
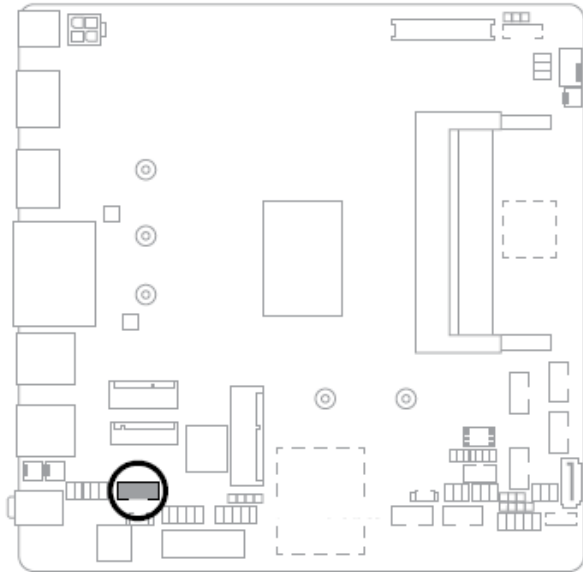


*Connector Type: 2.54mm pitch

To erase the RTC RAM:

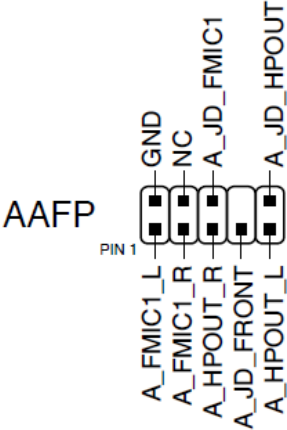
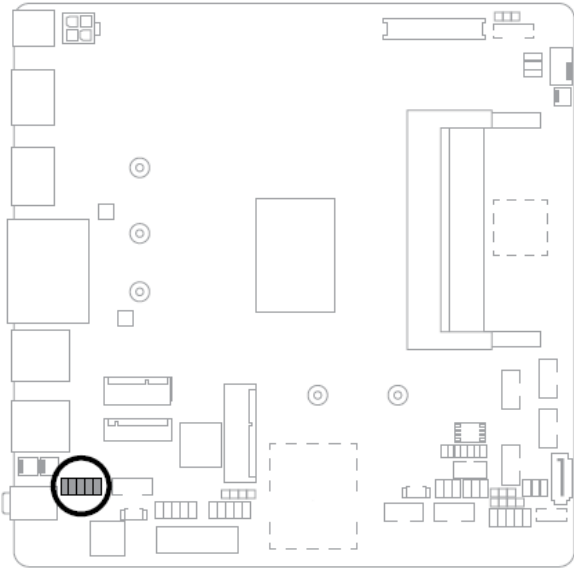
1. Turn OFF the computer and unplug the power cord.
2. Use a metal object such as a screwdriver to short the two pins.
3. Plug the power cord and turn ON the computer.
4. Hold down the key during the boot process and enter BIOS setup to re-enter data.

25 :General Purpose Input/output header (GPIO_CON)



*Connector Type: 2.00mm pitch

26 :Front Panel Audio header (10-1 pin AAFP)

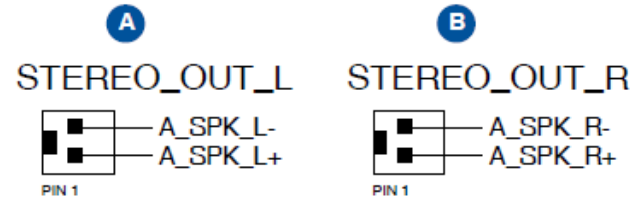
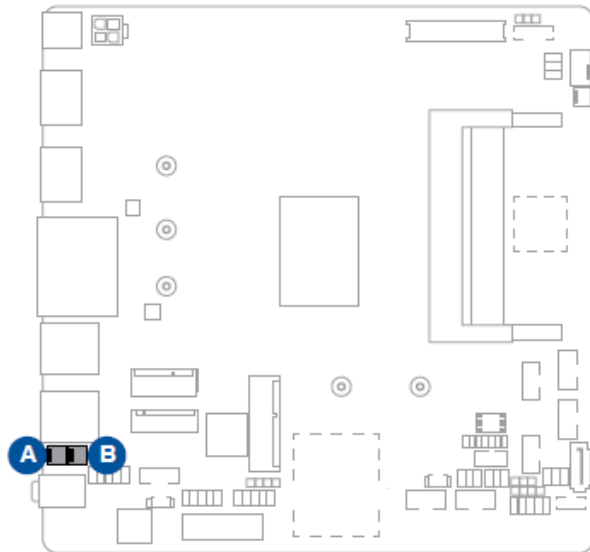


*Connector Type: 2.54mm pitch

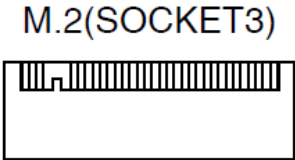
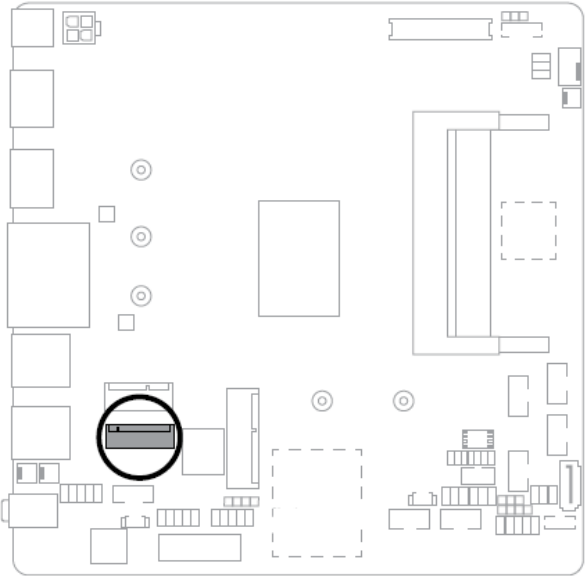
WADE-8173-J6412

27 :Internal Stereo Speaker header (2-pin STEREO_OUT_L, STEREO_OUT_R)

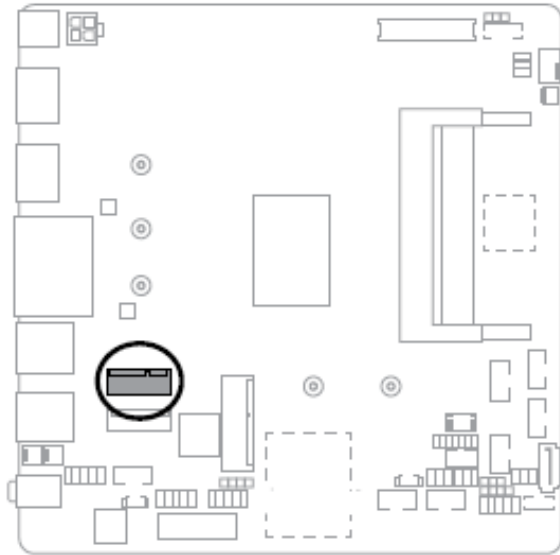
The internal mono speaker header allows connection to an internal, low-power speaker for basic system sound capability. The subsystem is capable of driving a speaker load of 4 Ohms at 3 Watts (rms).



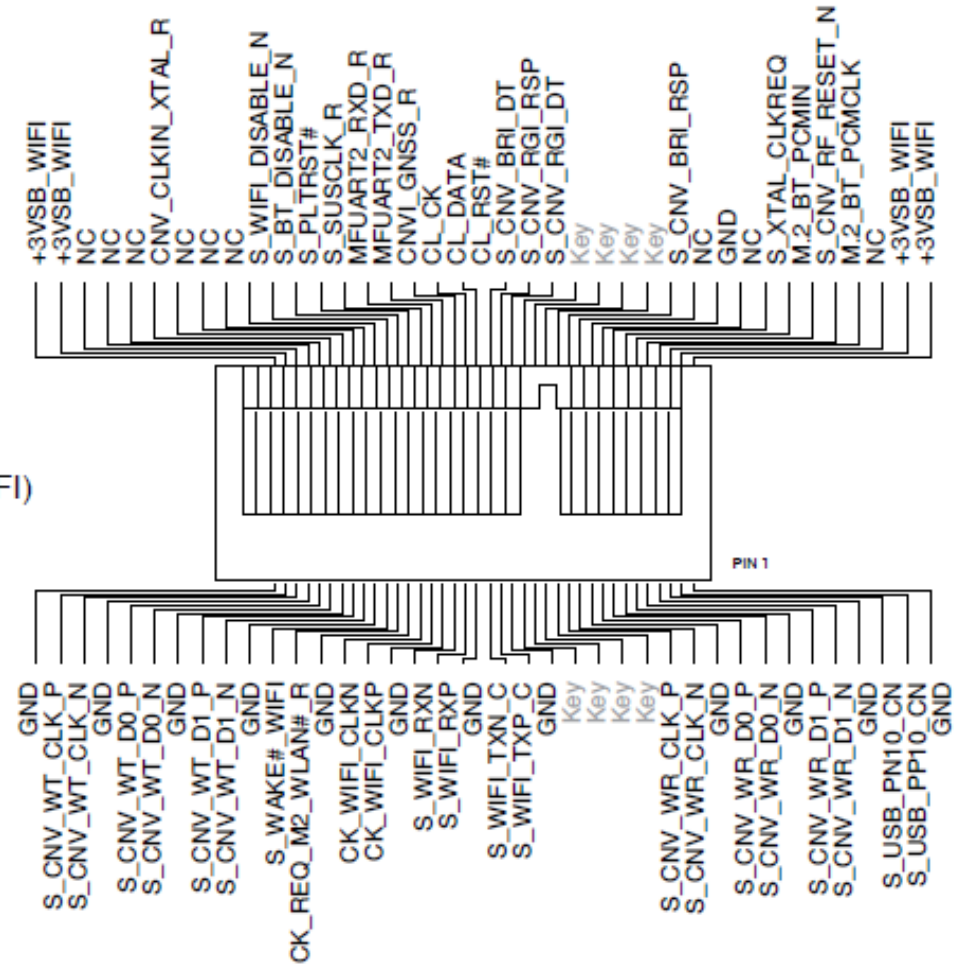
28 :M.2 socket 3 (M.2_SOCKET3)



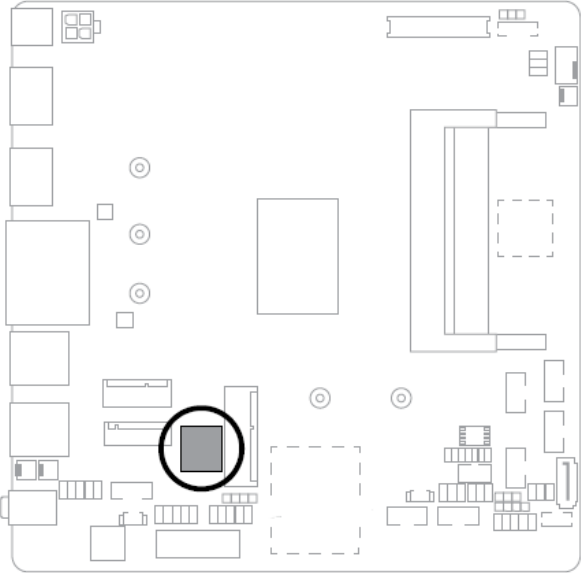
29 :M.2 Wi-Fi slot



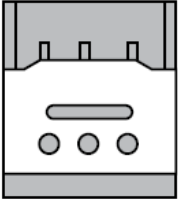
M.2(WiFi)



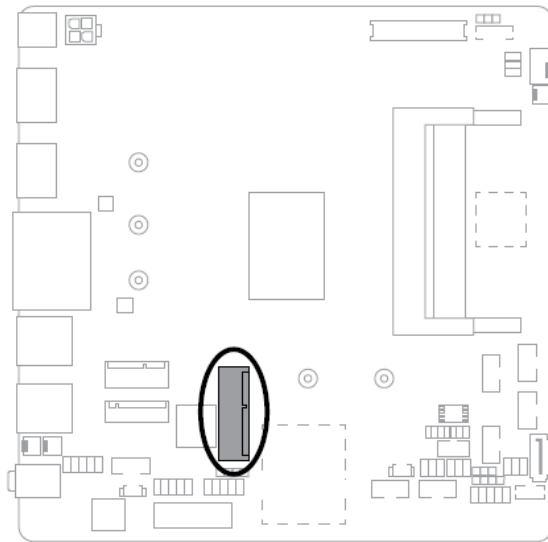
30 :Nano SIM Card slot



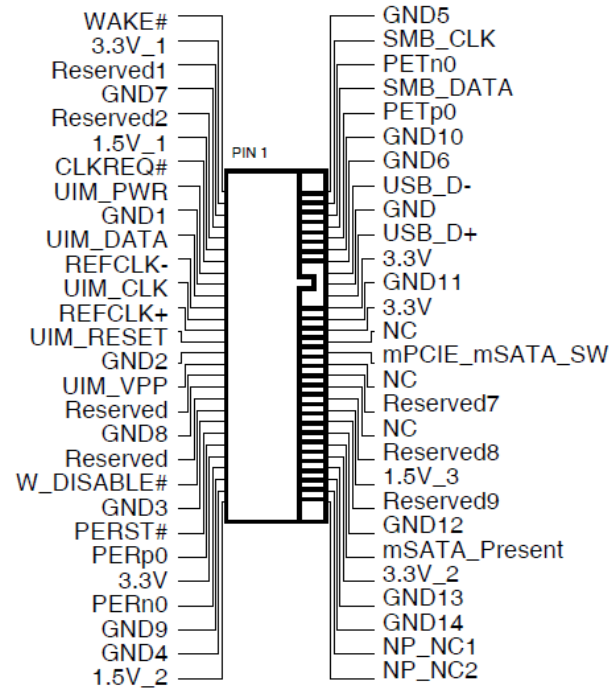
NANO_SIM



31 :MPCle combo slot (MPCIE)



MPCIE



5 Signal Descriptions

5.1 Watch Dog Signal

WDT setting

SIO_INDEX_PORT is 0x2E

SIO_DATA_PORT is 0x2F

1. Set WDT Time Unit

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07);
```

```
Outportb(SIO_DATA_PORT, 0x08);
```

```
Outportb(SIO_INDEX_PORT, 0xF0); //select WDT setting
```

```
val = Inportb(SIO_DATA_PORT) // Read current WDT setting
```

```
val = val | 0x08; // minute mode, val = val& 0xF7 if second mode
```

```
Outportb(SIO_INDEX_PORT, 0xF0); //select WDT setting
```

```
Outportb(SIO_DATA_PORT, val); // Write back WDT setting
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

2. Set WDT Time

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07);
```

```
Outportb(SIO_DATA_PORT, 0x08);
```

```
Outportb(SIO_INDEX_PORT, 0xF1); //select time value
```

```
Outportb(SIO_DATA_PORT, Time); // Write WDT time, value 1 to 255
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

3. Enable WDT

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07); // select device
```

```
Outportb(SIO_DATA_PORT, 0x08); // device 8
```

```
Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port
```

```
val = Inportb(SIO_DATA_PORT) // Read current WDT status
```

```
val = val | 0x01; // Enable WDT Timer
```

```
Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port
```


WADE-8173-J6412

```
Outportb(SIO_DATA_PORT, val); // Write back WDT status
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

4. Disable WDT

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x87); // Unlock SIO
```

```
Outportb(SIO_INDEX_PORT, 0x07);
```

```
Outportb(SIO_DATA_PORT, 0x08);
```

```
Outportb(SIO_INDEX_PORT, 0xF1); //select time value
```

```
Outportb(SIO_DATA_PORT, 0x00); // Clear WDT time, it means WDT Time-Out disable
```

```
Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port
```

```
val = Inportb(SIO_DATA_PORT) // Read current WDT status
```

```
val = val & 0xFE; // Disable WDT Timer
```

```
Outportb(SIO_INDEX_PORT, 0x30); //select WDT status port
```

```
Outportb(SIO_DATA_PORT, val); // Write back WDT status
```

```
Outportb(SIO_INDEX_PORT, 0xAA); // Lock SIO
```

5. WADE-8173-J6412 SIO not support WDT Reset Flag judgement.

5.2 GPIO Signal

GPIO Setting

1. Get SMBUS_BASE address

```
val = 0x8000FC20;
```

```
Outportd(0xCF8, val);
```

```
val = Inportd(0xCFC);
```

```
SMBUS_BASE = val&0x0000FFE0;
```

2. Set GPIO on to GPI or GPO

```
Status = Inportb(SMBUS_BASE + 0x00);
```

```
Outportb(SMBUS_BASE + 0x00, Status); // SMBus Clear Status
```

```
Outportb(SMBUS_BASE + 0x02, 0x08); // Set SMBus CMD to Byte Data
```

```
Outportb(SMBUS_BASE + 0x04, 0x41); // Set SMBus Slave Address to 0x40 and excute Read flow
```

