DFI

CMS100

Mini-ITX

User's Manual

Copyright

Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

FCC and DOC Statement on Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

Table of Contents

About this Manual

This manual can be retrieved from the website.

The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

Warranty

1. Warranty does not cover damages or failures that arises from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.

2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.

3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.

4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

About this Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- 1 CMS100 motherboard
- 1 Serial ATA data cable w/lock (Length: 500mm)
- 1 COM port cable (Length: 250mm, 1 x COM port)
- 1 I/O shield
  - w/ icon DVI/DP/DP
  - w/ icon DVI/DP/HDMI

Note: The items are subject to change in the developing stage.
The product and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

Important:
Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Precautions

- Use the correct DC / AC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging in the power cord.
- There is danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent specifications of batteries recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humid environments.
- Make sure the system is placed or mounted correctly and stably to prevent the chance of dropping or falling may cause damage.
- The openings on the system shall not be blocked and shall be kept in distance from other objects to make sure of proper air ventilation to protect the system from overheating.
- Dress the cables, especially the power cord, so they will not be stepped on, in contact with high temperature surfaces, or cause any tripping hazards.
- Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and is compliant with the voltage and current ranges required by the system's electrical specifications.
- If the system is to be unused or stored for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated the system.
  - The system has been exposed to moisture.
  - The system is not working properly.
  - The system is physically damaged.
- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.
- Disconnect the system from the electricity outlet before cleaning. Use a damp cloth for cleaning the surface. Do not use liquid or spray detergents for cleaning.
- Before connecting, make sure that the power supply voltage is correct. The device is connected to a power outlet which should be grounded connection.

The system may burn fingers while running.

Wait for 30 minutes to handle electronic parts after power off.

Chapter 1 - Introduction

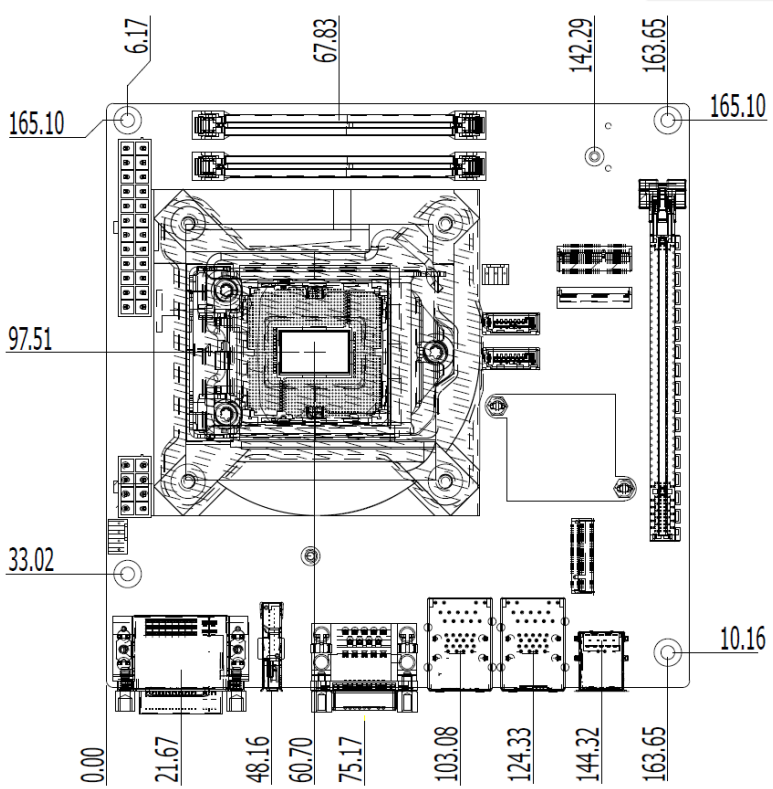
▶ Specifications

SYSTEM	Processor	10th Gen Intel® Xeon/Core™/Pentium/Celeron Processors, LGA 1200 Socket, TDP up to 125W Intel® Xeon W-1290E Processor (Core 10; Max speed 4.8GHz; TDP 95W) (ECC memory supported) **(W480E only)*** Intel® Xeon W-1270E Processor (Core 8; Max speed 4.8GHz; TDP 80W) (ECC memory supported)**(W480E only)*** Intel® Xeon W-1250E Processor (Core 6; Max speed 4.7GHz; TDP 80W) (ECC memory supported)**(W480E only)** Intel® Xeon W-1290TE Processor (Core 10; Max speed 4.5GHz; TDP 35W)**(W480E only)** Intel® Xeon W-1270TE Processor (Core 8; Max speed 4.4GHz; TDP 35W)**(W480E only)** Intel® Xeon W-1250TE Processor (Core 6; Max speed 3.8GHz; TDP 35W)**(W480E only)** Intel® Core i9-10900E Processor (Core 10; Max speed 4.7GHz; TDP 65W) Intel® Core i9-10900TE Processor (Core 10; Max speed 4.5GHz; TDP 35W) Intel® Core i7-10700E Processor (Core 8; Max speed 4.5GHz; TDP 65W) Intel® Core i7-10700TE Processor (Core 8; Max speed 4.4GHz; TDP 35W) Intel® Core i5-10500E Processor (Core 6; Max speed 4.2GHz; TDP 65W) Intel® Core i5-10500TE Processor (Core 6; Max speed 3.7GHz; TDP 35W) Intel® Core i3-10100E Processor (Core 4; Max speed 3.8GHz; TDP 65W) Intel® Core i3-10100TE Processor (Core 4; Max speed 3.6GHz; TDP 35W) Intel® Pentium G6400E Processor (Core 2; Max speed 3.8GHz; TDP 65W) Intel® Pentium G6400TE Processor (Core 2; Max speed 3.2GHz; TDP 35W) Intel® Celeron G5900E Processor (Core 2; Max speed 3.2GHz; TDP 65W) Intel® Celeron G5900TE Processor (Core 2; Max speed 3.0GHz; TDP 35W) ***Note: 5-year life cycle support based on Intel IOTG roadmap.**
	Chipset	Intel® W480E/Q470E/H420E Chipset
	Memory	Two 260-pin SODIMM up to 64GB Dual Channel DDR4 2933MHz (ECC supported by W480E only)
	BIOS	AMI SPI 256Mbit
GRAPHICS	Controller	Intel® HD Gen 9 Graphics
	Feature	OpenGL 4.5, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: AVC/H.264, MPEG2, JPEG, HEVC/H265, VP8, VP9
	Display	1 x DP++ DP++: Resolution up to 4096x2304 @60Hz 1 x HDMI 1.4b/DP++ HDMI 1.4b: Resolution up to 4096x2160 @30Hz 1 x LVDS/eDP LVDS: resolution up to 1920x1200 @ 60Hz eDP: resolution up to 4096x2160 @ 60Hz 1 x DVI-I (DVI-D signal) DVI-I: resolution up to 1920x1200 @ 60Hz
	Quad Displays	DP++ + DP++ + DVI-I + LVDS/eDP or DP++ + HDMI + DVI-I + LVDS/eDP

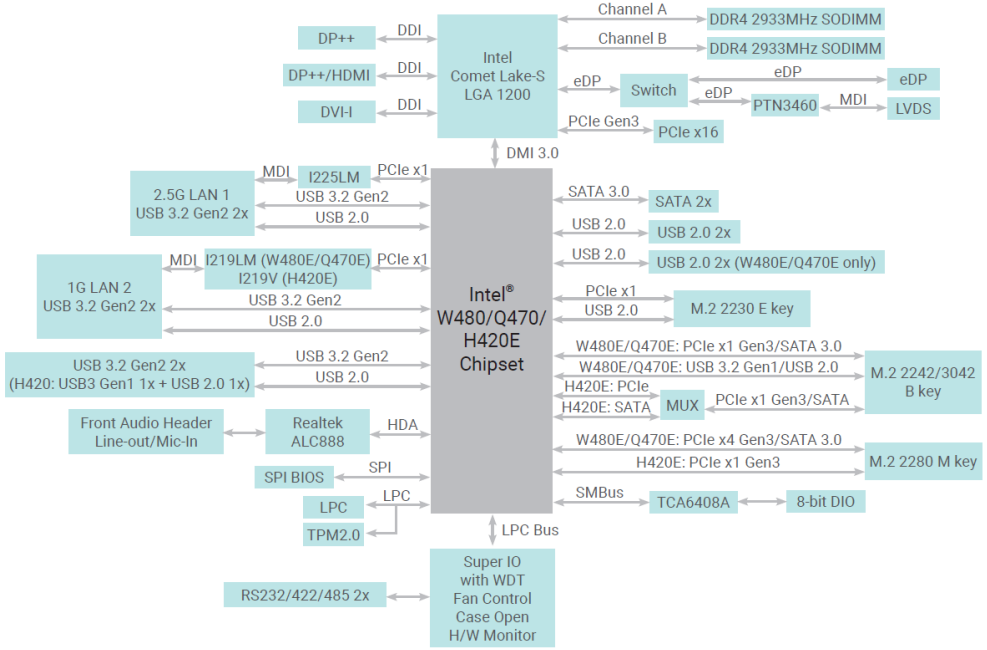
EXPANSION	Interface	1 x PCIe x16 (Gen 3) 1 x M.2 2230 E Key (PCIe x1/USB 2.0) 1 x M.2 2280 M Key (PCIe x4 Gen3 or SATA, H420E supports PCIe x1 signal only) 1 x M.2 2242/3042 B Key (W480E/Q470E: PCIe x1 Gen3 or SATA, USB 3.2 Gen1/USB 2.0) 1 x Nano SIM slot
AUDIO	Audio Codec	Realtek ALC888
ETHERNET	Controller	**W480E/Q470E:** 1 x Intel® I225LM PCIe(10/100/1000/2.5G speeds) 1 x Intel® I219LM PHY(10/100/1000 speeds), support vPro/AMT
		H420E: 1 x Intel® I225LM PCIe(10/100/1000/2.5G speeds) 1 x Intel® I219V PHY(10/100/1000 speeds)
REAR I/0	Ethernet	1 x 2.5GHz (RJ-45) 2 x GbE (RJ-45)
	Serial	2 x RS232/422/485 (DB-9)
	USB	**W480E/Q470E:** 6 x USB 3.2 Gen2 (dual type-A connector) **H420E:** 5 x USB 3.2 Gen1 + 1 x USB 2.0 (dual type-A connector)
	Display	1 x DP++ 1 x HDMI 1.4b or 1 x DP++ 1 x DVI-I
INTERNAL I/O	Audio	1 x Front Audio (2.0mm pitch)
	USB	**W480E/Q470E:** 4 x USB 2.0 (2.0mm pitch) **H420E:** 2 x USB 2.0 (2.0mm pitch)
	Display	1 x LVDS header 1 x eDP connector
	SATA	2 x SATA 3.0 (up to 6Gb/s) RAID 0/1/5/10 (w/ M.2 Key-M/B slot + 2 SATA Conn., **W480E/Q470E only**)
	DIO	1 x 8-bit DIO 1 x DIO Power
	LPC	1 x LPC
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	fTPM(Default); dTPM(Opt.)