```
Outportb(SMBUS_BASE + 0x03, 0x00); // Set SMBus Reg
```

```
val = Inportb(SMBUS_BASE + 0x02);
```

```
val = val | 0x40;
```

```
Outportb(SMBUS_BASE + 0x02, val); // ExcuteSMBus Command
```

```
Status = Inportb(SMBUS_BASE + 0x00); // Get SMBus Status
```

```
while (!(Status & 0x8E)) { // Wait for SMBus finished command
```

```
MicroSecondDelay(10);
```

```
Status = Inportb(SMBUS_BASE + 0x00);
}

val = Inportb(SMBUS_BASE + 0x05); // Get SMBus Data
val = val | (0x01 <<GPIOn); // GPI, val = val | ~(0x01 <<GPIOn) if GPO, GPIOn is value 0 to 7

Status = Inportb(SMBUS_BASE + 0x00);
Outportb(SMBUS_BASE + 0x00, Status); // SMBus Clear Status

Outportb(SMBUS_BASE + 0x02, 0x08); // Set SMBus CMD to Byte Data
Outportb(SMBUS_BASE + 0x04, 0x40); // Set SMBus Slave Address to 0x40 and excute Write flow
Outportb(SMBUS_BASE + 0x03, 0x00); // Set SMBus Reg
Outportb(SMBUS_BASE + 0x05, val); // Set SMBus Data
val = Inportb(SMBUS_BASE + 0x02);
val = val | 0x40;
Outportb(SMBUS_BASE + 0x02, val); // ExcuteSMBus Command

Status = Inportb(SMBUS_BASE + 0x00); // Get SMBus Status
while (!(Status & 0x8E)) { // Wait for SMBus finished command
MicroSecondDelay(10);
Status = Inportb(SMBUS_BASE + 0x00);
}
```

3. Get GPIO on GPI value

```
Status = Inportb(SMBUS_BASE + 0x00);
Outportb(SMBUS_BASE + 0x00, Status); // SMBus Clear Status

Outportb(SMBUS_BASE + 0x02, 0x08); // Set SMBus CMD to Byte Data
Outportb(SMBUS_BASE + 0x04, 0x41); // Set SMBus Slave Address to 0x40 and execute Read flow
Outportb(SMBUS_BASE + 0x03, 0x09); // Set SMBus Reg
val = Inportb(SMBUS_BASE + 0x02);
val = val | 0x40;
Outportb(SMBUS_BASE + 0x02, val); // Execute SMBus Command

    Status = Inportb(SMBUS_BASE + 0x00); // Get SMBus Status
    while (!(Status & 0x8E)) { // Wait for SMBus finished command
MicroSecondDelay(10);
        Status = Inportb(SMBUS_BASE + 0x00);
    }

val = Inportb(SMBUS_BASE + 0x05); // Get SMBus Data
if (val & (0x01 << GPIO)) // Determine if GPIO is High or Low, GPIO is value 0 to 7
    return HIGH; // GPI High
else
    return LOW; // GPI Low
```

4. Set GPIO on GPO value

```
Status = Inportb(SMBUS_BASE + 0x00);
Outportb(SMBUS_BASE + 0x00, Status); // SMBus Clear Status

Outportb(SMBUS_BASE + 0x02, 0x08); // Set SMBus CMD to Byte Data
Outportb(SMBUS_BASE + 0x04, 0x41); // Set SMBus Slave Address to 0x40 and execute Read flow
Outportb(SMBUS_BASE + 0x03, 0x0A); // Set SMBus Reg
val = Inportb(SMBUS_BASE + 0x02);
val = val | 0x40;
Outportb(SMBUS_BASE + 0x02, val); // Execute SMBus Command

Status = Inportb(SMBUS_BASE + 0x00); // Get SMBus Status
while (!(Status & 0x8E)) { // Wait for SMBus finished command
MicroSecondDelay(10);
Status = Inportb(SMBUS_BASE + 0x00);
}

val = Inportb(SMBUS_BASE + 0x05); // Get SMBus Data
val = val | (0x01 <<GPIO); // GPO High, val = val | ~(0x01 <<GPIO) if GPO Low, GPIO is value 0 to 7

Status = Inportb(SMBUS_BASE + 0x00);
```

```
Outportb(SMBUS_BASE + 0x00, Status); // SMBus Clear Status

Outportb(SMBUS_BASE + 0x02, 0x08); // Set SMBus CMD to Byte Data
Outportb(SMBUS_BASE + 0x04, 0x40); // Set SMBus Slave Address to 0x40 and excute Write flow
Outportb(SMBUS_BASE + 0x03, 0x0A); // Set SMBus Reg
Outportb(SMBUS_BASE + 0x05, val); // Set SMBus Data
val = Inportb(SMBUS_BASE + 0x02);
val = val | 0x40;
Outportb(SMBUS_BASE + 0x02, val); // ExcuteSMBus Command