POWER	Type	ATX
	Connector	8-pin ATX 12V power 24-pin ATX power
	Consumption	Idle: Intel Xeon W-1290E 95W: 12V @ 4.6A (55.2W) Max: Intel Xeon W-1290E 95W: 12V @ 11.6A (139.2W)
		Idle: Intel i9-10900K 125W: 12V @ 2A (24W) Max: Intel i9-10900K 125W: 12V @ 22A (264W)
	RTC Battery	CR2032 Coin Cell
OS SUPPORT	Microsoft	Windows 10 IoT Enterprise 64-bit
	Linux	Linux
MECHANISM	Dimensions	Mini-ITX Form Factor , 170mm (6.7") x 170mm (6.7")
	Height	PCB: 1.6mm Top Side: 31.51 mm Bottom Side: 4.4 mm
ENVIRONMENT	Temperature	Operating: -5 to 65°C Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH
	MTBF	CMS100-Q470: 591,713 hrs @ 25°C; 357,627 hrs @ 45°C ; 234,022 hrs @ 60°C Calculation model: Telcordia Issue 4 Environment: GB, GC – Ground Benign, Controlled
CERTIFICATION	Certification	CE, FCC, RoHS, UL, CB

▶ Dimensions



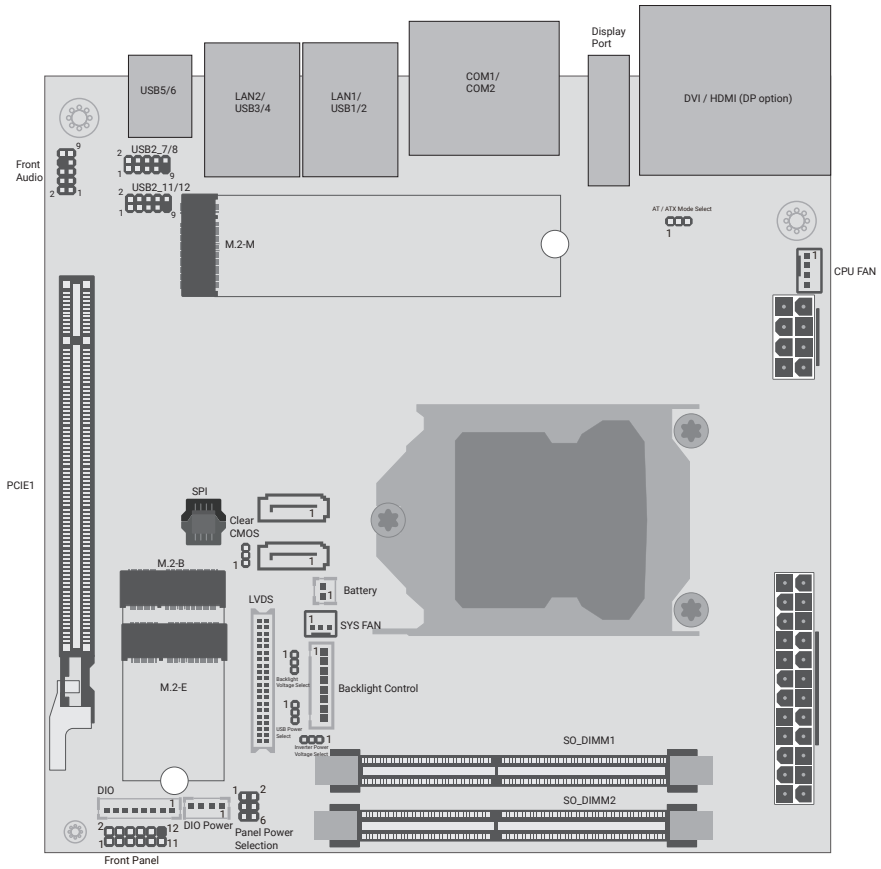
▶ Block Diagram



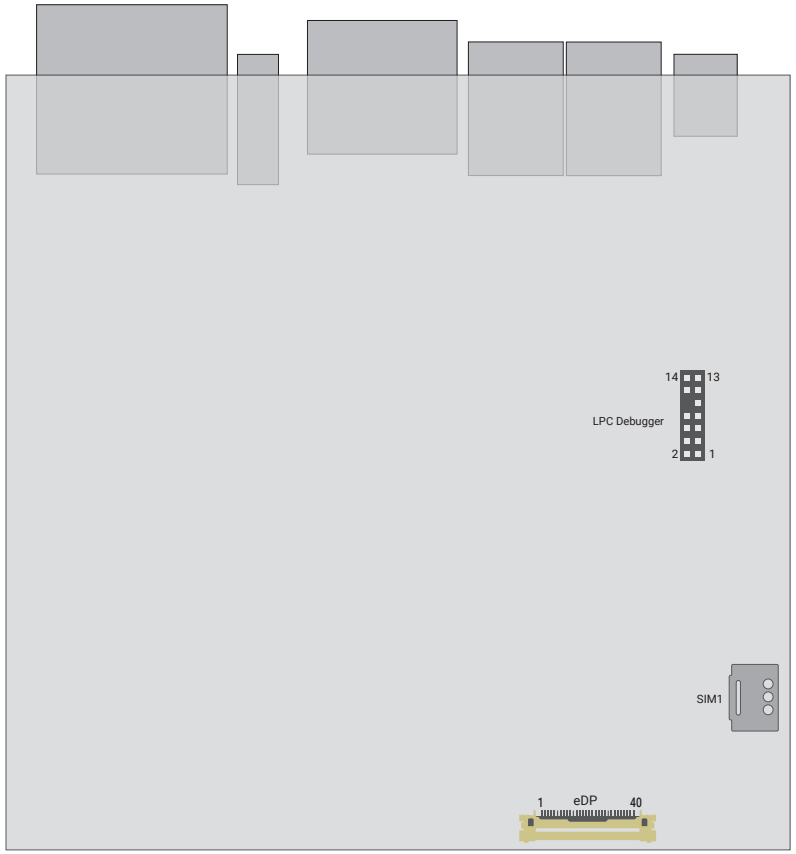
Chapter 2 - Hardware Installations

▶ Overview

Top View

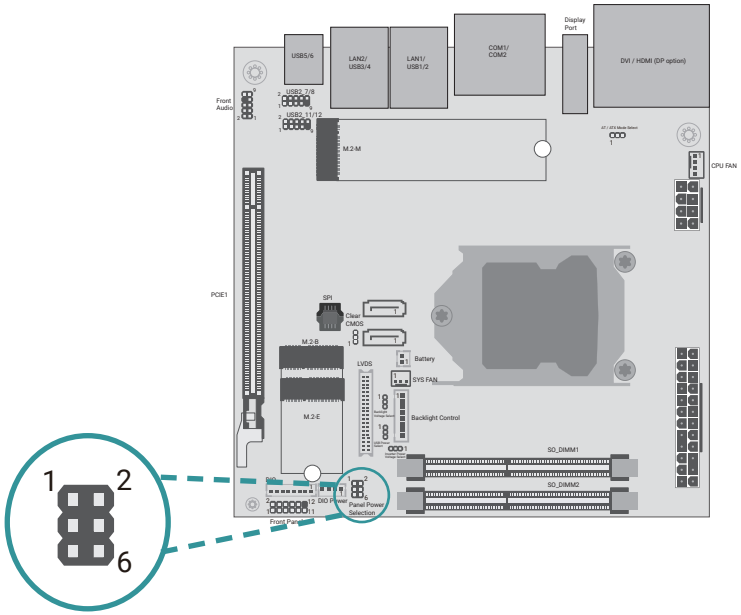


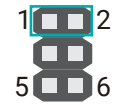
Bottom View



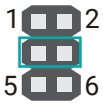
▶ Jumper Settings

Panel Power Selection (DPJP603)





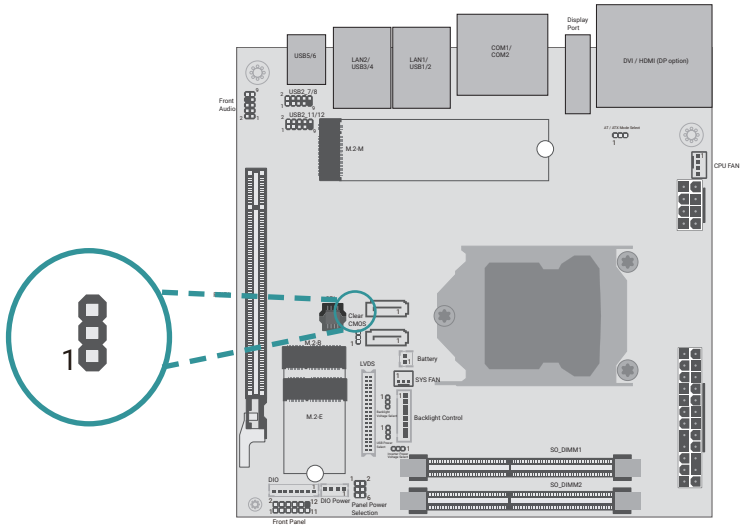
■ 1-2 On: 12V

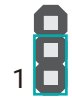


■ 3-4 On: 5V

■ 5-6 On: 3.3V (Default)

Clear CMOS (JP1)

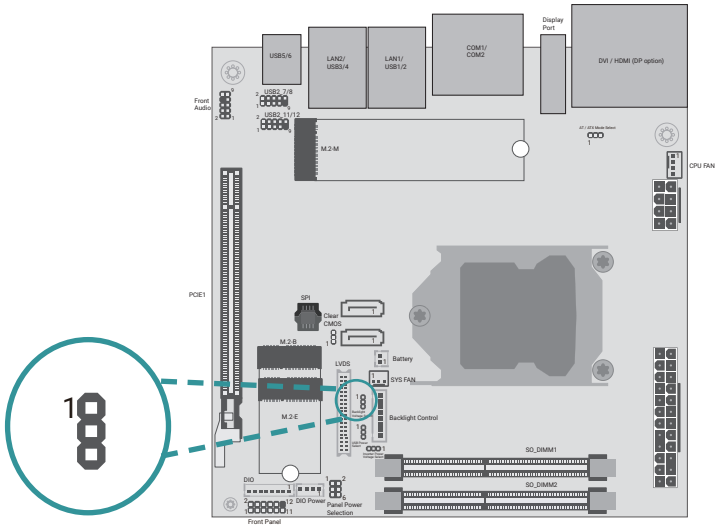




■ 1-2 On: Normal (Default)

■ 2-3 On: Clear CMOS

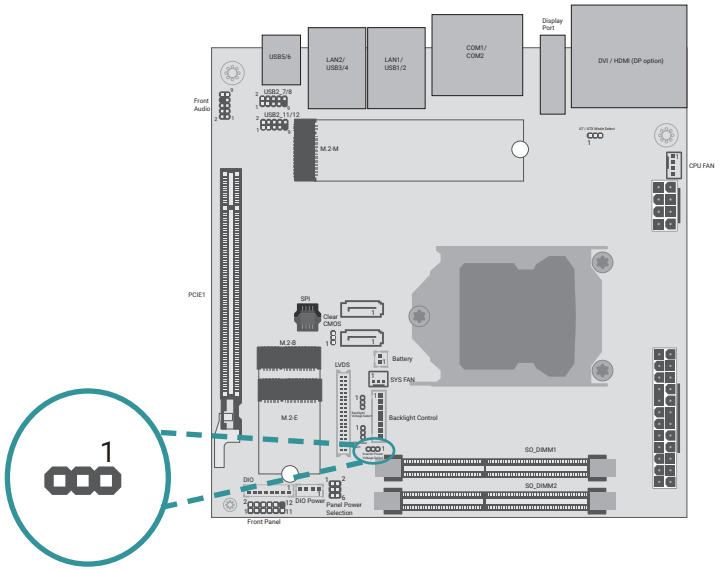
Backlight Voltage Select (DPJP601)



■ 1-2 On: 3V3 (Default)

■ 2-3 On: 5V

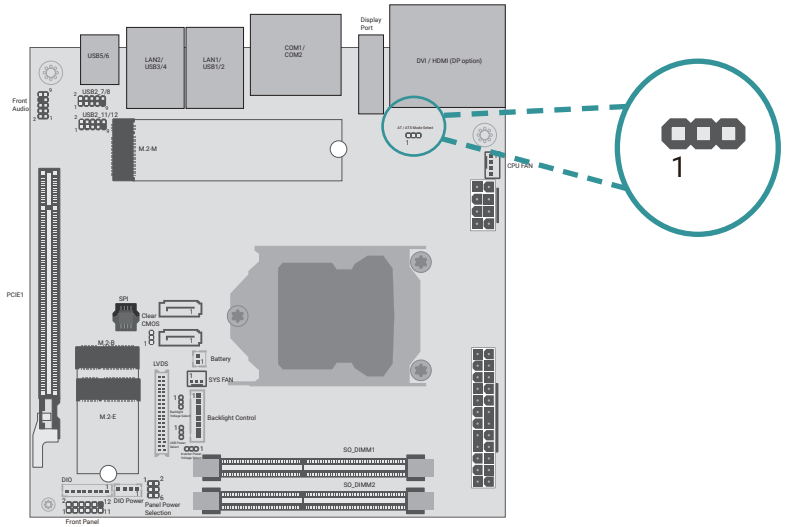
Inverter Power Voltage Select (DPJP602)



■ 1-2 On: +12V (Default)

■ 2-3 On: 5V

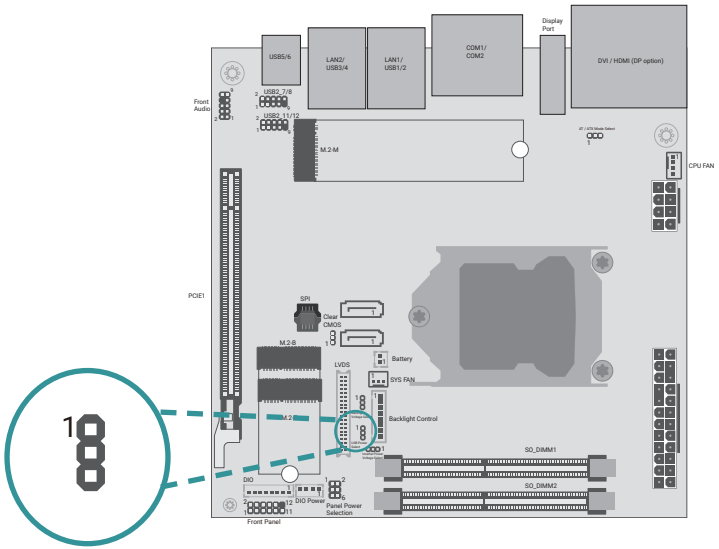
AT / ATX mode select (JP26)



■ 1-2 On: AT (Default)

■ 2-3 On: ATX

USB Power Select (DPJP604)

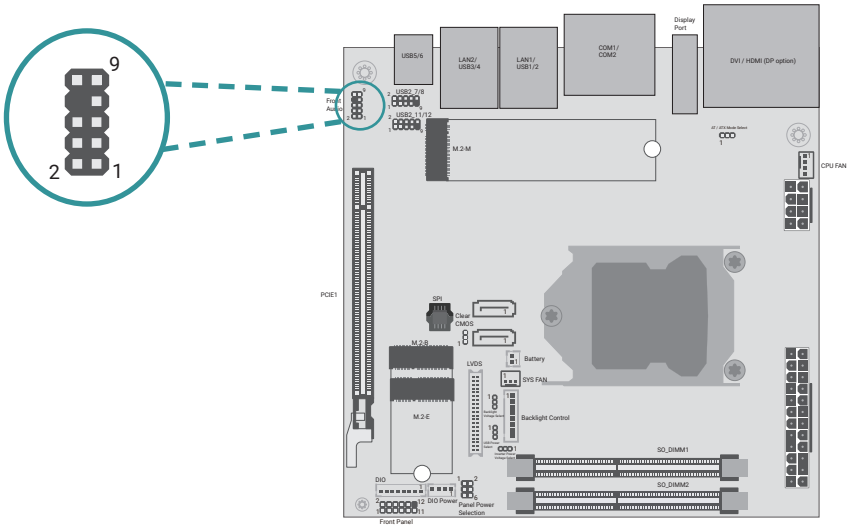


■ 1-2 On: 5VDU (Default)