    Status = Inportb(SMBUS_BASE + 0x00); // Get SMBus Status
    while (!(Status & 0x8E)) { // Wait for SMBus finished command
MicroSecondDelay(10);
        Status = Inportb(SMBUS_BASE + 0x00);
    }
```

6 System Resources

6.1 Intel® Elkhart Lake SoC

Intel®Celeron™ J6412 Processor(1.5M L2 Cache, up to 2.00 GHz)

6.2 Main Memory

WADE-8173-J6412 provides 2x SO-DIMM sockets which supports DDR4 non-ECC memory. The maximum memory can be up to 32GB. Memory clock and related settings can be detected by BIOS via SPD interface.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

6.3 Installing the Single Board Computer

To install your WADE-8173-J6412 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position

Step 2 : Install and configure memory module on right position

Step 3 : Place WADE-8173-J6412 into the dedicated position in the system

Step 4 : Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that motherboard is properly inserted and fixed by mechanism.

6.3.1 Chipset Component Driver

The WADE-8173-J6412 build with Intel® Celeron™ processor J6412. It's a new chipset that some old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows 10, please install its INF before any of other Drivers are installed.

6.3.2 Intel® UHD Graphics

WADE-8173-J6412 has integrated Intel® UHD Graphics for 10th Gen Intel® Processors.

Processor Graphics indicates graphics processing circuitry integrated into the processor, providing the graphics, compute, media, and display capabilities. Intel® HD Graphics, Iris™ Graphics, Iris Plus Graphics, and Iris Pro Graphics deliver enhanced media conversion, fast frame rates, and 4K Ultra HD (UHD) video. WADE-8173-J6412 supports DP, LVDS/eDP, HDMI display output. This combination makes WADE-8173-J6412 an excellent performance hardware.

6.3.3 RealtekRTL8111H Gigabit Ethernet Controller

- RTL8111H Gigabit Ethernet controller and 2x RJ45 connectors on rear I/O

7 BIOS Setup Items

7.1 Introduction

The following section describes the BIOS setup program. The BIOS setup program can be used to view and change the BIOS settings for the module. Only experienced users should change the default BIOS settings.

7.2 BIOS Setup

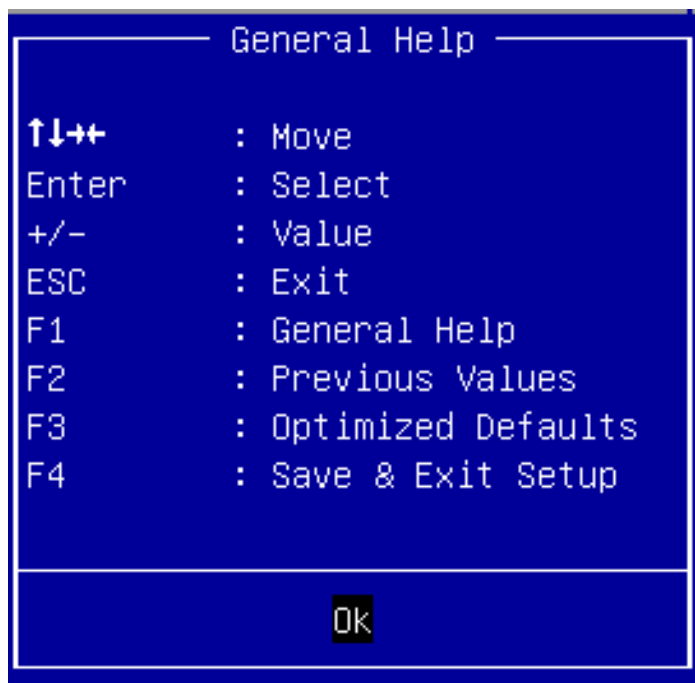
Power on the computer and the system will start POST (Power on Self Test) process. When the message below appears on the screen, press <Delete> or <ESC> key will enter BIOS setup screen.

Press<Delete> or <ESC> to enter SETUP

If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

Press <F1> to Run General Help or Resume

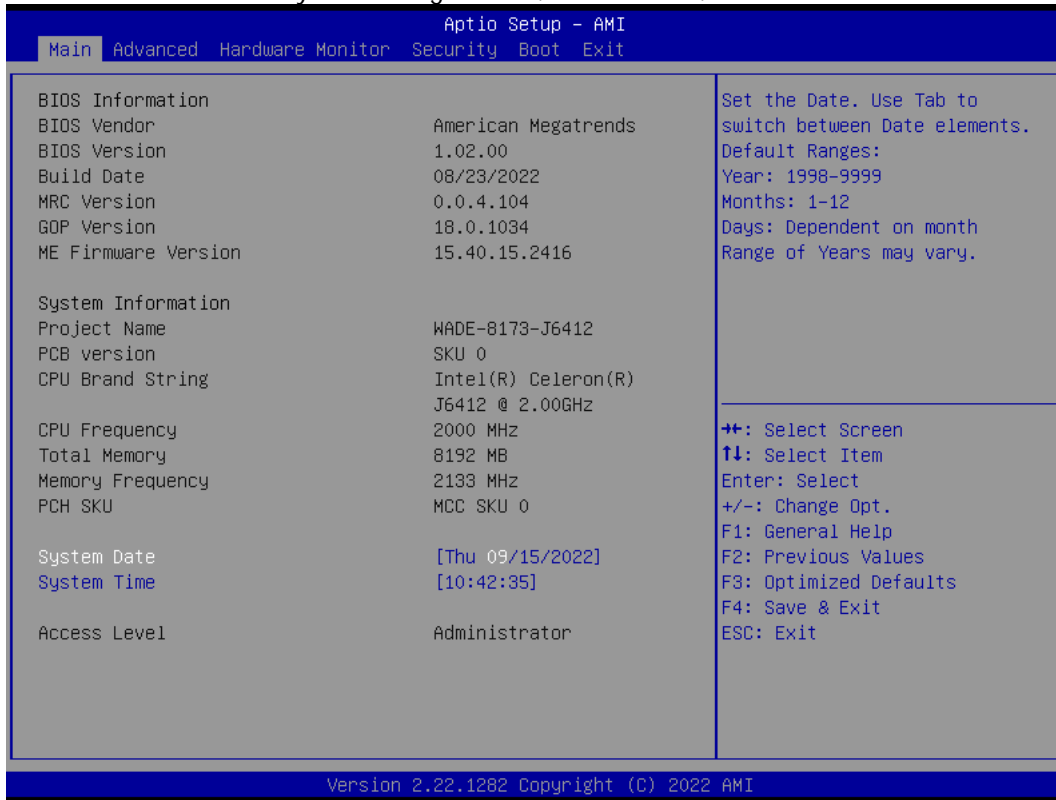
The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help Screen.



WADE-8173-J6412

7.2.1 Main

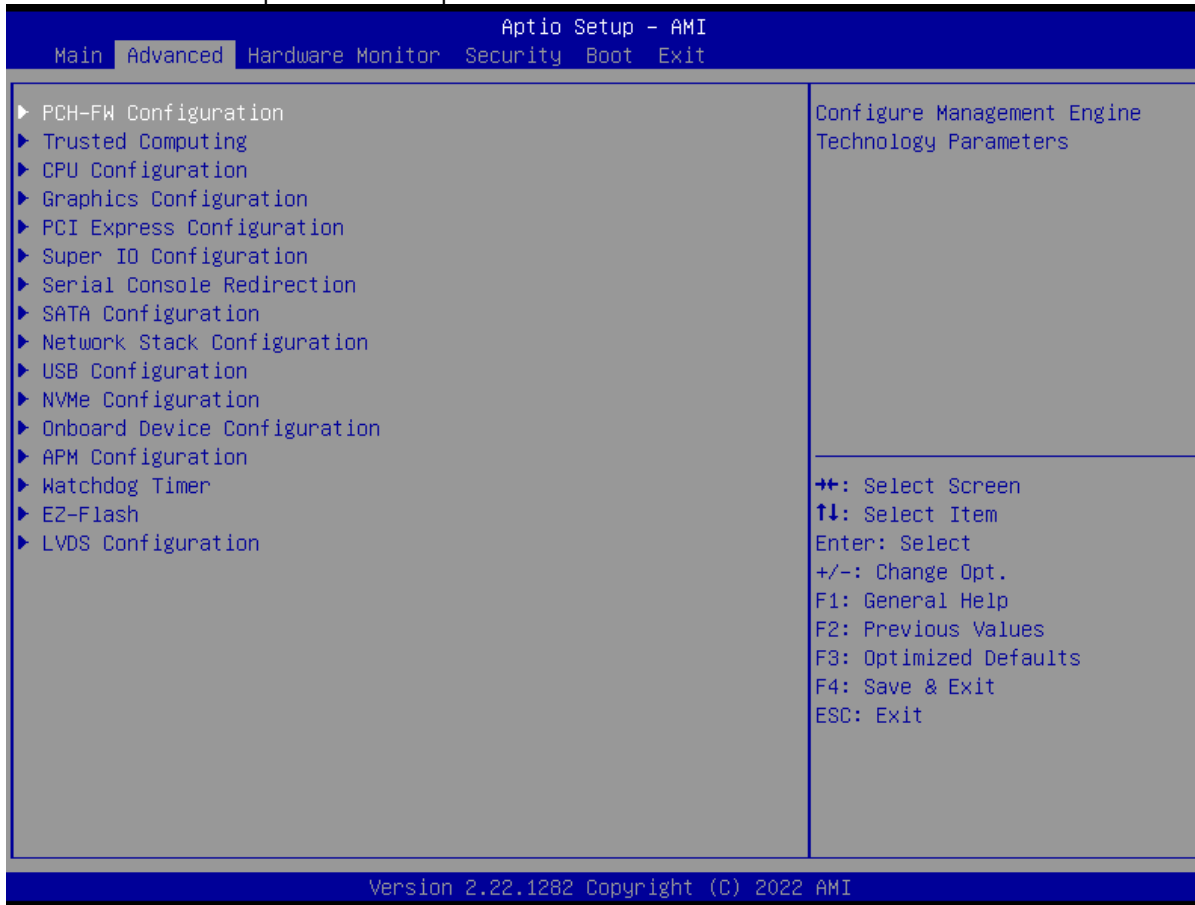
Use this menu for basic system configurations, such as time, date etc.



Feature	Description	Options
System Date	The date format is <Day>, <Month><Date><Year>. Use [+] or [-] to configure system Date.	
System Time	The time format is <Hour><Minute><Second>. Use [+] or [-] to configure system Time.	

7.2.2 Advanced

Use this menu to set up the items of special enhanced features



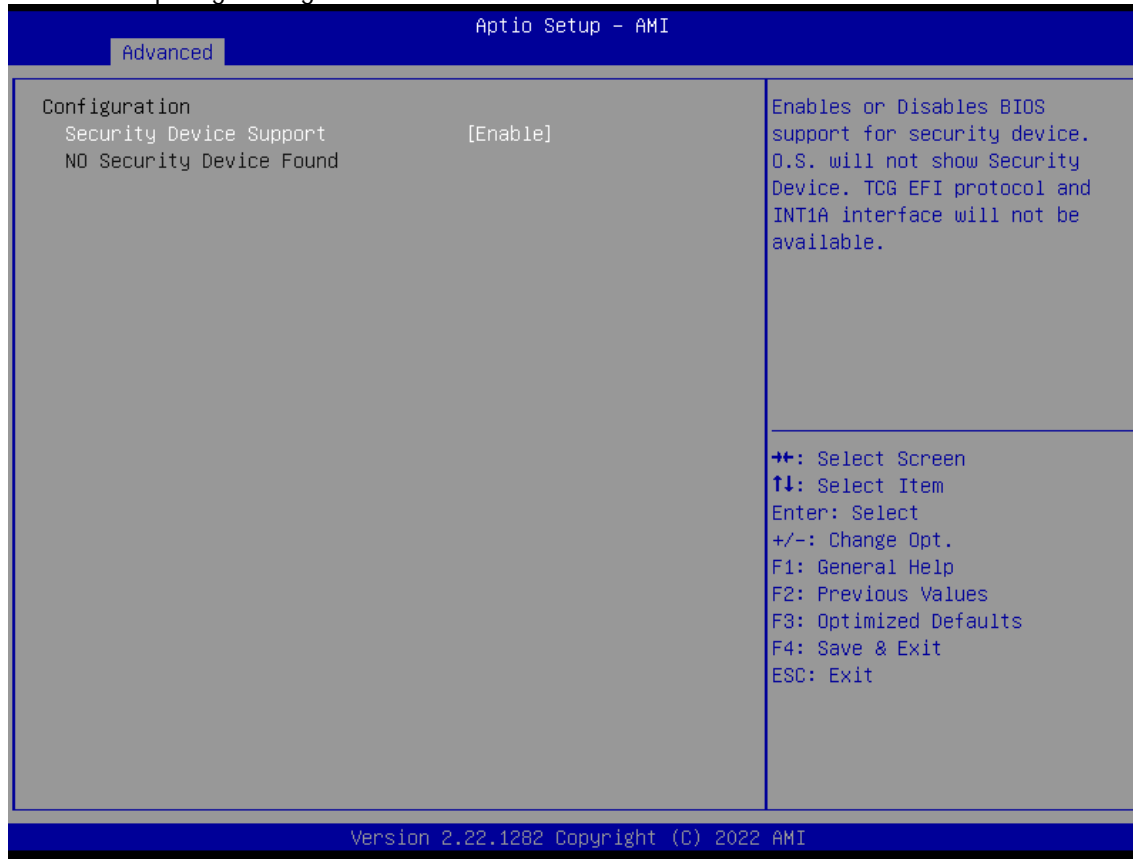
PCH-FW Configuration

Configure Management Engine Technology Parameters



Feature	Description	Options
TPM Device Selection	Selects TPM device: PTT or dTPM. PTT-Enable PTT in SkuMgr dTPM1.2 -Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.	★dTPM , PTT

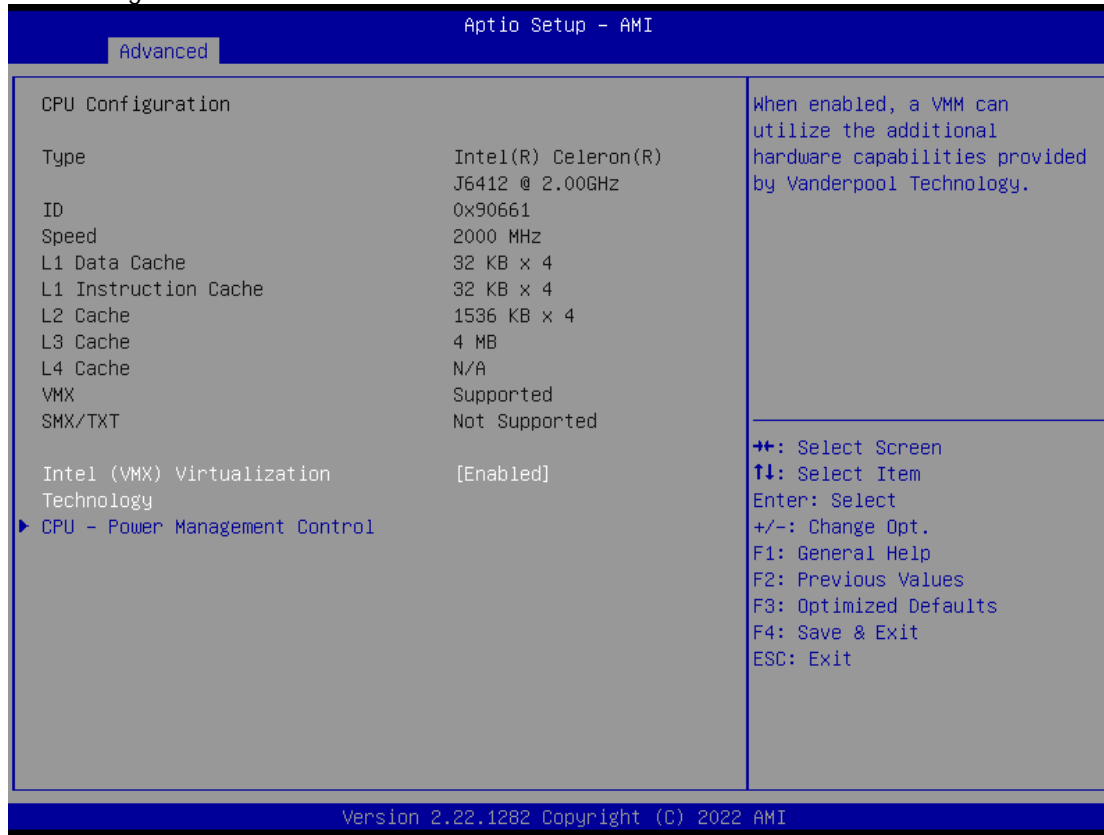
Trusted Computing
Trusted Computing Settings



Feature	Description	Options
Security Device Support	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.	★ Enable, Disable

CPU Configuration

CPU Configuration Parameters



Feature	Description	Options
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.	★Enabled ,Disabled

CPU- Power Management Control

CPU-Power Management Control Options

The screenshot displays the 'Advanced' tab of the 'Aptio Setup - AMI' BIOS. The 'CPU - Power Management Control' section is active, showing various settings. A description on the right explains that this section allows for more than two frequency ranges. A legend at the bottom right lists navigation keys: right arrow for screen selection, up/down arrows for item selection, Enter for selection, +/- for option changes, F1 for help, F2 for previous values, F3 for optimized defaults, F4 for save and exit, and ESC for exit. The footer indicates the BIOS version is 2.22.1282, copyrighted by AMI in 2022.