■ 2-3 On: 5V

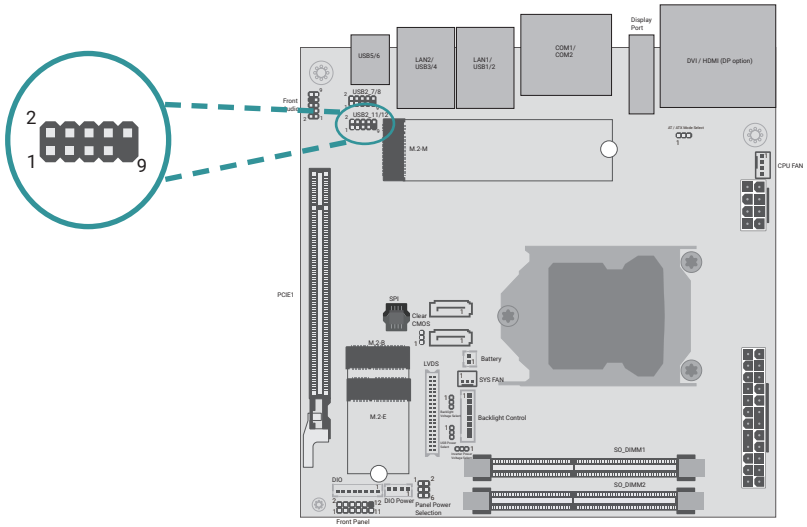
▶ Pin Assignment

Front Audio (AUJ2)



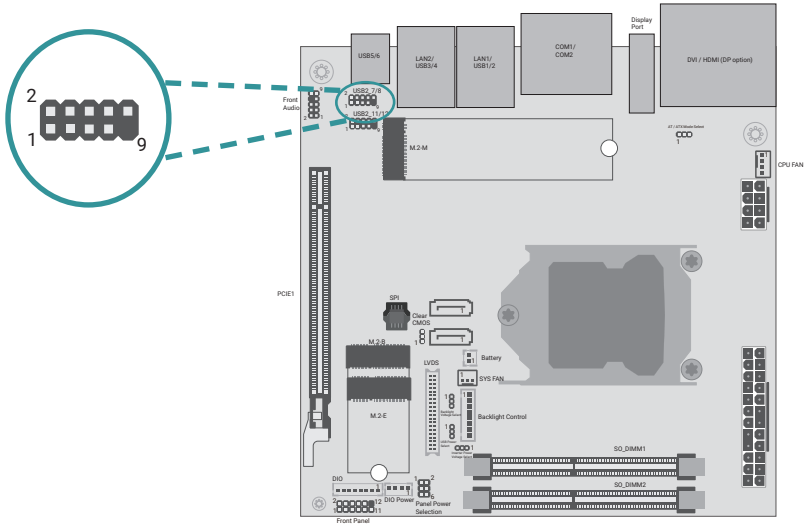
Pin	Assignment	Pin	Assignment
1	MIC2-L	2	GND
3	MIC2-R	4	--
5	LINE2-R	6	MIC2-JD
7	GND	8	--
9	LINE2-L	10	LINE2-JD

USB2_11/12 (UBJ7)



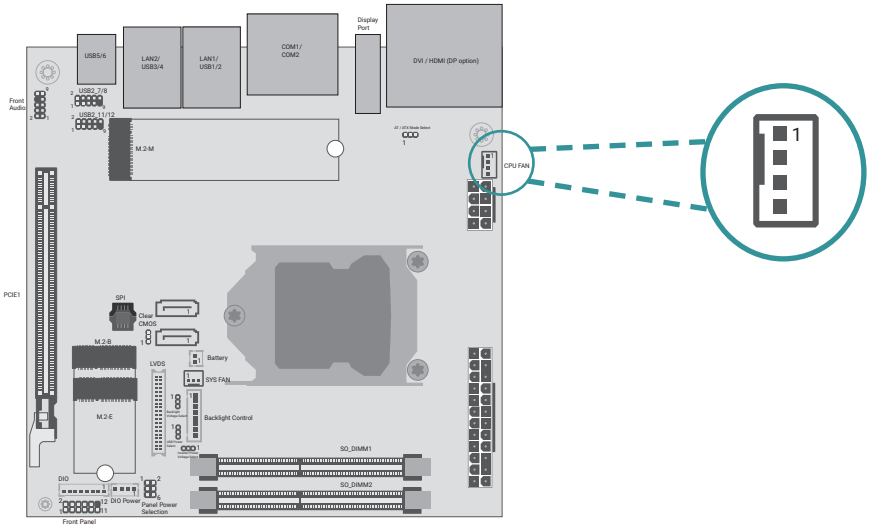
Pin	Assignment	Pin	Assignment
1	SBV4	2	SBV4
3	USBP_C_11N	4	USBP_C_12N
5	USBP_C_11P	6	USBP_C_12P
7	GND	8	GND
9	--	10	--

USB2_7/8 (UBJ8)



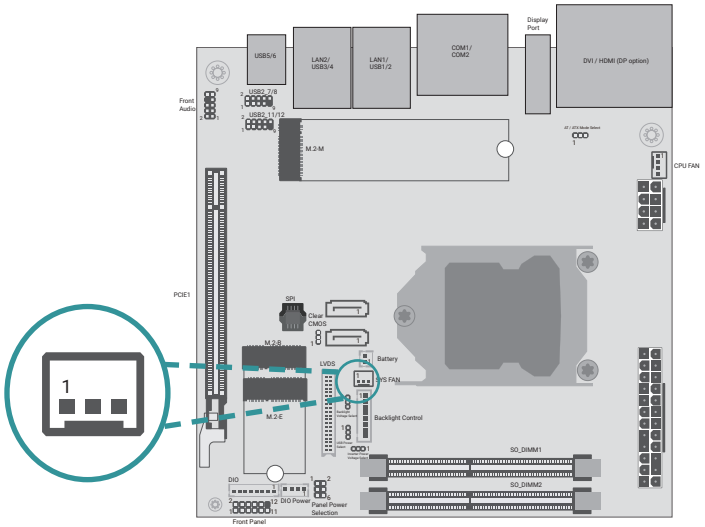
Pin	Assignment	Pin	Assignment
1	SBV4	2	SBV4
3	USBP_C_7N	4	USBP_C_8N
5	USBP_C_7P	6	USBP_C_8P
7	GND	8	GND
9	--	10	--

CPU Fan (J10)



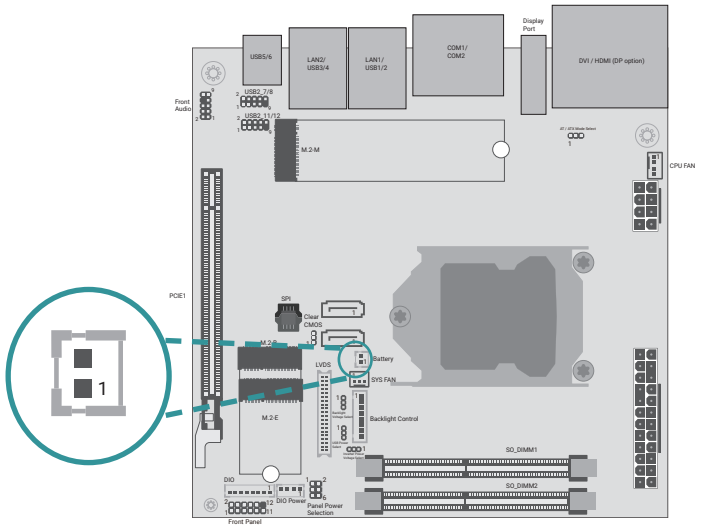
Pin	Assignment
1	GND
2	+12V
3	CPUFANIN
4	CPUFANOUT

System Fan (J9)



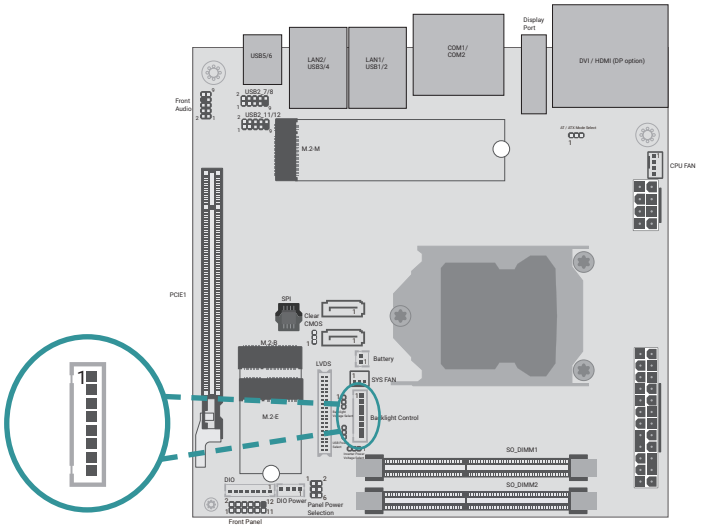
Pin	Assignment
1	GND
2	SYSFANOUT1
3	SYSFANIN1

Battery (J5)