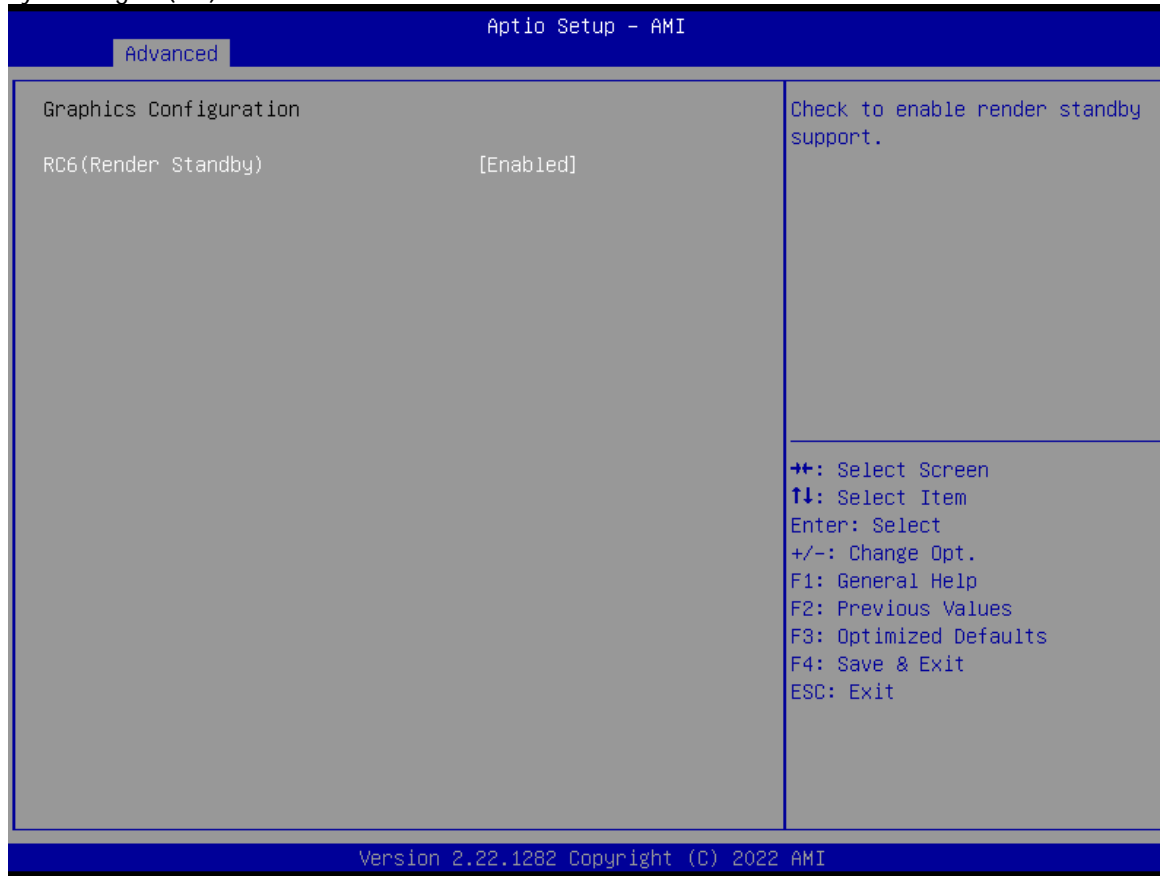
CPU - Power Management Control		Allows more than two frequency ranges to be supported.
Intel(R) SpeedStep(tm)	[Enabled]	
Intel(R) Speed Shift Technology	[Enabled]	
Turbo Mode	[Enabled]	
C states	[Enabled]	
Enhanced C-states	[Enabled]	
Power Limit 1 Override	[Enabled]	
Power Limit 1	0	
Power Limit 2 Override	[Enabled]	
Power Limit 2	0	

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.22.1282 Copyright (C) 2022 AMI

Feature	Description	Options
Intel(R)SpeedStep(tm)	Allows more than two frequency ranges to be supported.	★Enabled ,Disabled
Intel(R)SpeedShift Technology	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.	★Enabled ,Disabled
Turbo Mode	Enable/Disable processor Turbo Mode(requires EMTTM enabled too). AUTO means enabled.	★Enabled ,Disabled
C states	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.	★Enabled ,Disabled
EnhancedC-states	Enable/Disable C1E.When enabled, CPU will switch to minimum speed when all cores enter C-State.	★Enabled ,Disabled
Power Limit 1 Override	Enable/Disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for Power Limit 1 Time Window.	★Disabled, Enabled
Power Limit 1 Override[Enabled]		
Power Limit 1	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0=no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits(specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and TDP Limit.	★0
Power Limit 2 Override	Enable/Disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for power Limit 2.	★Enabled ,Disabled
Power Limit 2	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. If value is 0, BIOS will program this value as 1.25*TDP. For 12.50w, enter 12500. Processor applies control policies such that the package power does not exceed this limit.	★0

Graphics Configuration
System Agent(SA)Parameters



Feature	Description	Options
RC6 (Render standby)	Check to enable render standby support.	★ Enabled, Disabled

PCI Express Configuration

PCI Express Configuration



Feature	Description	Options
PCIe x1 slot	PCI Express Configuration Settings.	

PCIe x1 slot

Aptio Setup - AMI

Advanced

PCIe_x1 Slot	[Enabled]	Control the PCI Express Root Port.
ASPM	[Disabled]	
L1 Substates	[Disabled]	
PCIe Speed	[Auto]	
Detect Timeout	0	
Hot Plug	[Disabled]	
Detect Non-Compliance Device	[Disabled]	

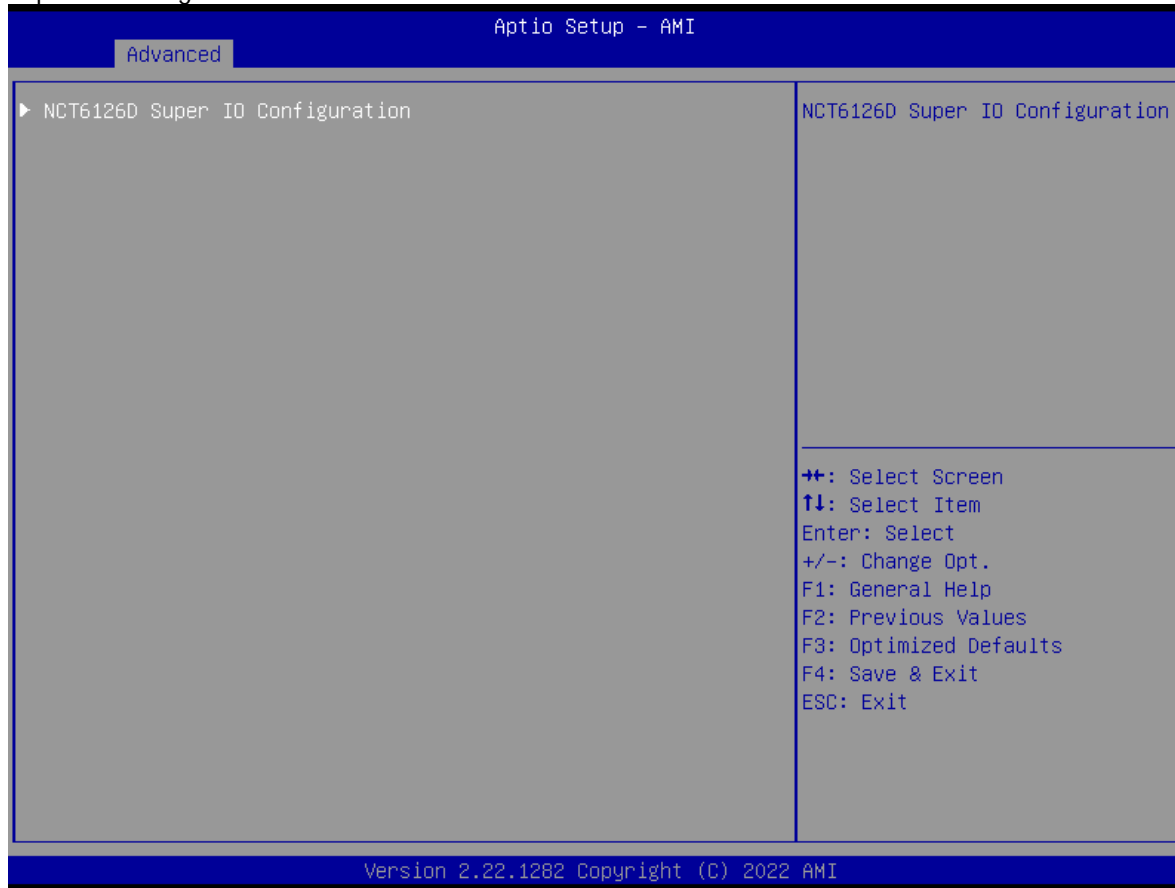
++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.22.1282 Copyright (C) 2022 AMI

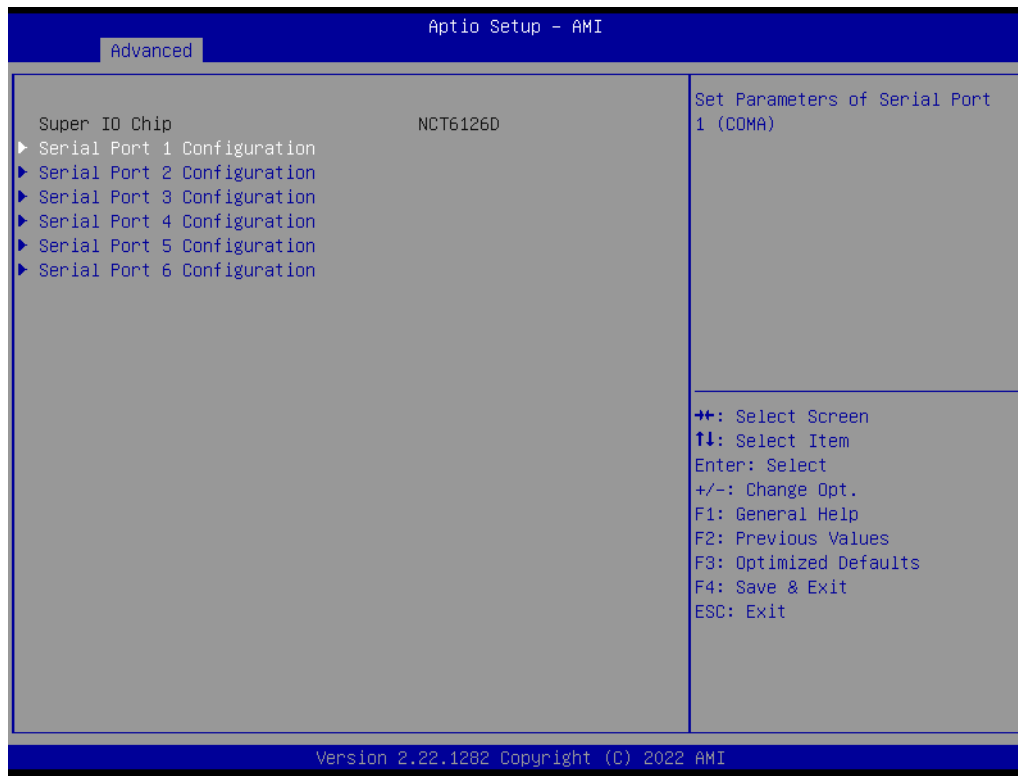
Feature	Description	Options
PCIe x1 slot	Control the PCI Express Root Port.	★Enabled, Disabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM	★Disabled, L0s, L1, L0sL1, Auto
L1 Substates	PCI Express L1 Substates settings.	★Disabled, L1.1, L1.1 & L1.2
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3
Detect Timeout	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.	★0
Hot Plug	PCI Express Hot Plug Enable/Disable.	★Disabled, Enabled
Detect Non-Compliance Device	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.	★Disabled, Enabled

Super IO Configuration

Super IO Configuration

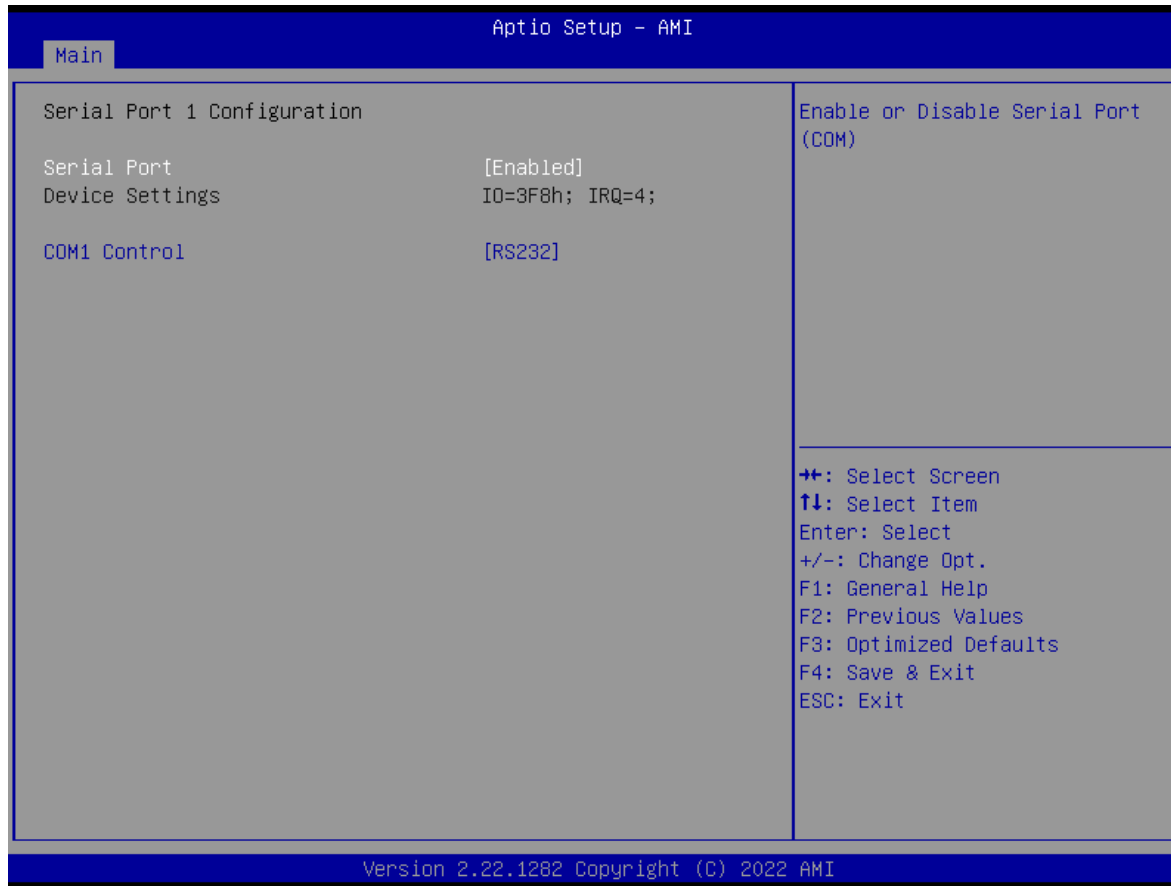


Feature	Description	Options
NCT6126D Super IO Configuration	NCT6126D Super IO Configuration.	



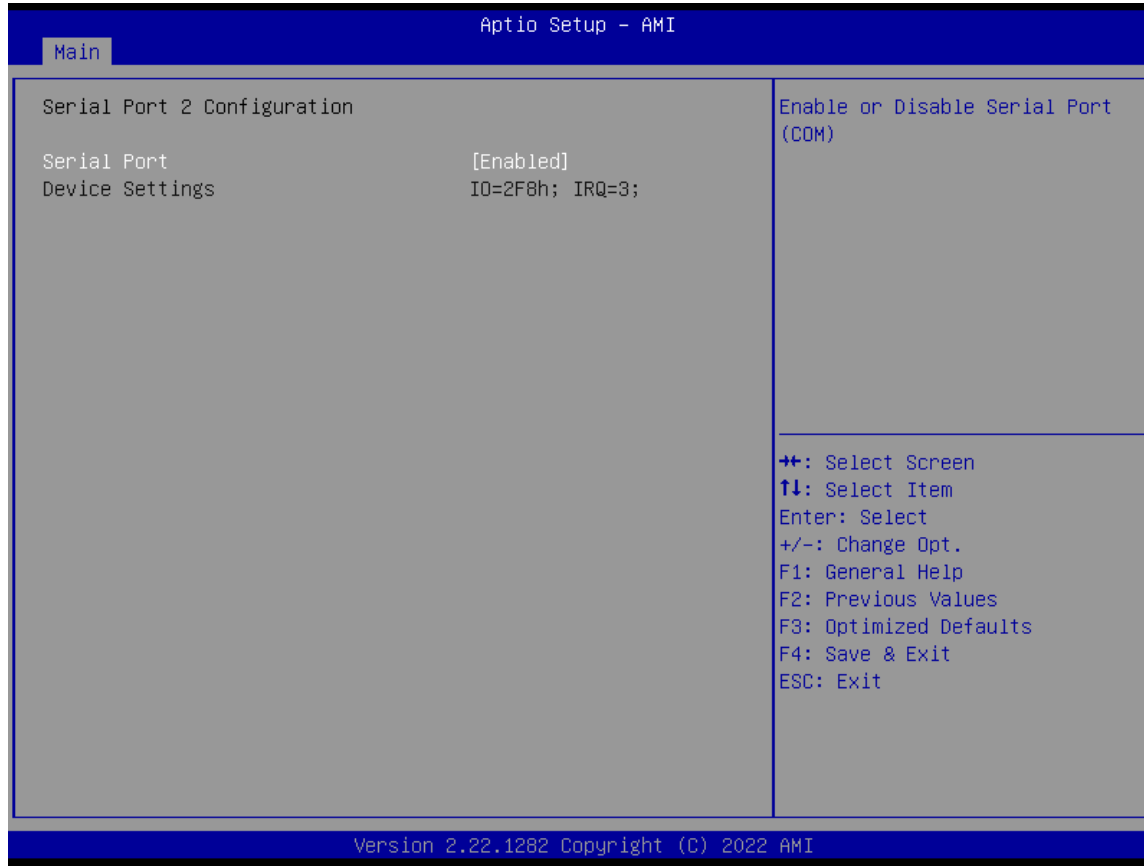
Feature	Description	Options
Serial Port 1 Configuration	Set Parameters of Serial Port1(COMA)	
Serial Port 2 Configuration	Set Parameters of Serial Port2(COMB)	
Serial Port 3 Configuration	Set Parameters of Serial Port3(COMC)	
Serial Port 4 Configuration	Set Parameters of Serial Port4(COMD)	
Serial Port 5 Configuration	Set Parameters of Serial Port4(COME)	
Serial Port 6 Configuration	Set Parameters of Serial Port4(COMF)	

Serial Port 1 Configuration



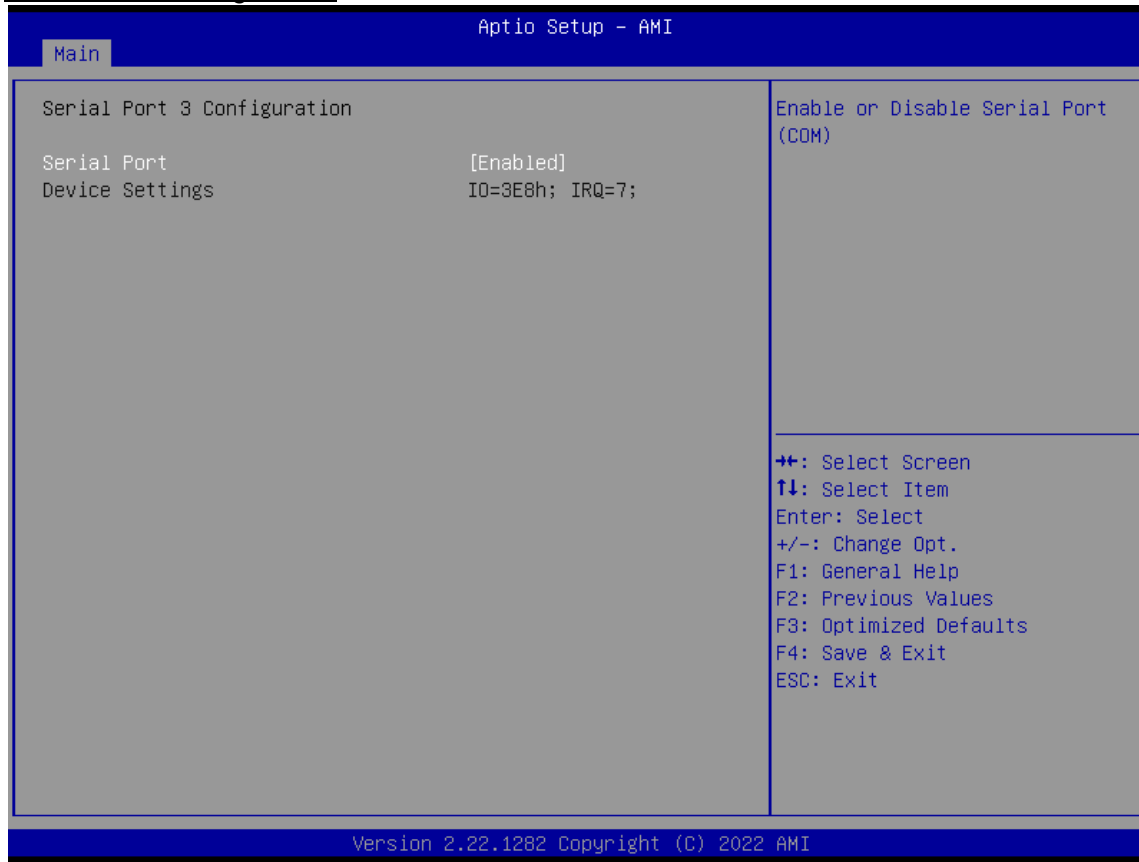
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled ,Disabled
COM1 Control	Select COM1 mode. RS232, RS422 or RS485	★RS232,RS422,RS485

Serial Port 2 Configuration



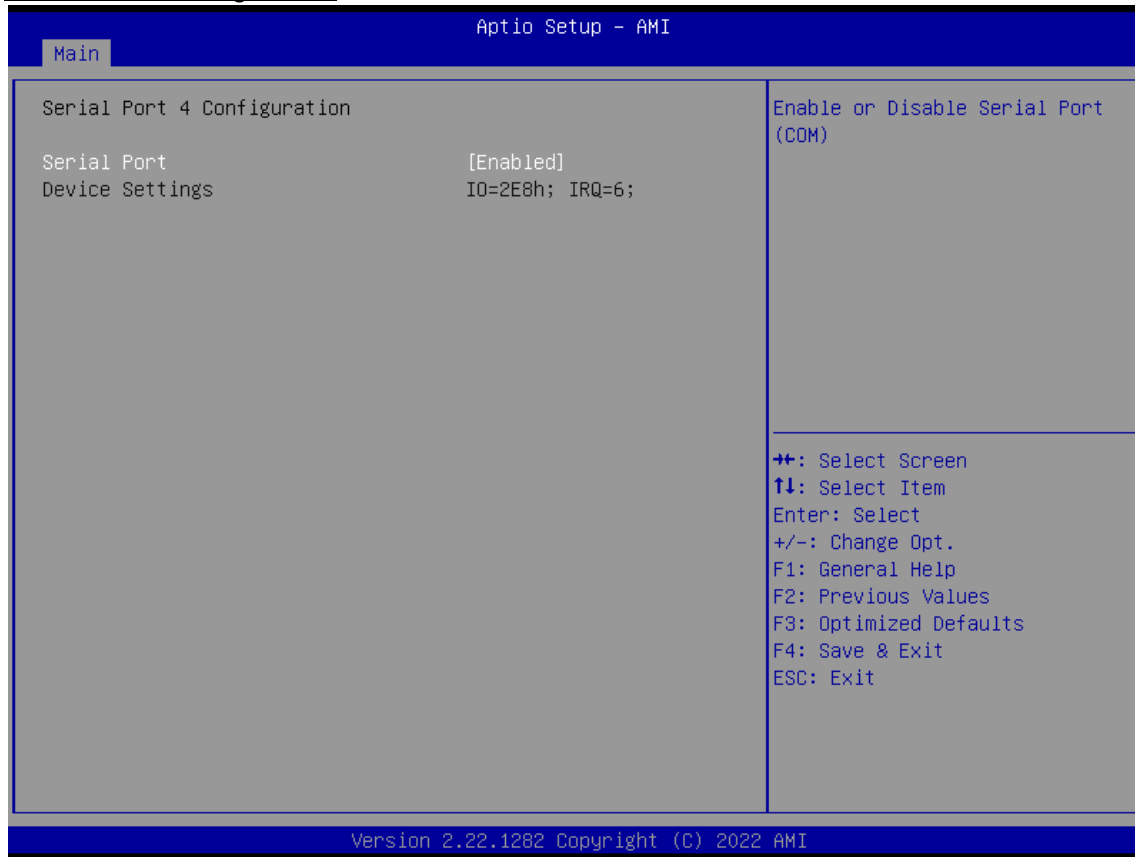
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled ,Disabled

Serial Port 3 Configuration



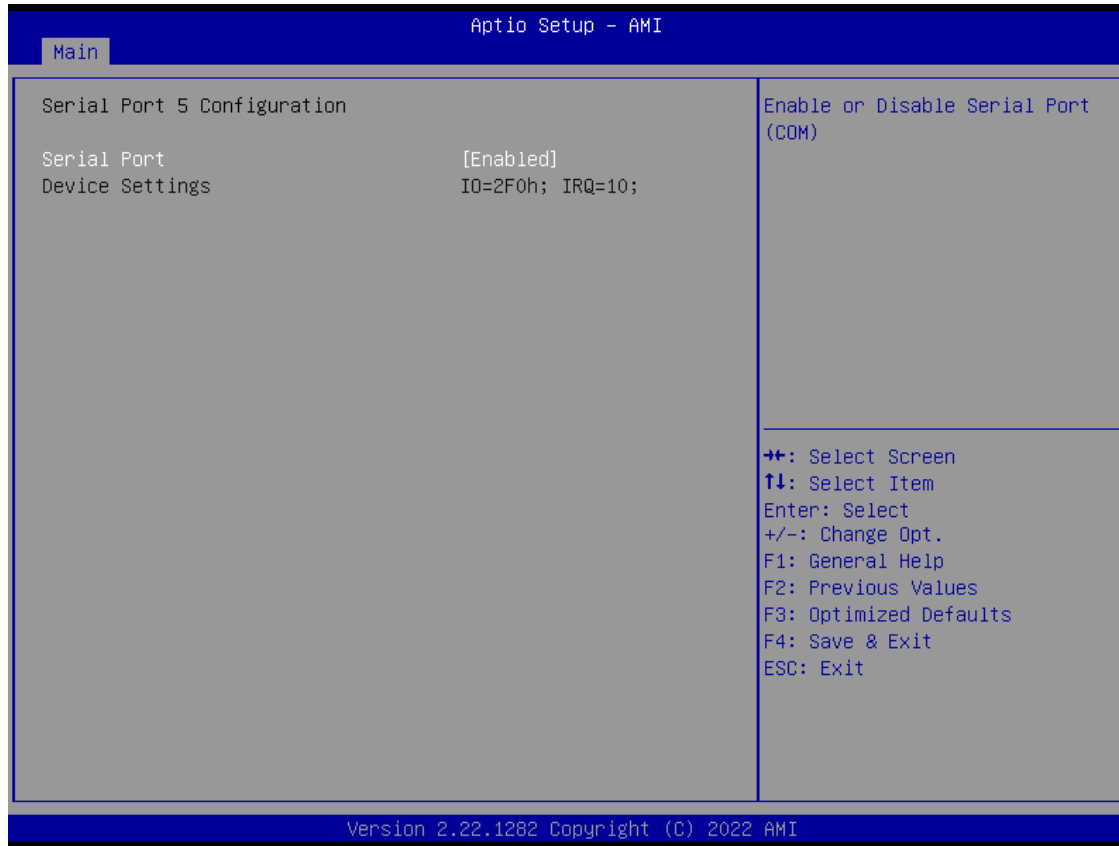
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled ,Disabled

Serial Port 4 Configuration



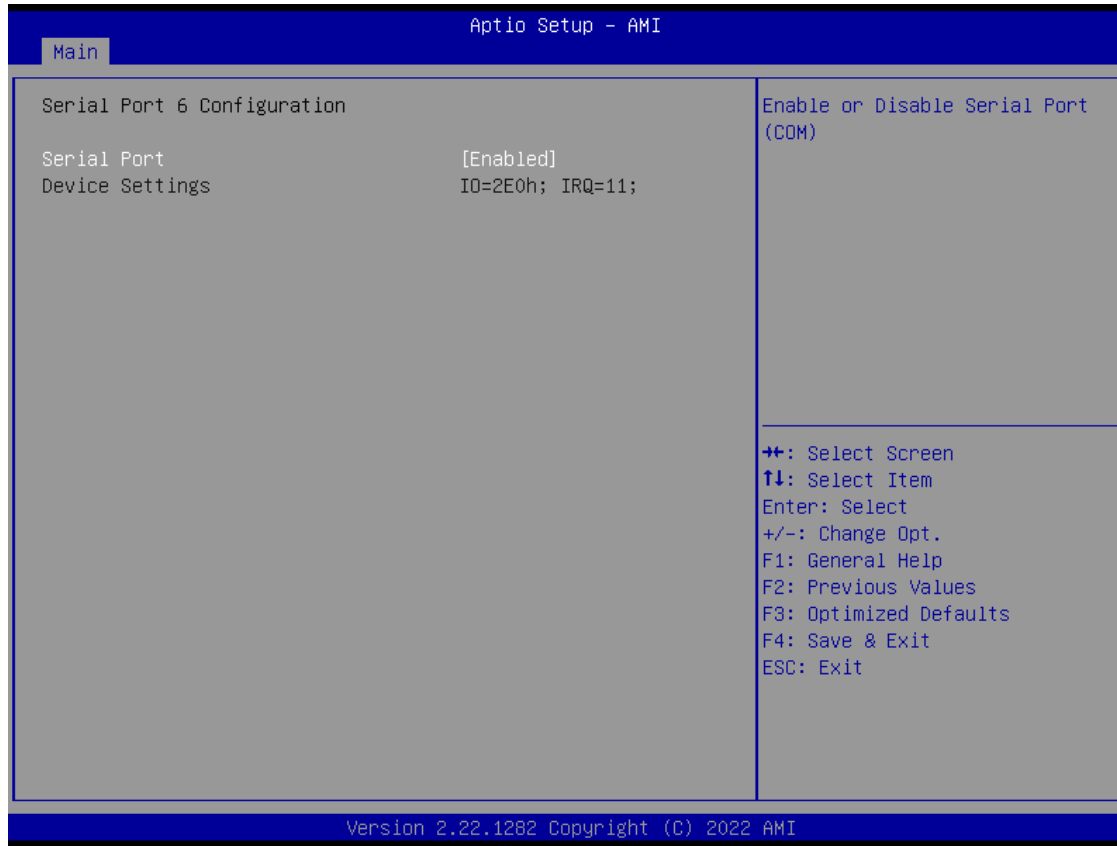
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled ,Disabled

Serial Port 5 Configuration