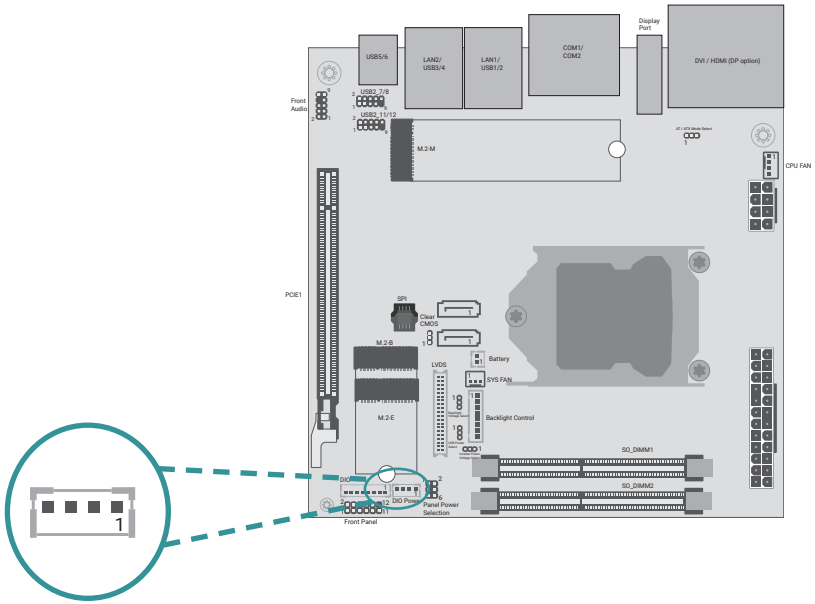
Pin	Assignment	Pin	Assignment
1	+3.3V	2	GND

Backlight Control (DPJ601)



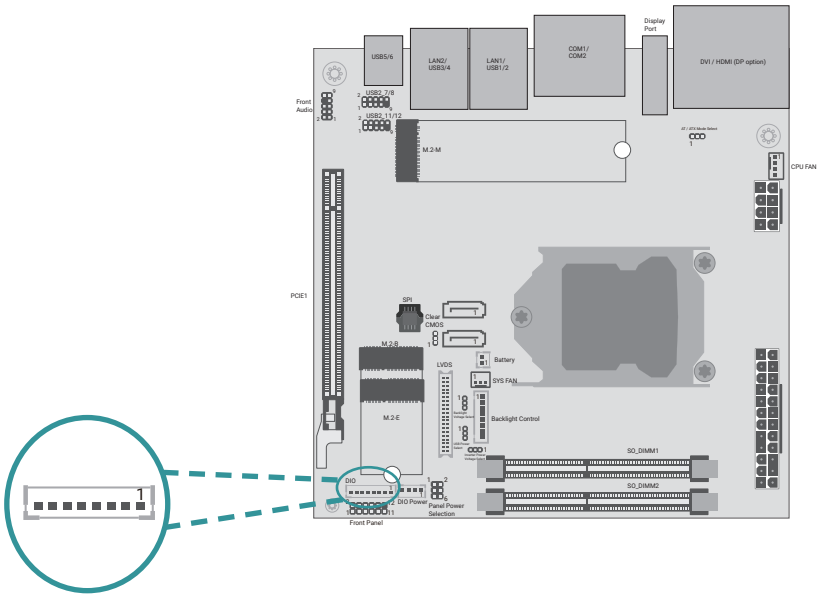
Pin	Assignment	Pin	Assignment
1	GND	2	GND
3	DIMMING	4	PANEL_PWR
5	LVDS_3V3	6	BLONOFF
7	VCC_INV_PWR	8	VCC_INV_PWR

DIO Power (J12)



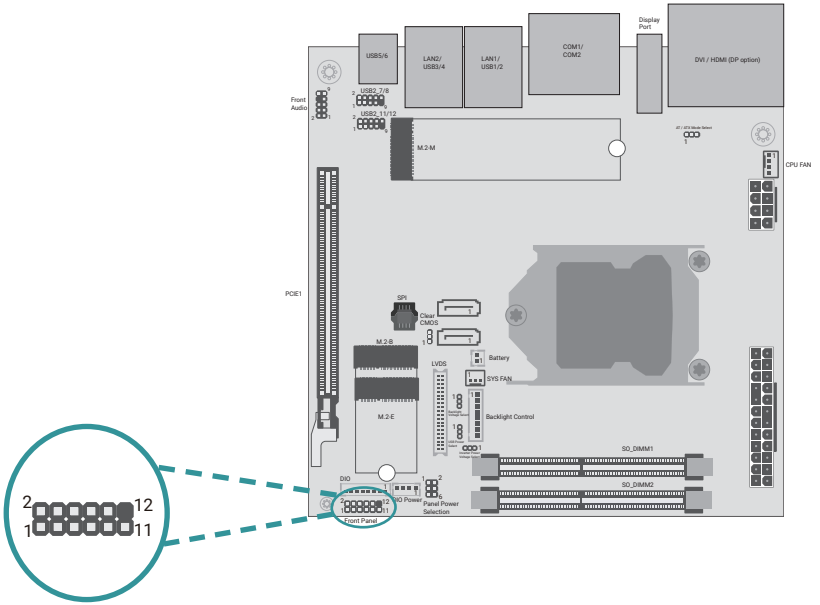
Pin	Assignment	Pin	Assignment
1	+12V	2	GND
3	5VDU	4	5V

DIO (J13)



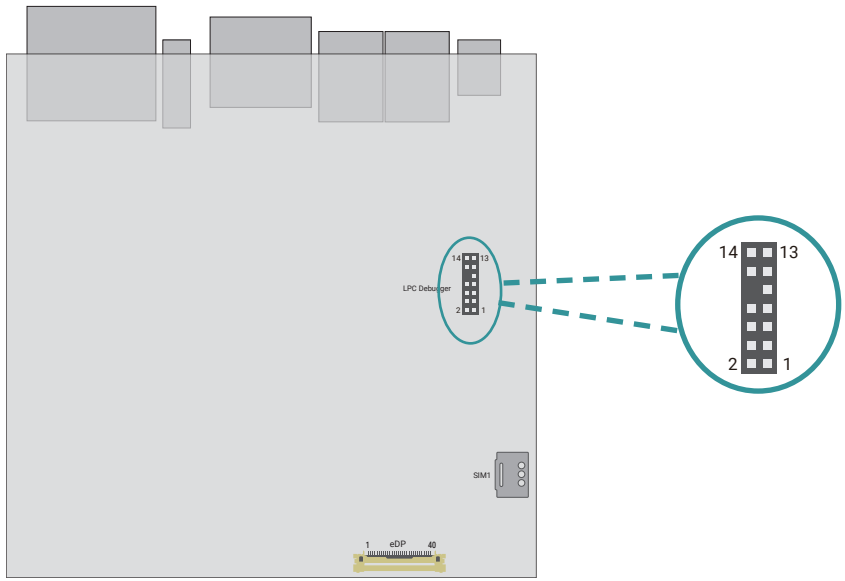
Pin	Assignment	Pin	Assignment
1	D_IOA0_C	2	D_IOA1_C
3	D_IOA2_C	4	D_IOA3_C
5	D_IOA4_C	6	D_IOA5_C
7	D_IOA6_C	8	D_IOA7_C

Front Panel (J11)



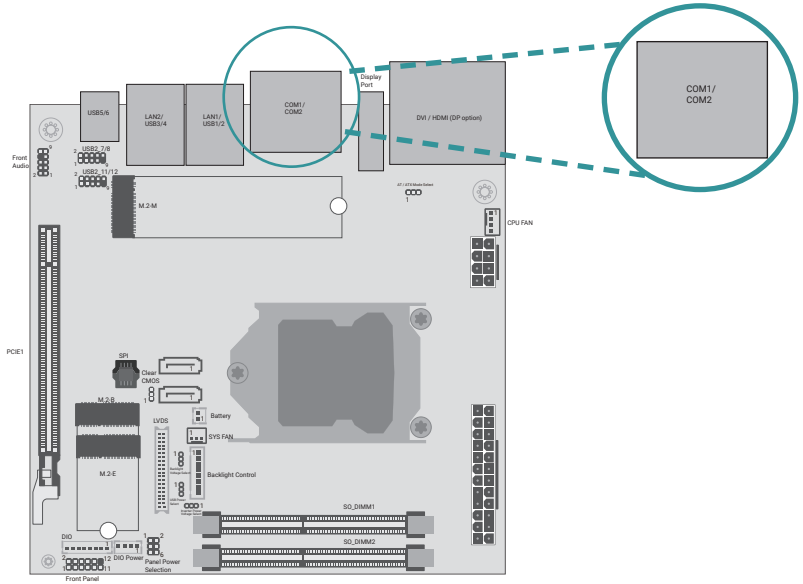
Pin	Function	Assignment	Function	Pin	Assignment
1		--		2	LED POWER
3	HDD LED	3V3	SYS LED	4	LED POWER
5		HD_LED		6	SUSLED
7	RESET	GND	POWER	8	GND
9		SYS_RST-		10	PWR_BTN-

LPC Debugger (J14)