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled ,Disabled

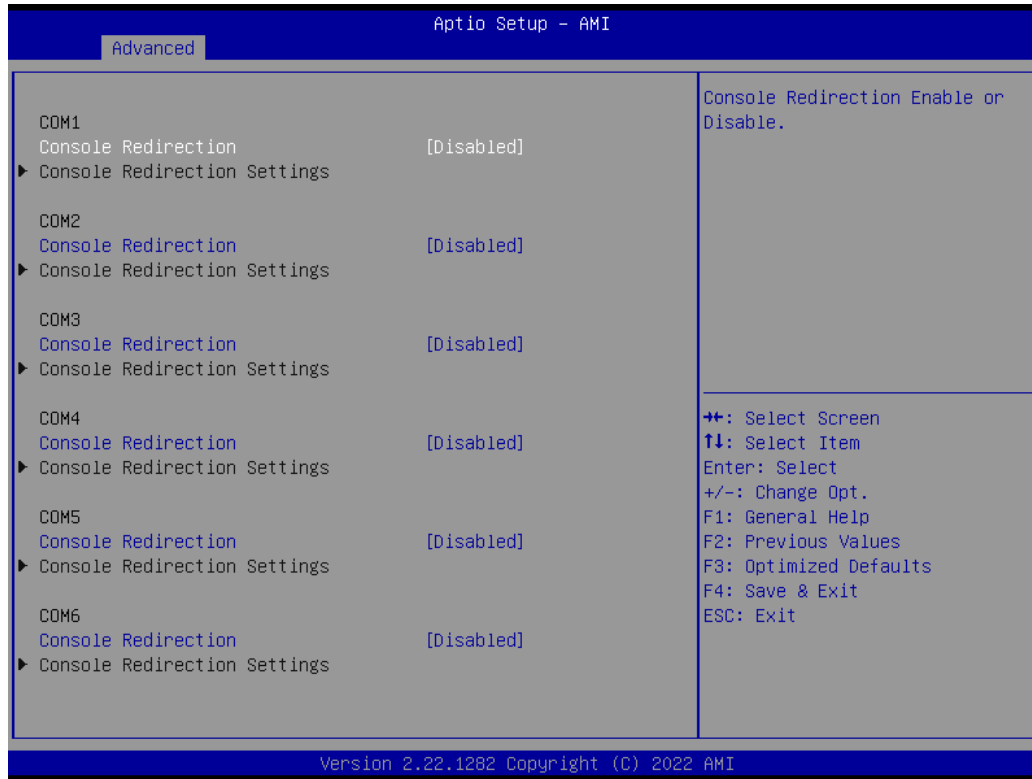
Serial Port 6 Configuration



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled ,Disabled

Serial Console Redirection

Serial Console Redirection



Feature	Description	Options
Console Redirection	Console Redirection Enable or Disable	★Disabled, Enabled
Console Redirection [Enabled]		
Console Redirection Settings	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.	

Console Redirection Settings

Aptio Setup - AMI

Advanced

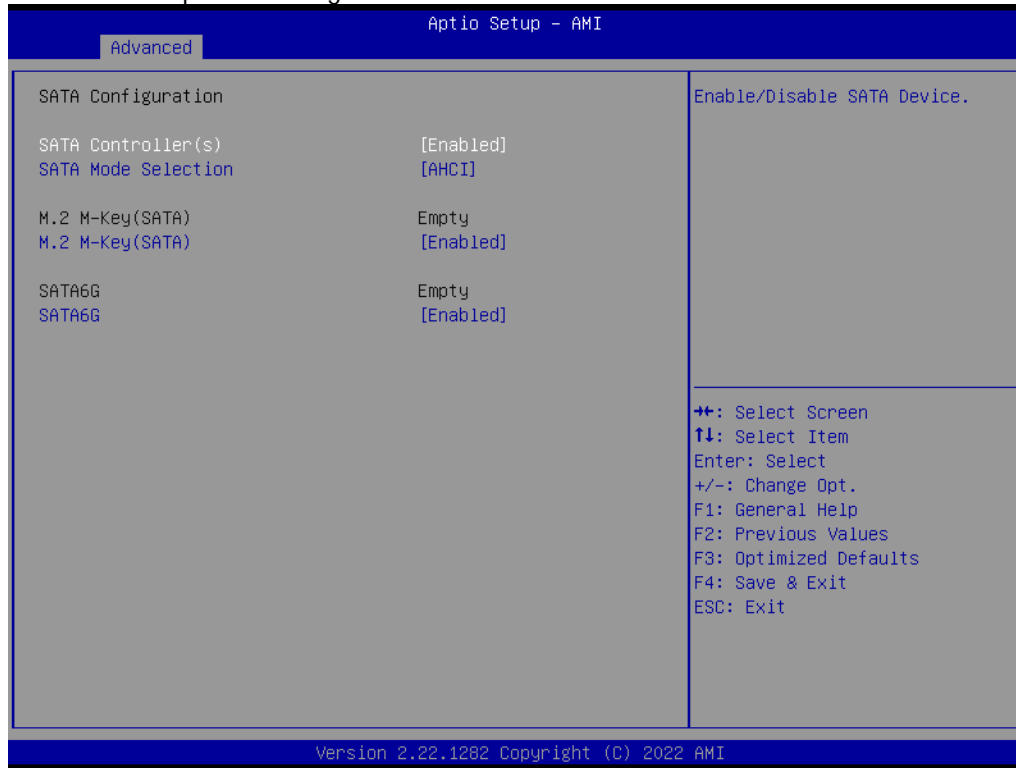
COM1 Console Redirection Settings		Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Terminal Type	[ANSI]	
Bits per second	[115200]	
Data Bits	[8]	
Parity	[None]	
Stop Bits	[1]	
Flow Control	[None]	
VT-UTF8 Combo Key Support	[Enabled]	
Recorder Mode	[Disabled]	
Resolution 100x31	[Disabled]	
Putty KeyPad	[VT100]	

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.22.1282 Copyright (C) 2022 AMI

Feature	Description	Options
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.	★ANSI, VT100, VT100+, VT-UTF8
Bits per second	Select Serial port transmission speed. The speed must be matched on other side. Long or noisy lines may require lower speeds.	★115200, 9600, 19200, 38400, 57600
Data Bits	Data Bits.	★8, 7
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space parity bit is always 0. Mark and Space Parity do not allow for error detection.	★None, Even, Odd, Mark, Space
Stop Bits	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.	★1,2
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.	★None, Hardware RTS/CTS
VT-UTFB Combo Key Support	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.	★Enabled, Disabled
Recorder Mode	With this mode enabled only text will be sent. This is to capture Terminal data.	★Disabled, Enabled
Resolution 100x31	Enables or disables extended terminal resolution.	★Disabled, Enabled
Putty KeyPad	Select FunctionKey and KeyPad on Putty.	★VT100, LINUX,XTERMR6, SCO, ESCN, VT400

SATA Configuration
SATA Device Options Settings



Feature	Description	Options
SATA Controller(s)	Enable/Disable the SATA controllers.	★Enabled ,Disabled
SATA Mode Selection	Determines how SATA controller(s) operate.	★AHCI
M.2 M-Key(SATA)	Enable or Disable SATA Port.	★Enabled, Disabled
SATA6G	Enable or Disable SATA Port.	★Enabled, Disabled

Network Stack Configuration

Network Stack Settings



Feature	Description	Options
Network Stack	Enable/Disable UEFI Network Stack.	★ Disabled, Enabled
Network Stack [Enabled]		
Ipv4 PXE Support	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.	★ Disabled, Enabled
Ipv6 PXE Support	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.	★ Disabled, Enabled

USB Configuration

USB Configuration settings

The screenshot shows the 'Advanced' menu of the Aptio Setup - AMI BIOS. The 'USB Configuration' section is highlighted. The settings are as follows:

Setting	Value
USB Configuration	
USB Module Version	25
USB Controllers:	1 XHCI
USB Devices:	1 Drive, 1 Keyboard, 1 Mouse
XHCI Hand-off	[Enabled]
USB Mass Storage Driver Support	[Enabled]
U3G2_1	[Enabled]
U3G2_2	[Enabled]
U3G2_3	[Enabled]
U2_4	[Enabled]
USB1	[Enabled]
USB2	[Enabled]
USB3	[Enabled]
USB4	[Enabled]

Additional information on the right side of the screen:

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

Navigation keys:

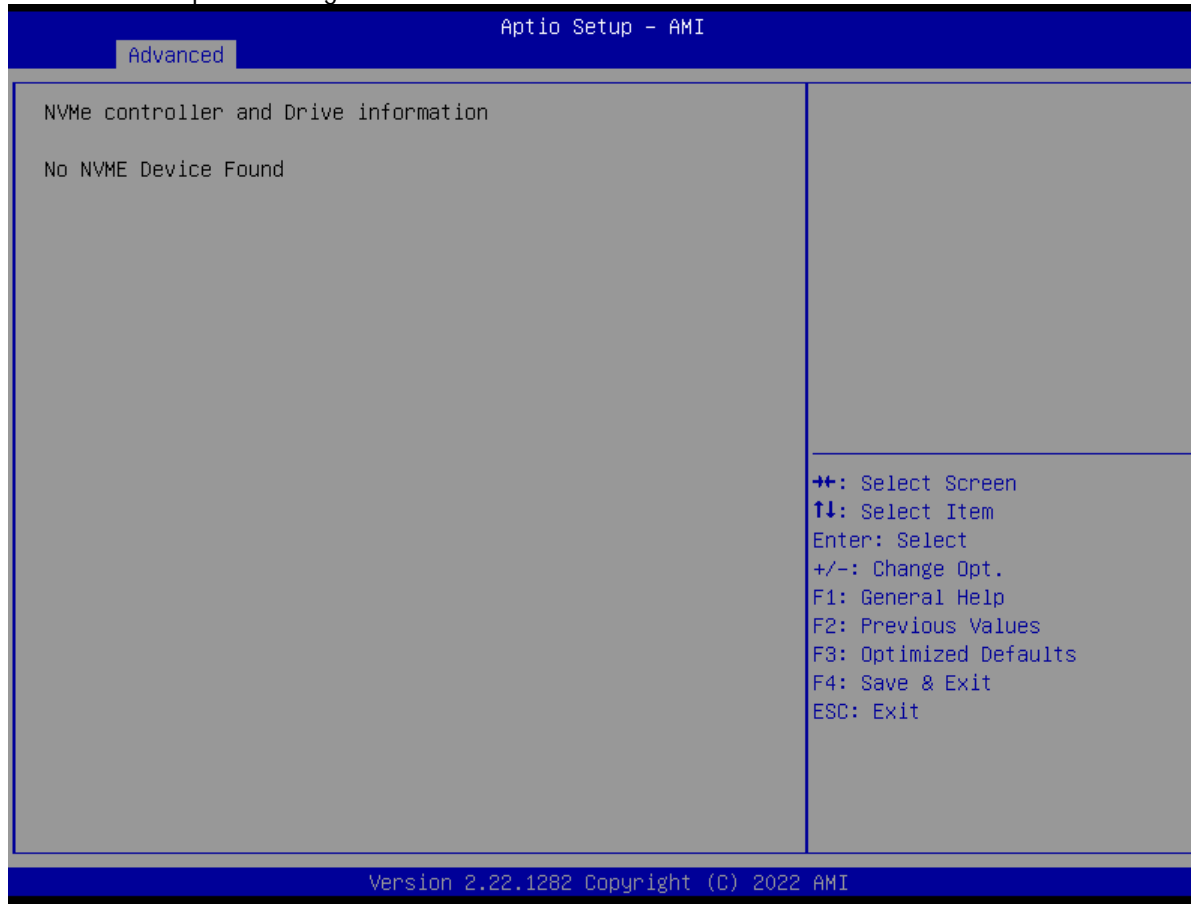
- ←: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Opt.
- F1: General Help
- F2: Previous Values
- F3: Optimized Defaults
- F4: Save & Exit
- ESC: Exit

Version 2.22.1282 Copyright (C) 2022 AMI

Feature	Description	Options
XHCI Hand-off	This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.	★ Enabled, Disabled
USB Mass Storage Driver Support	Enable/Disable USB Mass Storage Driver Support.	★ Enabled, Disabled
U32G2_1~ U32G2_3	Enable/Disable this USB Physical Connector (Physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	★ Enabled, Disabled
U2_4	Enable/Disable this USB Physical Connector (Physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	★ Enabled, Disabled
USB1~USB4	Enable/Disable this USB Physical Connector (Physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	★ Enabled, Disabled

NVMe Configuration

NVMe Device Option Settings



Onboard Devices Configuration

Onboard Devices Configuration

Aptio Setup - AMI		
Advanced		
HD Audio	[Enabled]	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.
Realtek LAN 1 Controller	[Enabled]	
Realtek LAN 2 Controller	[Enabled]	
SD Card	[Enabled]	
M.2 M-Key(PCIE)	[Enabled]	
PCIE_x1/M.2(WiFi) Switch	[Auto]	
M.2(WiFi)		
PCIE Port(WiFi)	[Enabled]	
USB Port(BT)	[Enabled]	
mPCIe		
PCIE Port	[Enabled]	⇧⇩: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
USB Port	[Enabled]	

Version 2.22.1282 Copyright (C) 2022 AMI

Feature	Description	Options
HD Audio	Control Detection of the HD-Audio device. Disabled= HDA will be unconditionally disabled. Enabled= HDA will be unconditionally enabled.	★Enabled, Disabled
Realtek LAN1 Controller	Enabled/DisabledRealtek LAN 1 Controller.	★Enabled, Disabled
Realtek LAN 2 Controller	Enabled/DisabledRealtek LAN 2 Controller.	★Enabled, Disabled
SD Card	SD Card Enabled/Disabled.	★Enabled, Disabled
M.2 M-Key(PCIE)	Enabled/disabledM.2 M-Key(PCIE)Controller.	★Enabled, Disabled
PCIE_x1/M.2(Wifi) Switch	PCIE_x1 / M.2(Wifi) Switch, Auto: If PCIE_x1 and M.2(Wifi) have devices at same time, PCIE_x1 first.	★Auto, M.2(WiFi)
M.2 WiFi		
PCIE Port(Wifi)	Enabled/disabled M.2 WiFi(PCIE Port) Controller.	
USB Port(BT)	Enabled/disabled M.2 BT(USB Port) Controller.	
mPCIE		
PCIE Port	Enabled/disabledthe PCIE Controller of mPCIE.	★Enabled, Disabled
USB Port	Enabled/disabled the USB Controller of mPCIE.	★Enabled, Disabled

APM Configuration

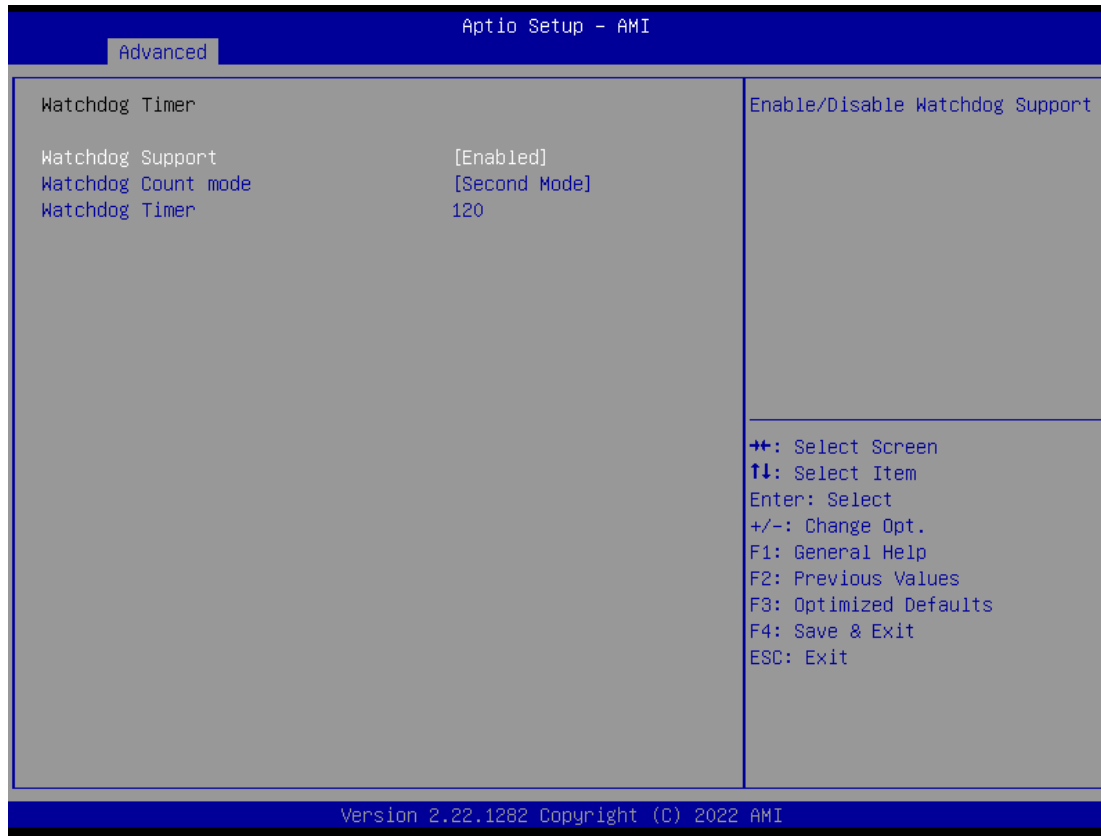
Advance Power Management

Aptio Setup - AMI		
Advanced		
APM Configuration		Select whether to enable Wake Up on Alarm, to turn on your system on a special day of the month, special day of the week or daily.
ErP Ready	[Disabled]	NOTE: Values in these fields may be overwritten by the operating system.
Restore AC Power Loss	[S5 State]	
Power On By PCIE	[Disabled]	
Power On By PS2	[Disabled]	
Power On By Ring	[Disabled]	
Power On By RTC	[Single event]	
Alarm Time		
Wake up hour	0	
Wake up minute	0	
Wake up second	0	
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit		
Version 2.22.1282 Copyright (C) 2022 AMI		

Feature	Description	Options
---------	-------------	---------

ErP Ready	Allow BIOS to switch off some power at S4/S5 to get the system ready for ErP requirement. When set to Enabled, all other PME options will be switched off.	★Disabled, Enabled
Restore AC Power Loss	Select AC power state when power is re-applied after a power failure.	★S5 State, S0 State
Power On By PCIE	Enable or disable the Wake-on-LAN function of the onboard LAN controller or other installed PCIE LAN devices.	★Disabled, Enabled
Power On By PS2	Power On By PS2.	★Disabled, Enabled
Power On By Ring	Power On By Ring.	★Disabled, Enabled
Power On By RTC	Select whether to enable Wake Up on Alarm, to turn on your system on a special day of the month, special day of the week or daily. NOTE: Values in these fields may be overwritten by the operation system.	★Disabled, Single event, Daily event, Weekly event, Monthly event
Alarm Time		
Wake up hour	Select 0-23 For example enter 3 for 3am and 15 for 3 pm.	★0
Wake up minute	Select 0-59 for Minute.	★0
Wake up second	Select 0-59 for Second.	★0

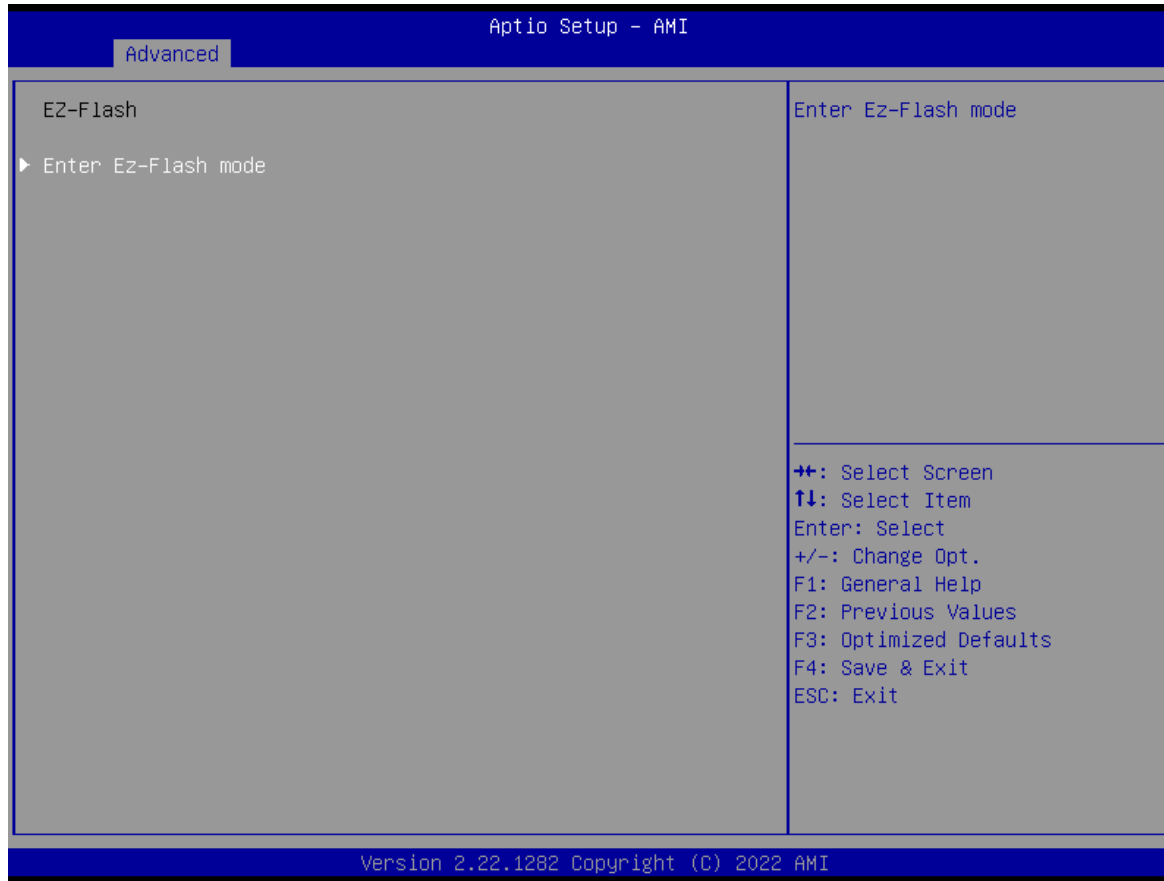
Watchdog Timer



Feature	Description	Options
Watchdog Support	Enable/Disable Watchdog Support.	★ Enable, Disabled
Watchdog Count mode	Select Watchdog Timer I count mode.	★ Second Mode, Minute Mode
Watchdog Timer	Watchdog Timer I Time-out value.	★ 120

EZ-Flash

Enter EZ-Flash mode



Feature	Description	Options
Enter Ez-Flash mode	Enter Ez-Flash mode	

LVDS Configuration

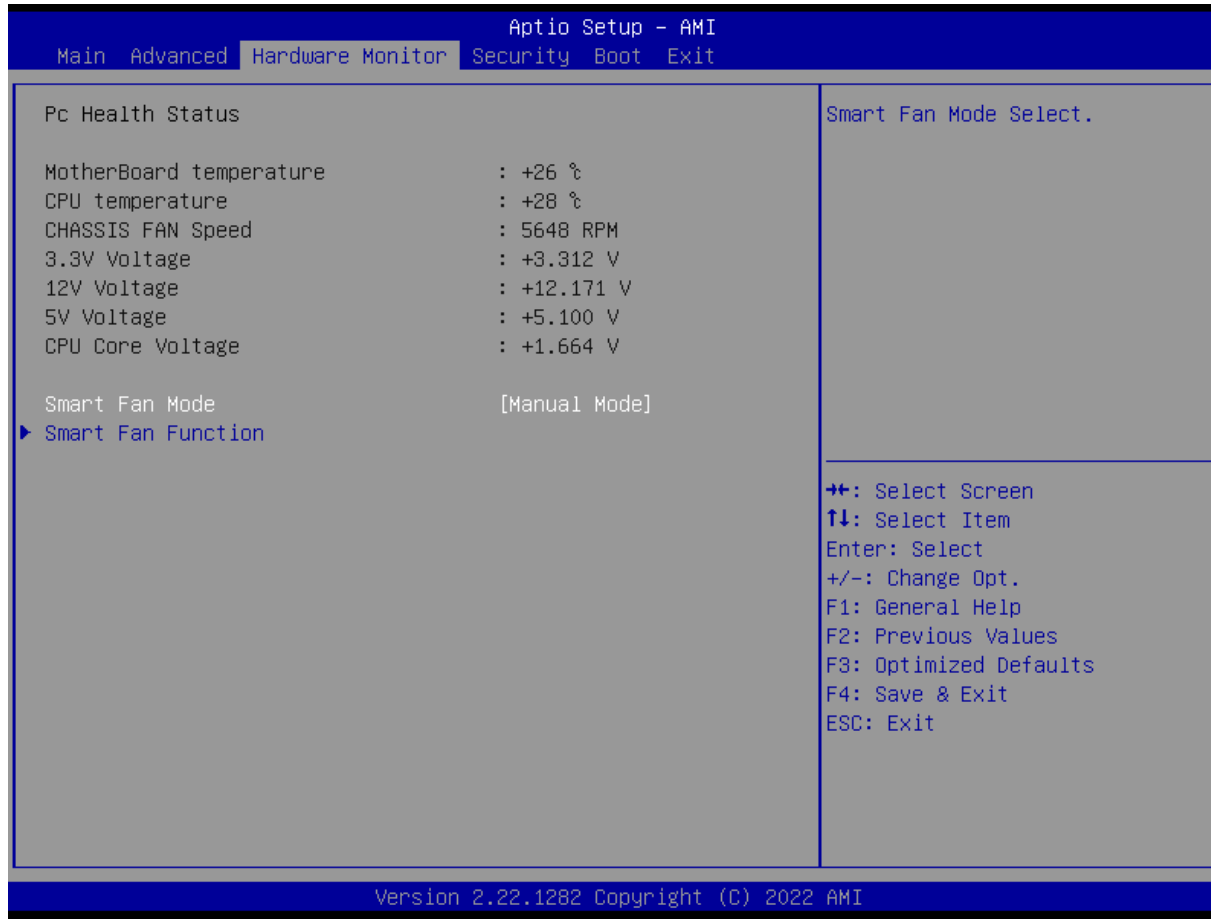
LVDS Configuration

Aptio Setup - AMI		
Main		
LVDS Configuration		Enable or disable IGD video output to onboard LVDS.
IGD Flat Panel	[Auto]	Auto: Enable IGD video output to onboard LVDS when the panel is present, and vice versa.
EDID Data Source	[Pre-defined]	
Pre-Defined LVDS Panel Type	[VBIOS Default]	
Inverter Polarity	[Normal]	
Channel Select	[Single Channel]	
Mode Select	[VESA 8bit]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.22.1282 Copyright (C) 2022 AMI		

Feature	Description	Options
---------	-------------	---------

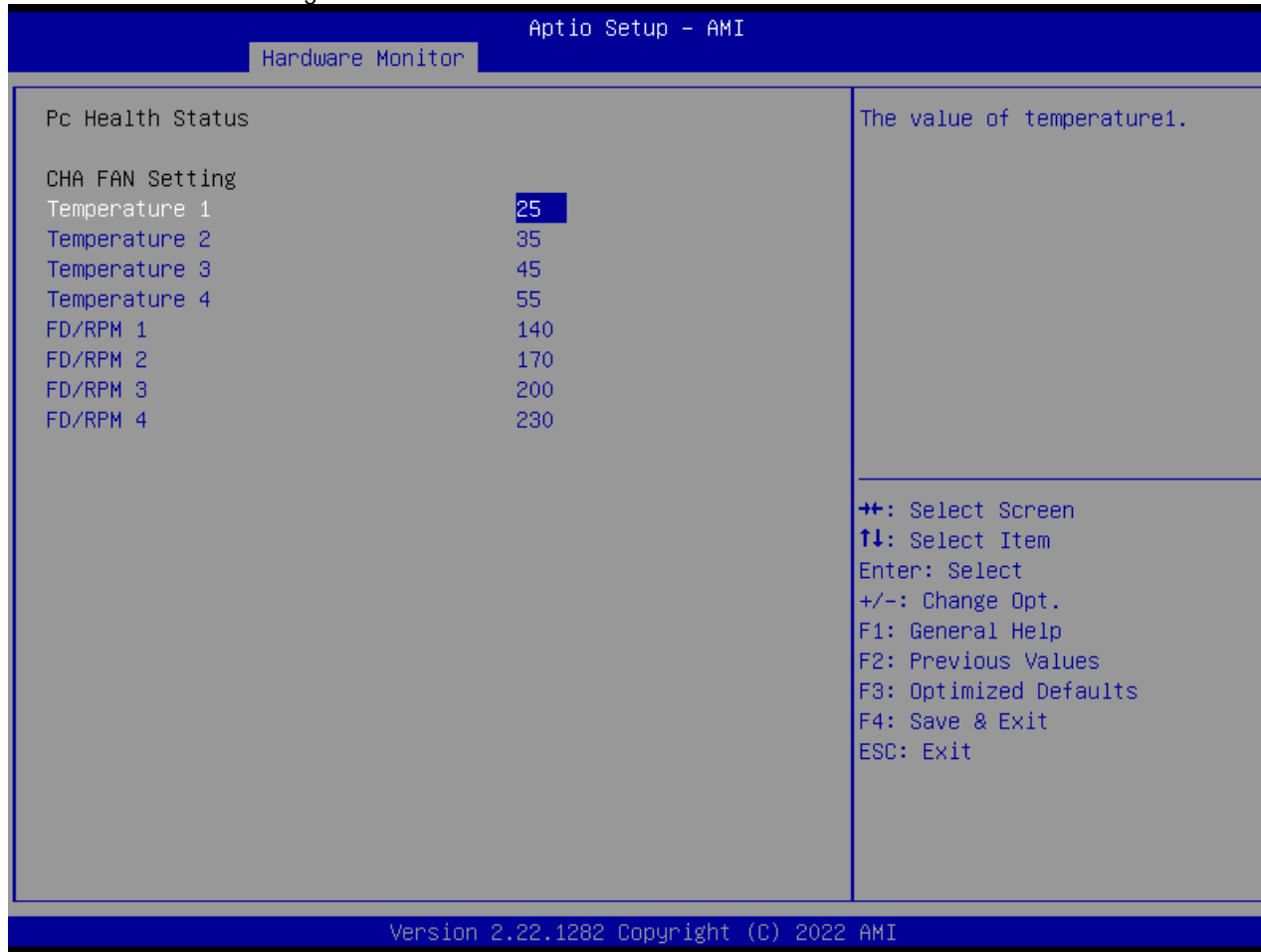
IGD Flat Panel	Enable or disable IGD video output to onboard LVDS. Auto: Enable IGD video output to onboard LVDS when the panel is present, and vice versa.	★Auto, Enabled, Disabled,
EDID Data Source	EDID Data Source	★Pre-defined, Flat Panel Display