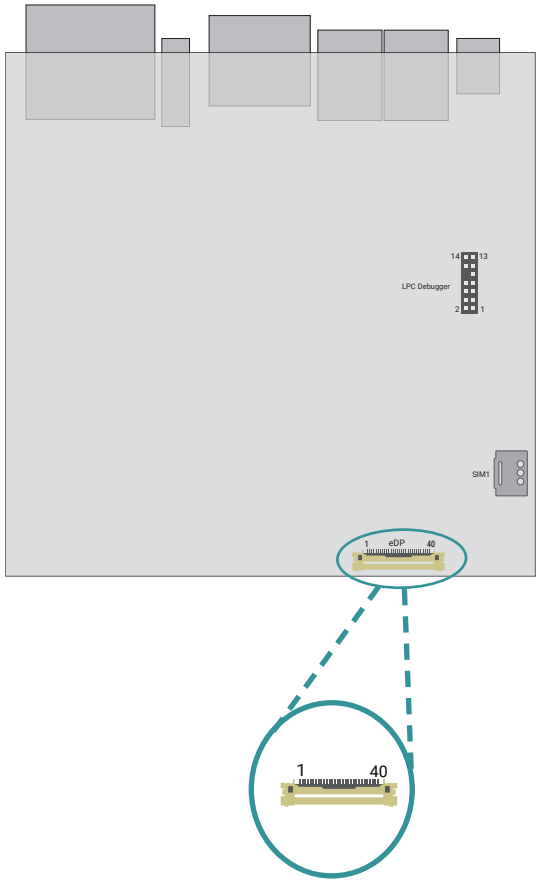
Pin	Assignment	Pin	Assignment
1	CLK	2	LAD1
3	RST#	4	LAD0
5	FRAME#	6	VCC3
7	LAD3	8	GND
9	LAD2	10	--
11	SERIRQ	12	GND
13	5VSB	14	5V

COM Port Pin Assignment



Pin	RS232	RS422 Full Duplex	RS485
1	DCD-	TX-	Data-
2	RD	TX+	Data+
3	TD	RX+	N.C
4	DTR-	RX-	N.C
5	GND	GND	GND
6	DSR-	N.C	N.C
7	RTS-	N.C	N.C
8	CTS-	N.C	N.C
9	RI-	N.C	N.C
10	N.C	N.C	N.C

eDP (CN23)



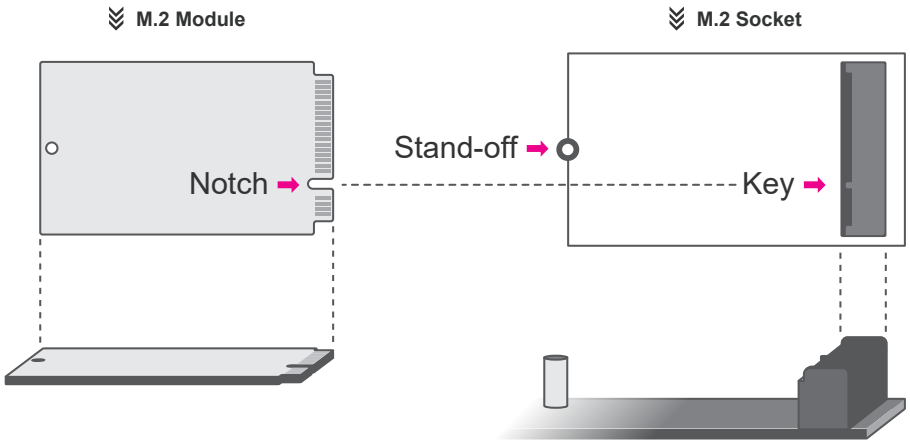
Pin	Assignment	Pin	Assignment
1	--	2	VCC_INV_PWR
3	VCC_INV_PWR	4	VCC_INV_PWR
5	VCC_INV_PWR	6	--
7	--	8	DIMMING
9	BLONOFF	10	eDP_GND
11	eDP_GND	12	eDP_GND
13	eDP_GND	14	eDP_HPD_B_R
15	GND	16	GND
17	GND	18	GND
19	--	20	PANEL_PWR
21	PANEL_PWR	22	PANEL_PWR
23	PANEL_PWR	24	GND
25	eDP_AUXN_C	26	eDP_AUXP_C
27	GND	28	eDP_LANE0_P
29	eDP_LANE0_N	30	GND
31	eDP_LANE1_P	32	eDP_LANE1_N
33	GND	34	eDP_LANE2_P
35	eDP_LANE2_N	36	GND
37	eDP_LANE3_P	38	eDP_LANE3_N
39	GND	40	--

▶ Expansion Slots

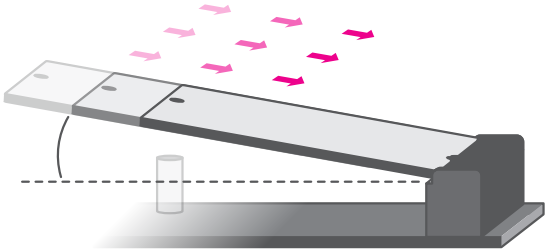
Installing the M.2 Module

Before installing the M.2 module into the M.2 socket, please make sure that the following safety cautions are well-attended.

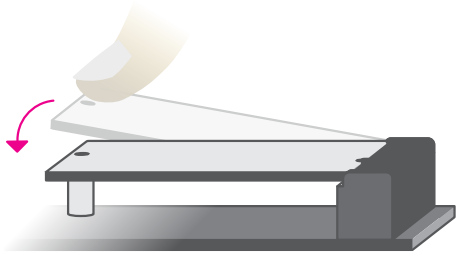
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.



Please follow the steps below to install the card into the socket.



Step 1:
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.



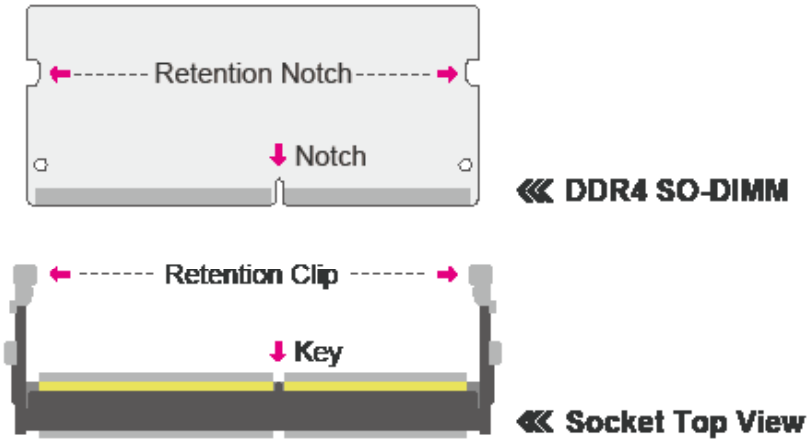
Step 2:
Press the end of the card far from the socket down until against the stand-off.

Step 3:
Screw tight the card onto the stand-off with a screw driver and a stand-off screw until the gap between the card and the stand-off closes up. The card should be lying parallel to the board when it's correctly mounted.

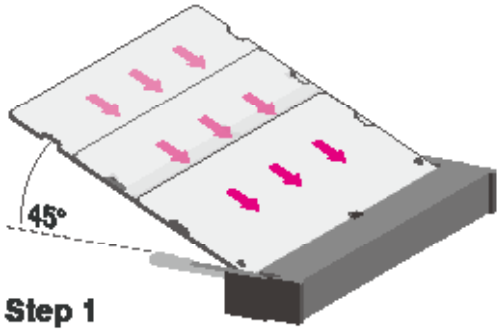
Installing the SO-DIMM Module

Before installing the memory module, please make sure that the following safety cautions are well-attended.

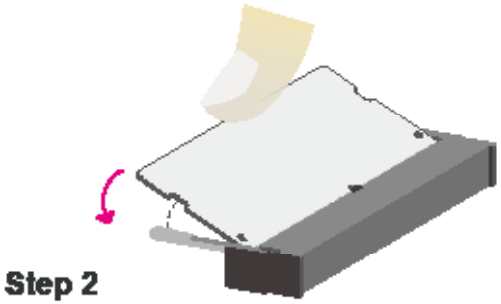
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the SO-DIMM socket on the system board
4. Make sure the notch on memory card is aligned to the key on the socket.



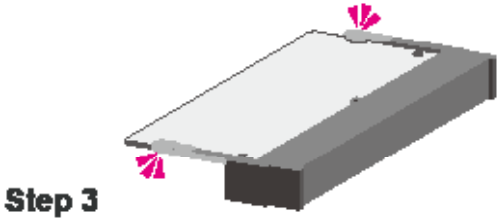
Please follow the steps below to install the memory card into the socket.



the memory card into the slot
aking sure 1) the notch and the
aligned, and 2) the non-connec-
rises approximately 45 degrees
tally. Press the card firmly into
cket while applying and main-
even pressure on both ends.



the end of the card far from
cket down while making sure
ention notch and the clip align
cated by the dotted line in the
tion. If the retention notch and
do not align, please remove the
d re-insert it. Press the card all
y down.



lips snap automatically and
y to the retention notches of the
ounding a distinctive click, and
e card in place. Inspect that the
s in the notch. If not, please pull
os outward, release and remove
d, and mount it again.