Pre-Defined LVDS Panel Type	Select LVDS panel used by Internal Graphics Device by selecting the appropriate setup item.	★VBIOS Default, 640x480, 800x600, 1024x768, 1280x1024, 1400x1050(RB) LVDS1, 1400x1050 LVDS2, 1600x1200 LVDS, 1366x768 LVDS, 1680x1050, 1920x1200, 1440x900 LVDS, 1600x900 LVDS, 1024x768 LVDS2, 1280x800, 1920x1080 LVDS, 2048x1536 LVDS
Inverter Polarity	Inverter board polarity Normal: PWM=0%(Dim) Inverted: PWM=0%(Bright) Consult inverter board specifications for proper value.	★Normal, Inverted
Channel Select	Channel Select.	★Single Channel. Dual Channel
Mode Select	Mode Select.	★VESA 8bit, JEIDA, VESA 6bit, VESA 10bit

7.2.3 HW Monitor



Feature	Description	Options
Smart Fan Mode	Smart Fan Mode Select	★Normal, Disabled, Manual Mode

Smart Fan Function
Smart Fan Function setting



Feature	Description	Options
CHA Fan Setting		
Temperature 1	The value of temperature 1.	★25
Temperature 2	The value of temperature 2.	★35
Temperature 3	The value of temperature 3.	★45
Temperature 4	The value of temperature 4.	★55
FD/RPM 1	The value of Fan Duty/RPM 1 when temperature isT1.	★140
FD/RPM 2	The value of Fan Duty/RPM 2 when temperature isT2.	★170
FD/RPM 3	The value of Fan Duty/RPM 3 when temperature isT3.	★200
FD/RPM 4	The value of Fan Duty/RPM 4 when temperature isT4.	★230

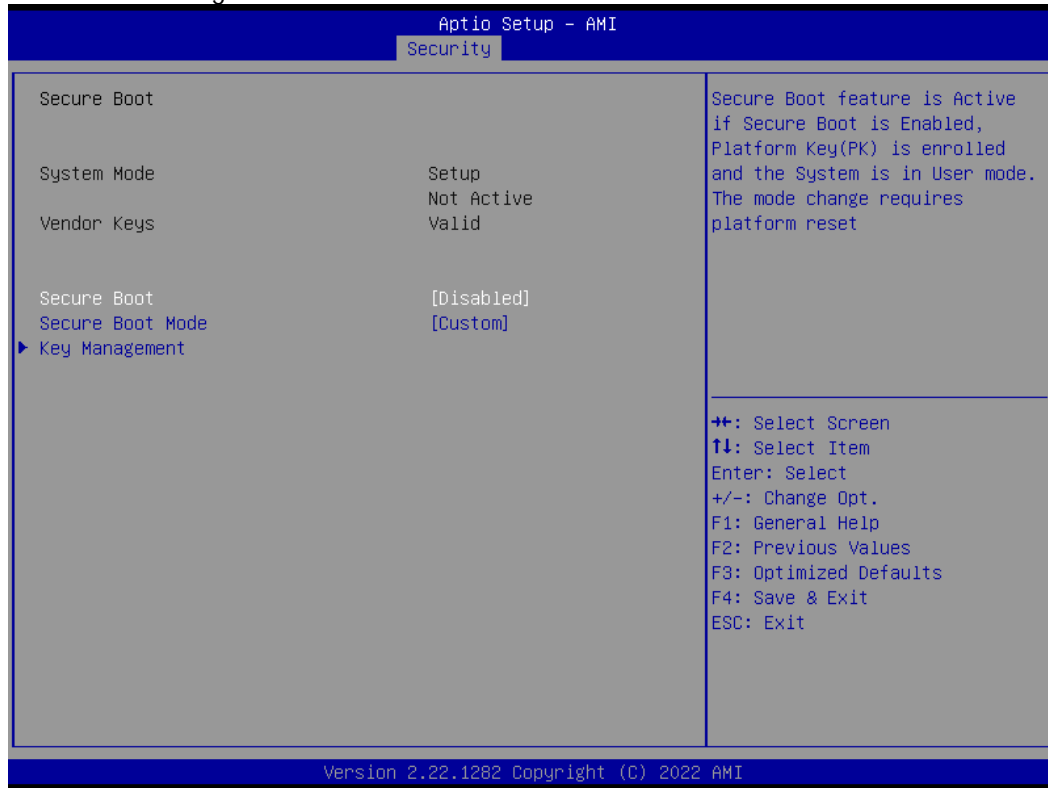
7.2.4 Security



Feature	Description	Options
Administrator Password	Set Administratorpassword.	
User Password	Set User Password	

Secure Boot

Secure Boot configuration



Feature	Description	Options
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.	★ Disabled, Enabled
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	★ Custom, Standard

Key Management

Aptio Setup - AMI

Security

Key Management			
Secure Boot variable	Size	Keys	Key Source
▶ Platform Key(PK)	0	0	No Keys
▶ Key Exchange Keys	0	0	No Keys
▶ Authorized Signatures	0	0	No Keys
▶ Forbidden Signatures	4040	83	External

Enroll Factory Defaults or load certificates from a file:

- 1.Public Key Certificate:
 - a)EFI_SIGNATURE_LIST
 - b)EFI_CERT_X509 (DER)
 - c)EFI_CERT_RSA2048 (bin)
 - d)EFI_CERT_SHAXXX
- 2.Authenticated UEFI Variable
- 3.EFI PE/COFF Image(SHA256)

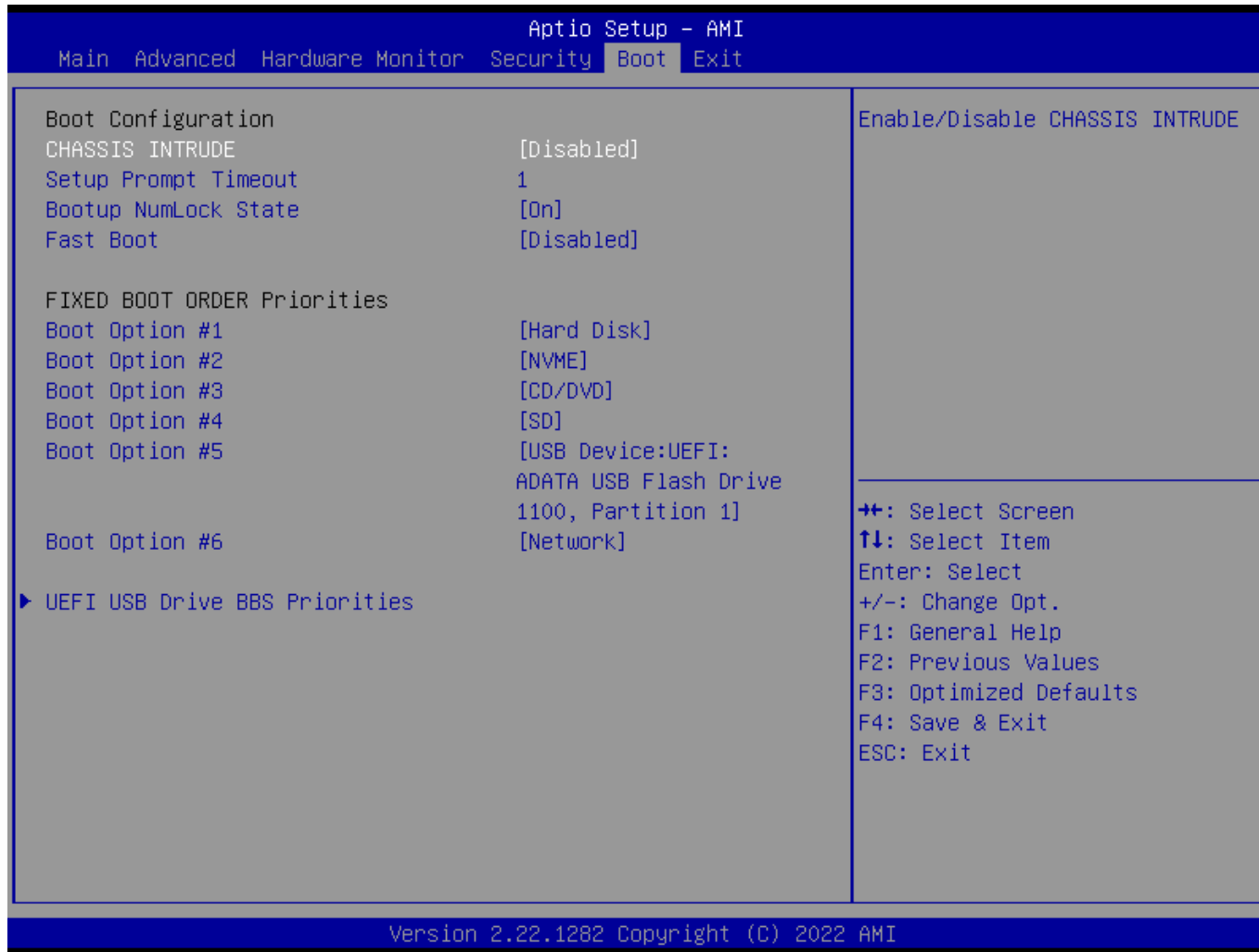
Key Source:
Factory,External,Mixed

⇧⇩: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

Version 2.22.1282 Copyright (C) 2022 AMI

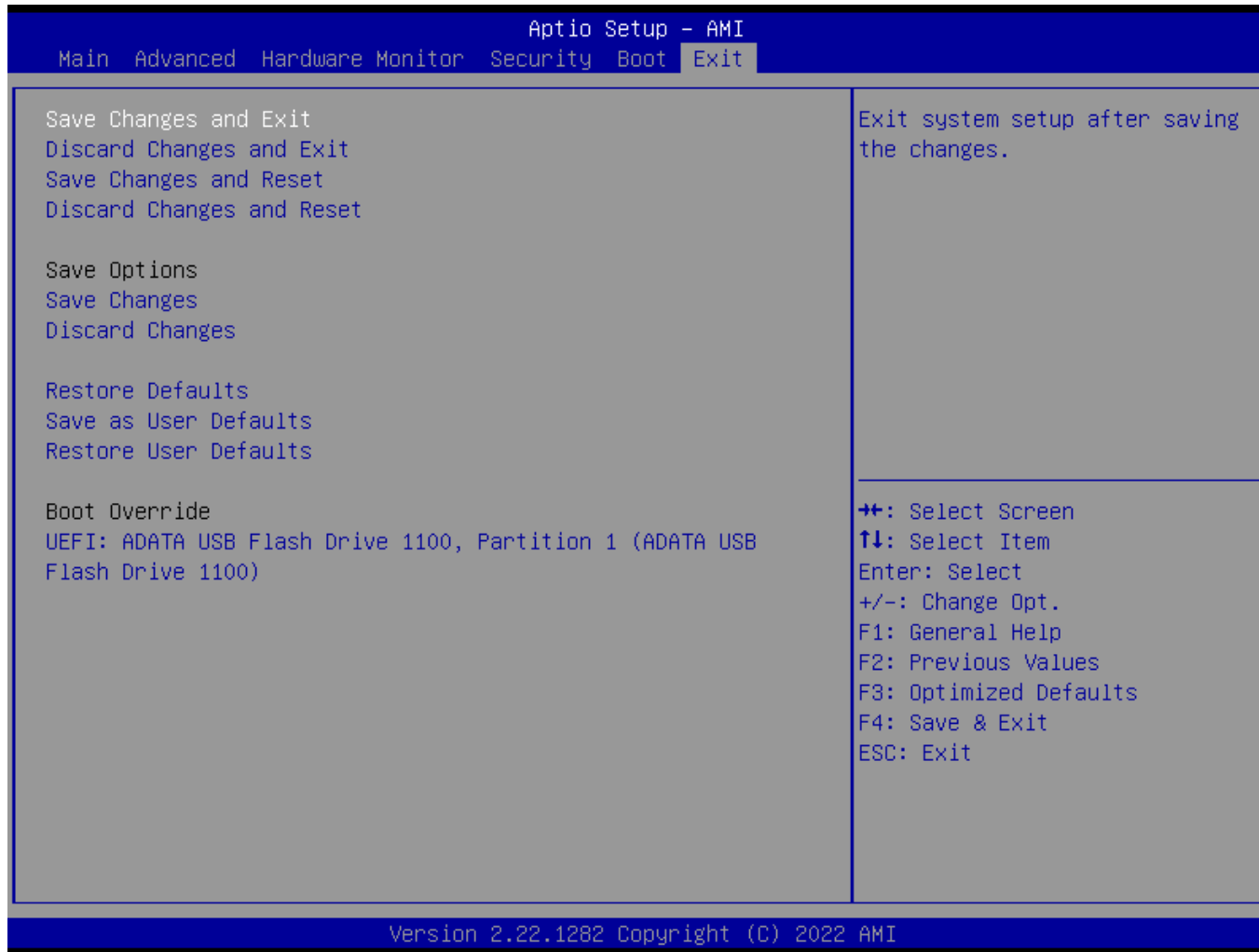
Feature	Description	Options
Platform Key(PK)	Enroll Factory Defaults or load certificates from a file: 1. Public Key Certificate: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2. Authenticated UEFI Variable 3. EFI PE/COFF Image(SHA256) Key Source: Factory, External, Mixed	
Key Exchange Keys		
Authorized Signatures		
Forbidden Signatures		

7.2.5 Boot



Feature	Description	Options
CHASSIS INTRUDE	Enable/Disable CHASSIS INTRUDE.	★ Disabled, Enabled
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	★ 1
Bootup NumLock State	Select the keyboardNumLockstate.	★ On, Off
Quiet Boot	Enables or disables Quiet Boot option.	★ Disabled, Enabled
Fast Boot	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	★ Disabled, Enabled
Boot Option #1-#6	Sets the system boot order.	★ Hard Disk, NVME, CD/DVD, USB device, Network, Disabled
UEFI USB Drive BBS Priorities	Specifies the Boot Device Priority sequence from available UEFI Hard Disk Drives.	

7.2.6 Exit



Feature	Description	Options
Save Changes and Exit	Exit system setup after saving the changes.	
Discard Changes and Exit	Exit system setup without saving any changes.	
Save Changes and Reset	Reset the system after saving the changes.	
Discard Changes and Reset	Rest system setup without saving any changes.	
Save Changes	Save Changes done so far to any of the setup options.	
Discard Changes	Discard Changes done so far to any of the setup options.	
Restore Defaults	Restore/Load Default values for all the setup options.	
Save as User Defaults	Save the changes done so far as User Defaults.	
Restore User Defaults	Restore the User Defaults to all the setup options.	

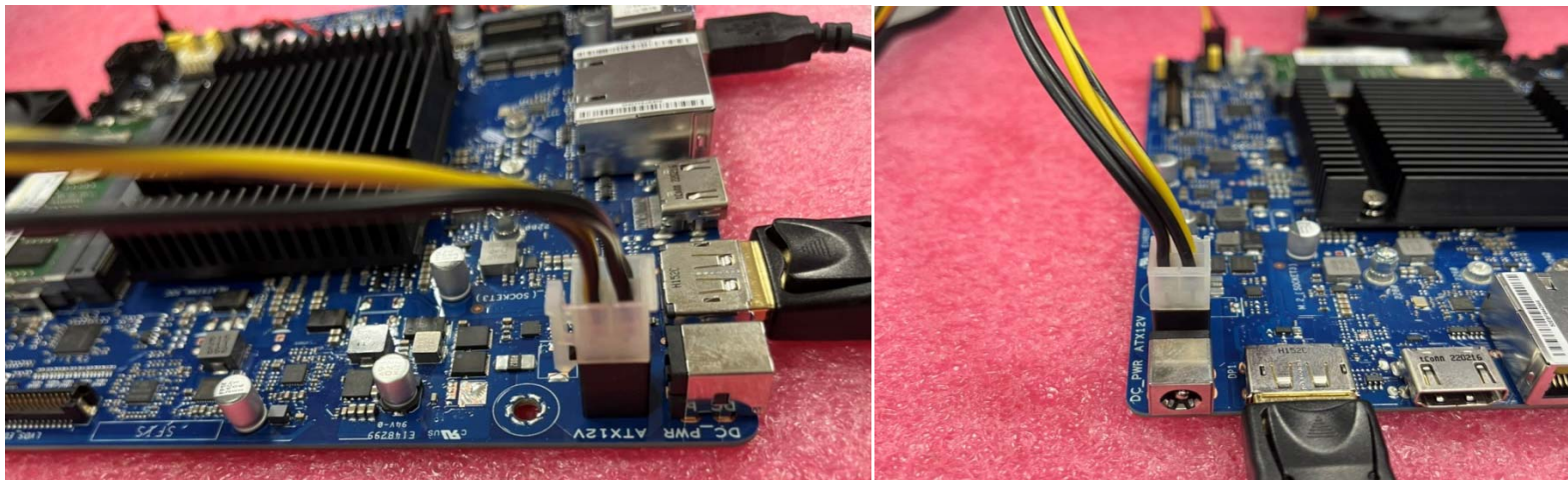
8 Troubleshooting

This section provides a few useful tips to quickly get WADE-8173-J6412 running with success. This section will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

8.1 Hardware Quick Installation

ATX Power Setting

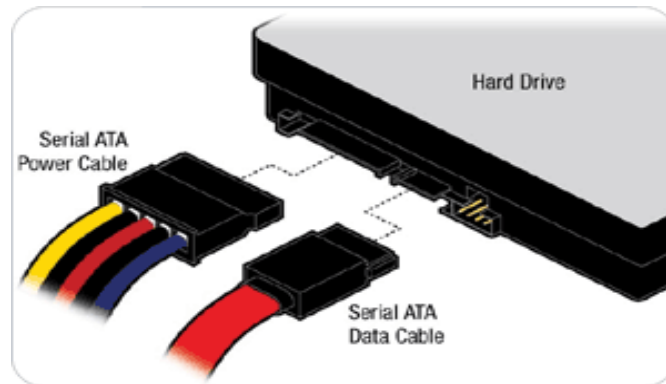
Unlike other Single board computer, WADE-8173-J6412 supports ATX only. Therefore, there is no other setting that needs to be set up. However, there are only two connectors that must be connected—4-pin ATX12VorDC power on the WADE-8173-J6412 board.



Serial ATA

Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time;

The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation.



WADE-8173-J6412 can support one SATA interface (SATAIII, 6.0Gb/s) on board. It has SATA ports on board.

8.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. DDR4 SO-DIMM Memory, keyboard, mouse, SATA hard disk, DP connector, power cable of the device, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with WADE-8173-J6412, it is recommended, when going with the boot-up sequence, to hit "delete " or " Esc" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to “Restore Defaults”, press “Enter” and select “Yes” to load default optimal BIOS setup. This will force your BIOS setting back to the initial factory configurations. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting at any time when system appears to be unstable in boot up sequence.

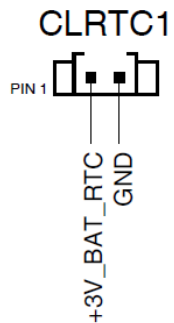
8.3 FAQ

Information & Support

Question: I forgot my password of system BIOS, what am I supposed to do?

Answer: You can switch off your power supply then find the 2-pin CLRTC on the WADE-8173-J6412board .Then Use a metal object such as a screwdriver to short the two pinsand wait 5 seconds to clean your password then to switch on your power supply.

Clear CMOS header (2-pin CLRTC) : CMOS Setting



WADE-8173-J6412

Question: How to update the BIOS file of WADE-8173-J6412?

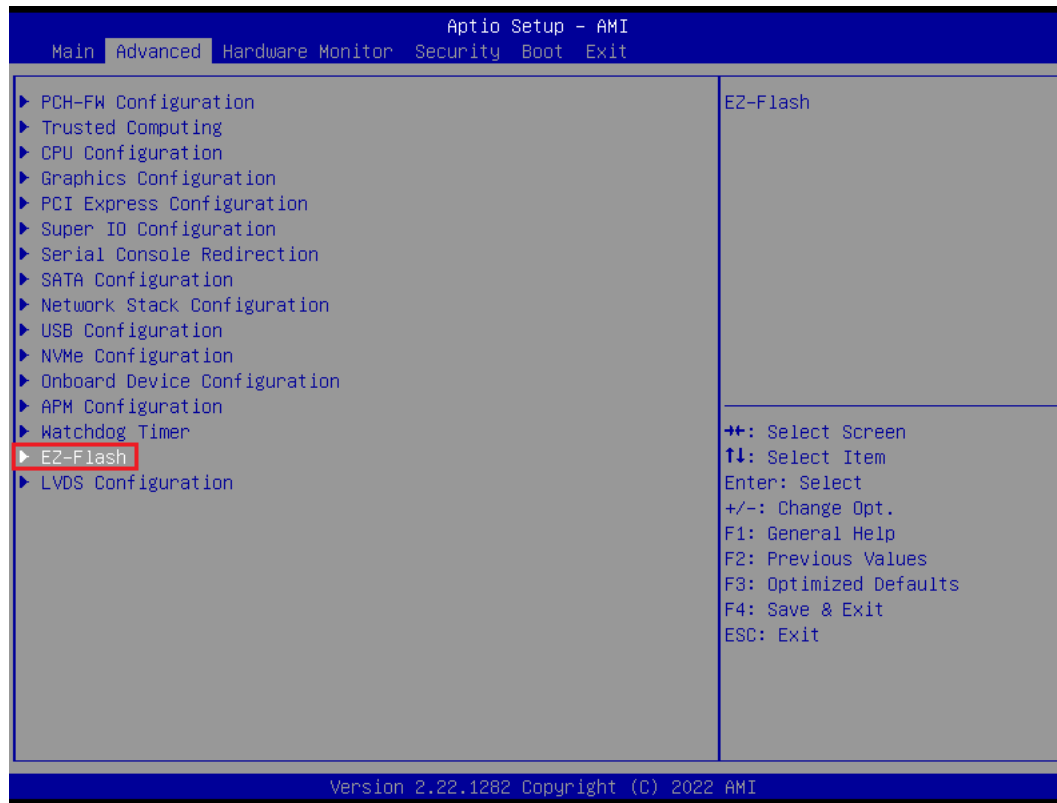
Answer: 1. Please visit web site of [Portwell download center](https://www.portwell.com.tw/support-center/download-center/) as below hyperlink

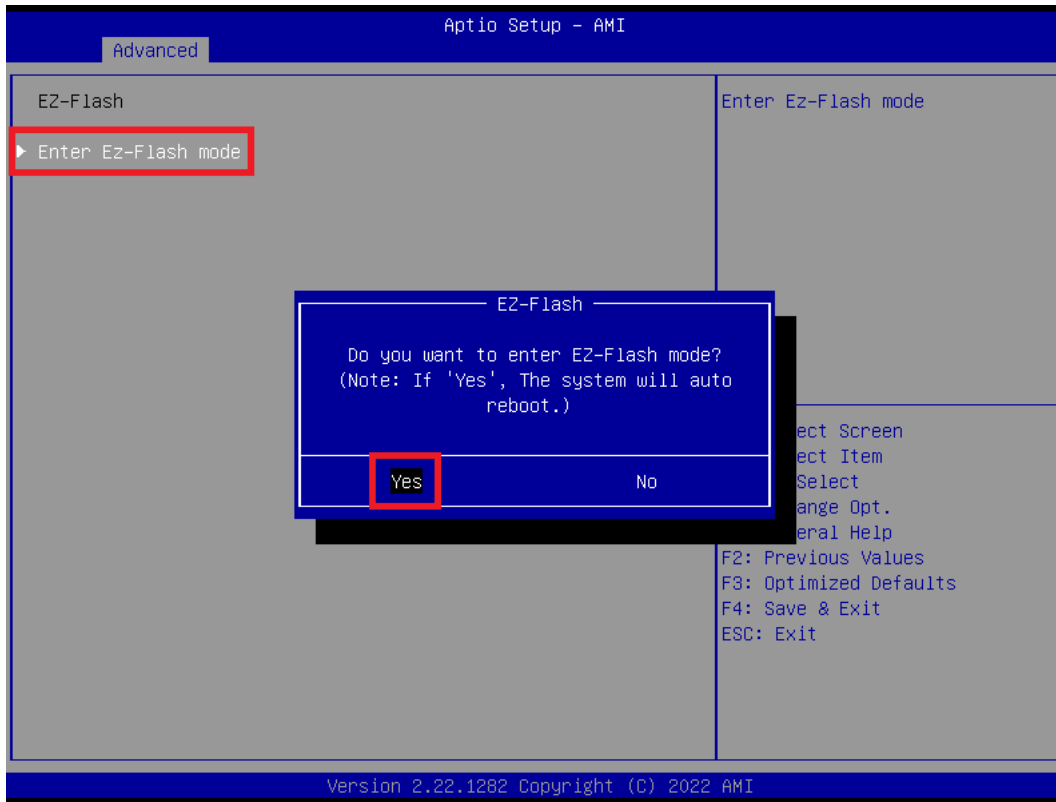
<https://www.portwell.com.tw/support-center/download-center/>

2. Select "Search download" and type the keyword "WADE-8173-J6412".

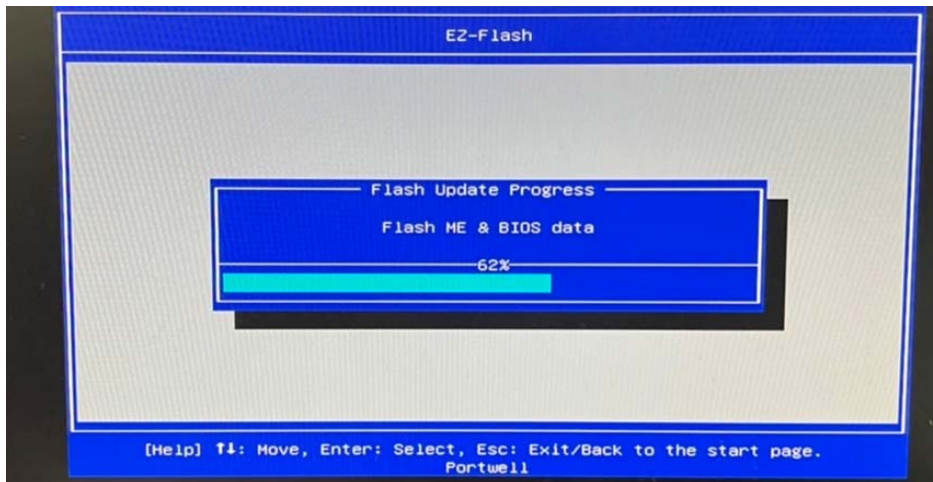
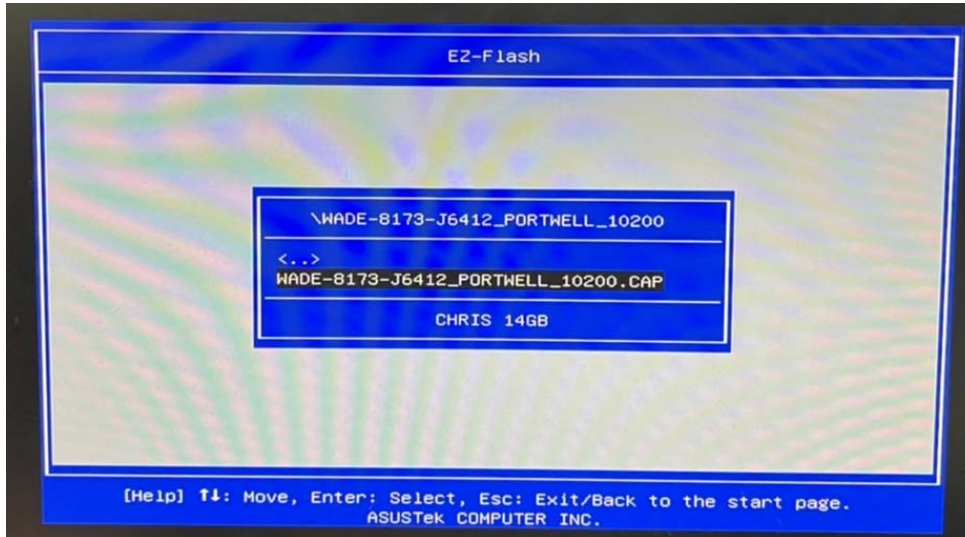
3. Find the "BIOS" page and download the ROM file and unzip file to USB flash drive(FAT 32 / 16 format).

4. Boot into BIOS and switch to "Advanced" page then select "EZ-Flash".

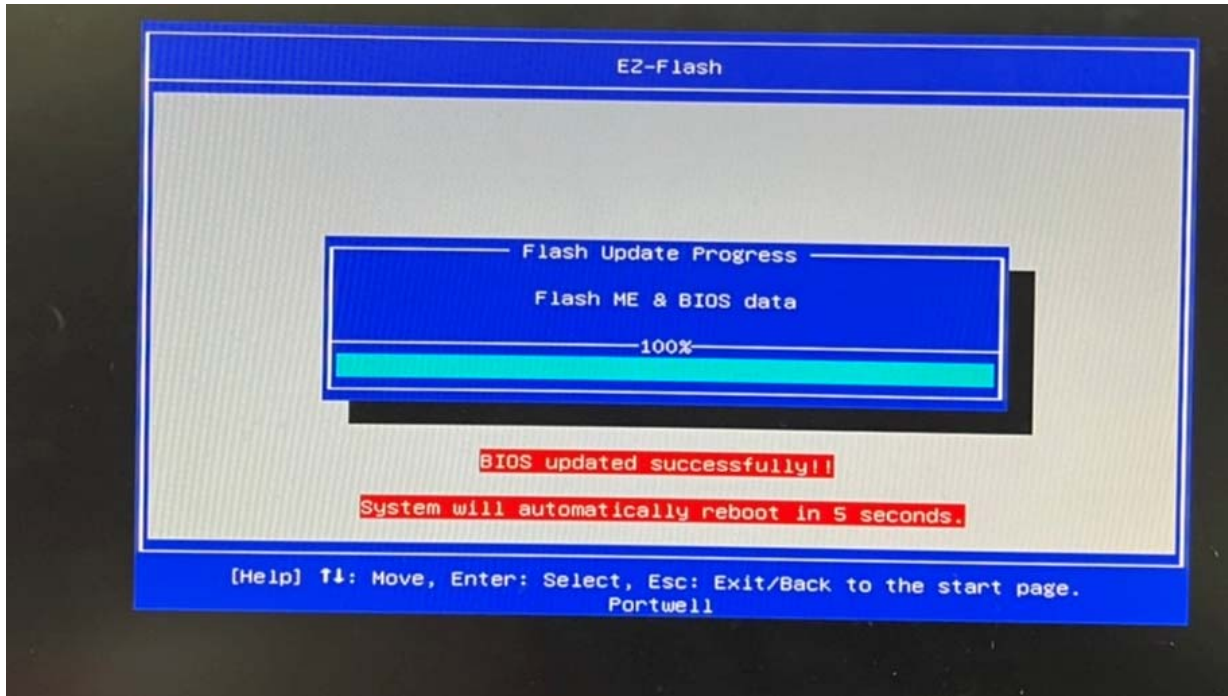




5. Enter EZ-Flash mode, Select the USB Drive and Click the BIOS file then start updating BIOS.



6. When you see the “BIOS updated successfully” message, which means the BIOS update processes finished. Please cut the AC power of and **wait for 10 seconds** before powering on.



WADE-8173-J6412

Question: What are the display options while using WADE-8173-J6412?

Answer: -The WADE-8173-J6412 supports HDMI 、 DP 、 LVDS display output.

Note:

Please visit our Download Center to get the Catalog, User manual, BIOS, and Driver files.

<https://www.portwell.com.tw/support-center/download-center/>

If you have other additional technical information or request which is not covered in this manual, please fill in the technical request form as below hyperlink.

<https://www.portwell.com.tw/support-center/technical-request/>

We will do our best to provide a suggestion or solution for you.

Thanks

9 Portwell Software Service

1. If you have customized requirements of BIOS, you can contact person of our company or branch.
2. If you have requirements of WDT、GPIO APP, you can contact our headquarter or branch, and we can render you assistance on developing.

Portwell Worldwide:	
Portwell, Inc.	E-mail: info@portwell.com.tw
Shanghai Portwell	E-mail: info@portwell.com.cn
Portwell Japan, Inc	E-mail: info@portwell.co.jp
American Portwell Technology	E-mail: info@portwell.com
European Portwell Technology	E-mail: info@portwell.eu
Portwell UK Ltd.	E-mail: info@portwell.co.uk
Portwell Deutschland GmbH	E-mail: info@portwell.eu
Portwell India Technology	E-mail: info@portwell.in
Portwell Korea, Inc.	E-mail: info@portwell.co.kr
Portwell Latin America	E-mail: vendas@portwell.com.br

10 Industry Specifications

10.1 Industry Specifications

The list below provides links to industry specifications that apply to Portwell modules.

Low Pin Count Interface Specification, Revision 1.0 (LPC) <http://www.intel.com/design/chipsets/industry/lpc.htm>

Universal Serial Bus (USB) Specification, Revision 2.0 <http://www.usb.org/home>

PCI Specification, Revision 2.3 <https://www.pcisig.com/specifications>

Serial ATA Specification, Revision 3.0 <http://www.serialata.org/>

PCI Express Base Specification, Revision 2.0 <https://www.pcisig.com/specifications>