Chapter 3 - BIOS Settings

▶ Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.
It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

Note:
The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.
The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message “Press DEL to run setup” will appear on the screen. If the message disappears before you respond, restart the system or press the “Reset” button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right / Left arrow	Move the highlight left or right to select a menu
Up / Down arrow	Move the highlight up or down between submenus or fields
<Enter>	Enter the highlighted submenu
+ (plus key)/F6	Scroll forward through the values or options of the highlighted field
- (minus key)/F5	Scroll backward through the values or options of the highlighted field
<F1>	Display general help
<F2>	Display previous values
<F7>	Popup Boot Device List
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

Scroll Bar

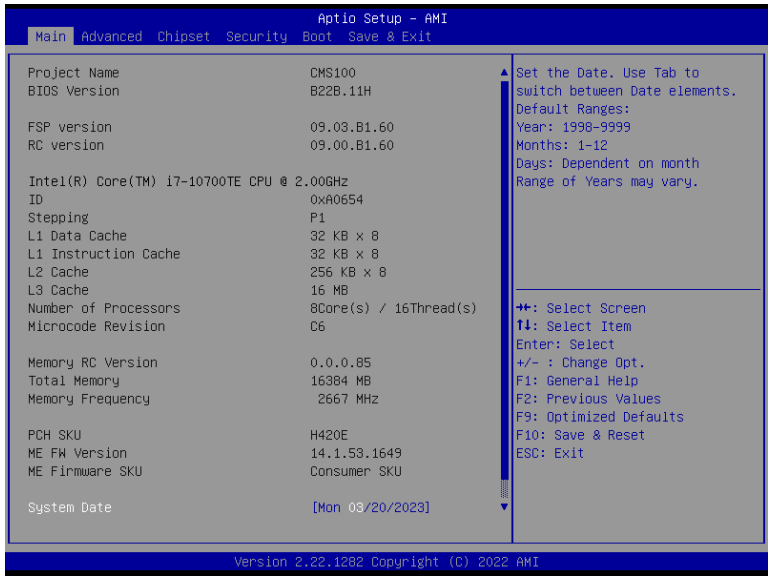
When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When “▶” appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

▶ Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Date

The date format is <month>, <date>, <year>. Press "Tab" to switch to the next field and press "-" or "+" to modify the value.

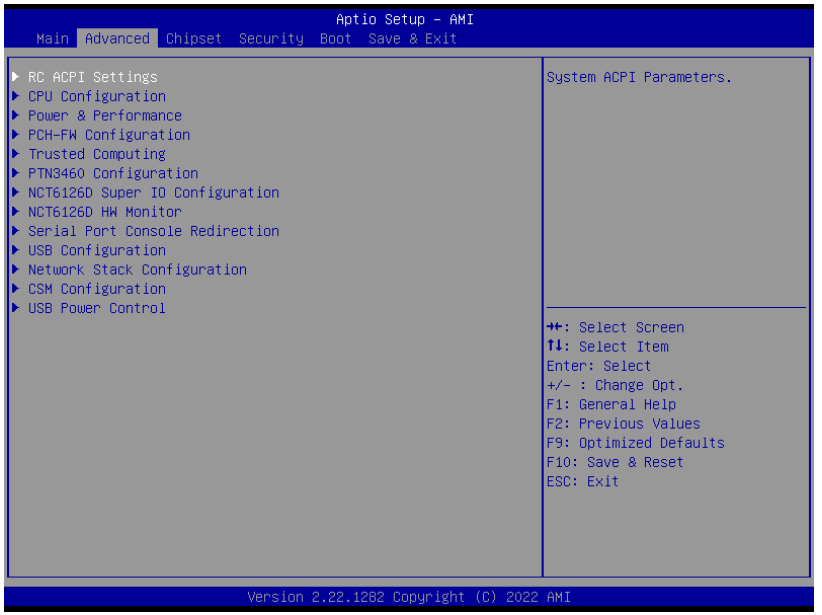
System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

▶ Advanced

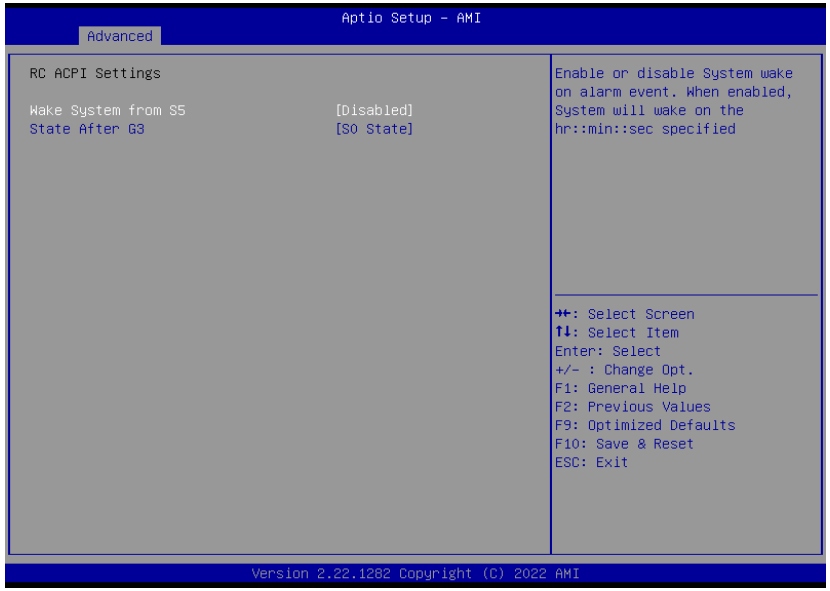
The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Important:
Setting incorrect field values may cause the system to malfunction.



▶ Advanced

RC ACPI Settings



Wake system from S5 via RTC

When Enabled, the system will automatically power up at a designated time every day. Once it's switched to [Enabled], please set up the time of day — hour, minute, and second — for the system to wake up.

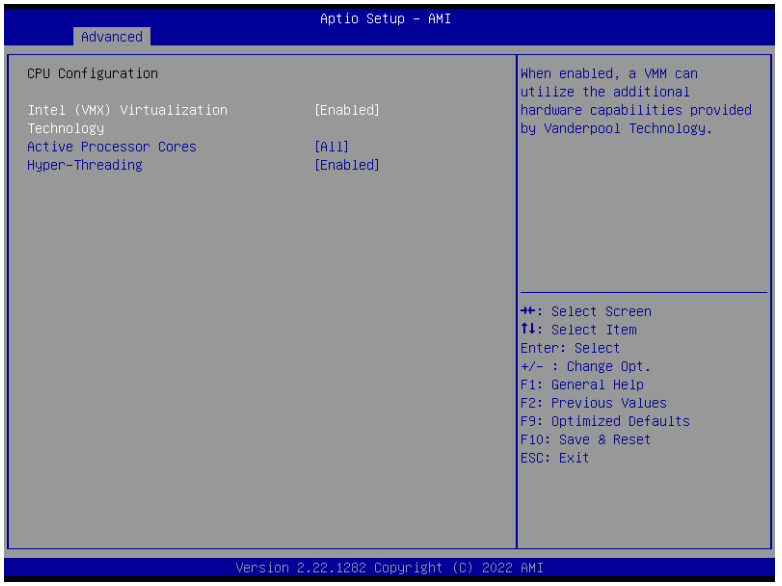
State After G3

Select between S0 State, and S5 State. This field is used to specify what state the system is set to return to when power is re-applied after a power failure (G3 state).

- **S0 State** The system automatically powers on after power failure.
- **S5 State** The system enter soft-off state after power failure. Power-on signal input is required to power up the system.
- **Last State** The system returns to the last state right before power failure.

▶ Advanced

CPU Configuration



Intel (VMX) Virtualization Technology

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Active Processor Cores

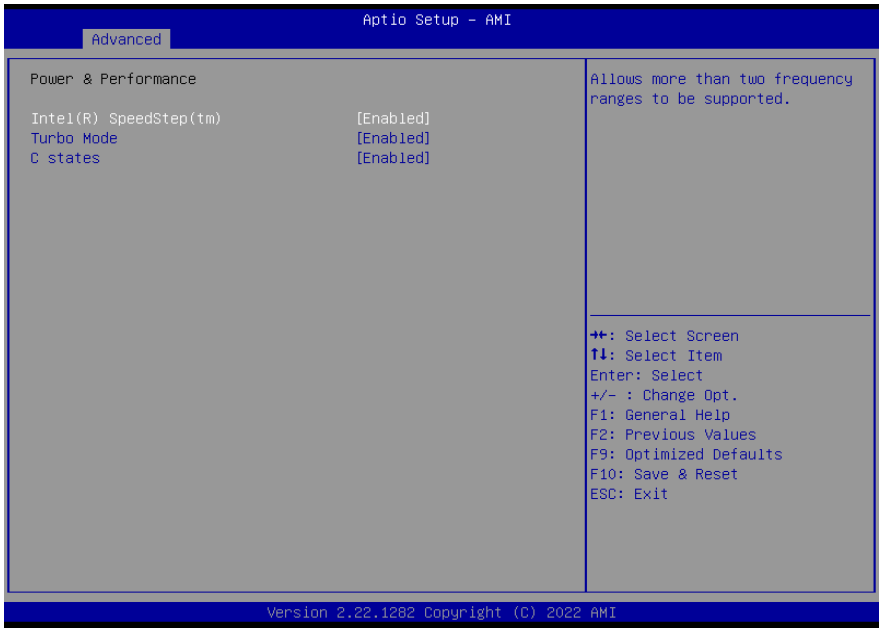
Select number of cores to enable in each processor package: all or 1.

Hyper-threading

Enables this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.

▶ Advanced

Power & Performance



Intel (R) SpeedStep(tm)

This field is used to enable or disable the Intel SpeedStep® Technology, which helps optimize the balance between system's power consumption and performance. After it is enabled in the BIOS, EIST features can then be enabled via the operating system's power management.

Turbo Mode

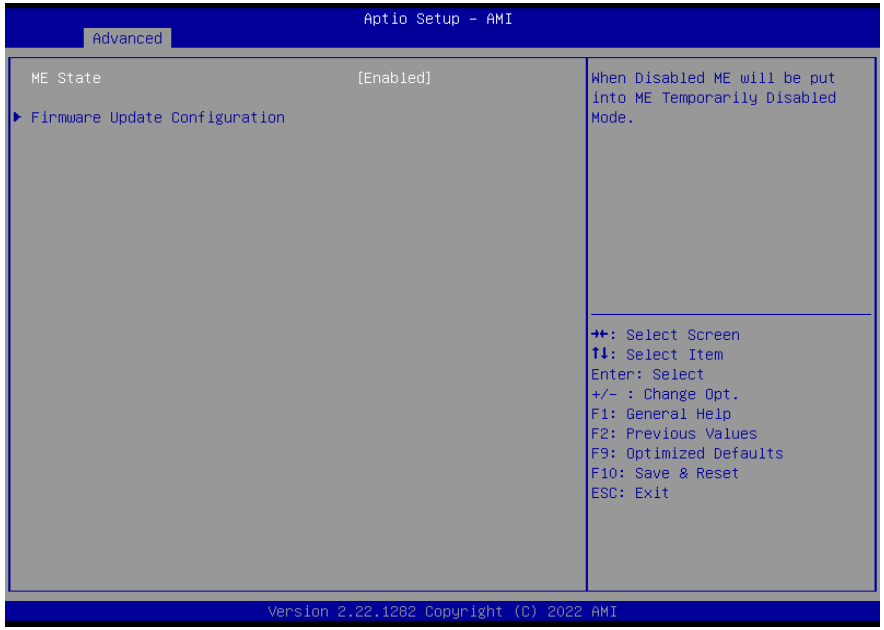
Enable or disable turbo mode of the processor. This field will only be displayed when EIST is enabled.

C states

Enable or disable CPU Power Management. It allows CPU to enter "C states" when it's idle and nothing is executing.

▶ Advanced

PCH-FW Configuration



ME State

When this field is set to Disabled, ME will be put into ME Temporarily Disabled Mode.

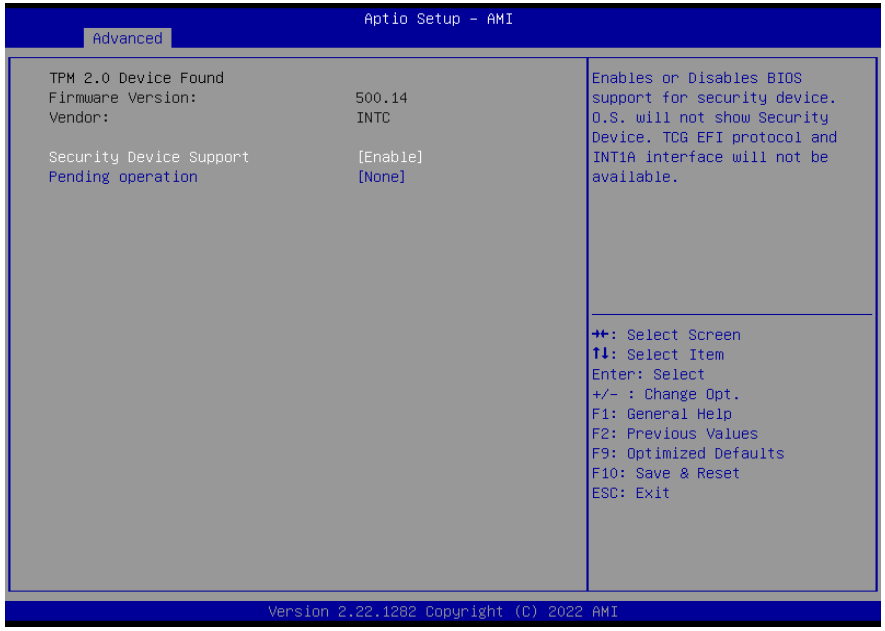
Firmware Update Configuration

Configure Management Engine Technology Parameters.

Note:
The sub-menus are detailed in following sections.

▶ Advanced

Trusted Computing



Security Device Support

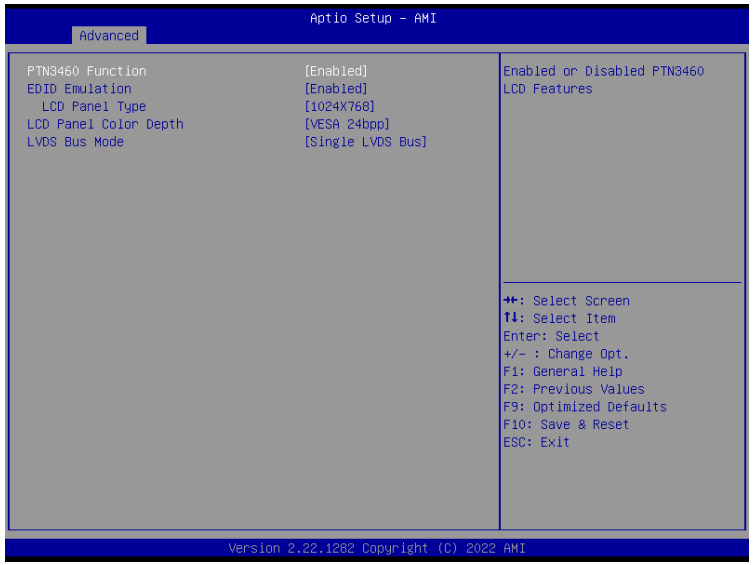
This field is used to enable or disable BIOS support for the security device such as an TPM 2.0 to achieve hardware-level security via cryptographic keys.

Pending operation

To clear the existing TPM encryption, select "TPM Clear" and restart the system. This field is not available when "Security Device Support" is disabled.

▶ Advanced

PTN3460 Configuration



PTN3460 Function

Enable or Disable PTN3460 LCD Features. When this field is disabled, the following fields will remain hidden.

LCD Panel Type

Select the resolution of the LCD Panel — 800X480, 800X600, 1024X768, 1366X768, 1280X1024, 1920X1080, or 1920X1200.

LCD Panel Color Depth

Select the color depth of the LCD Panel — VESA 24bpp, JEIDA 24bpp, VESA and JEIDA 18 bpp.

LVDS Bus Mode

Select PTN3460 LVDS BUS Mode : Single LVDS Bus /Dual LVDS Bus

Note:
The configuration must match the specifications of your LCD Panel in order for the LCD Panel to display properly.

▶ Advanced

NCT6126D Super IO Configuration

WatchDog Output Options

Select the Output Options.

- **Mode1 (System Reset) =**
A Watchdog Timeout causes the system to be reset.
- **Mode2 (Output Only) =**
WDT pin goes high upon timeout of the watchdog timer.
- **Mode3 (Generate NMI) =**
Generate NMI upon timout of the watchdog timer.

WatchDog Timer Unit

Select WatchDog Timer Unit — Second or Minute.

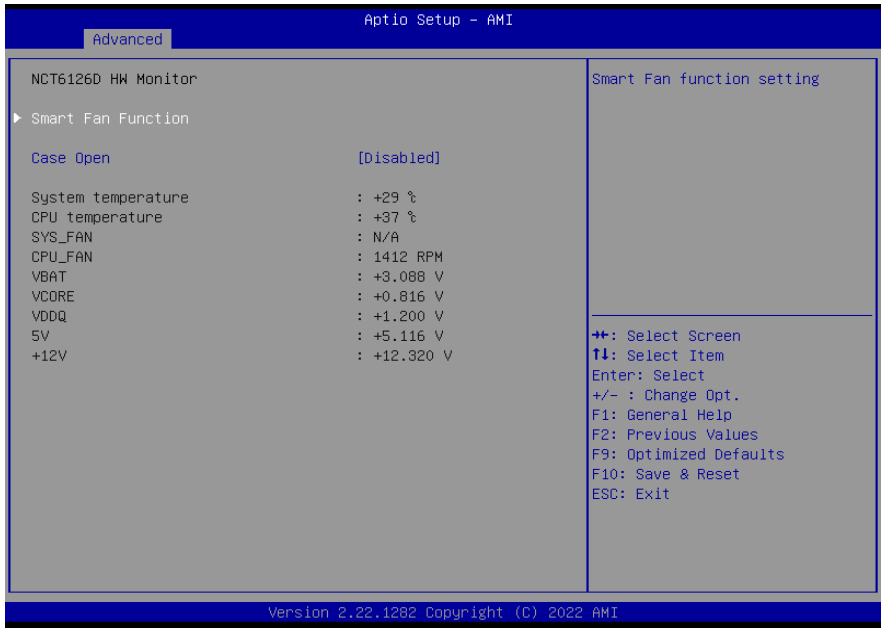
SuperIO WatchDog Timer

Set SuperIO WatchDog Timer Timeout value. The range is from 0 (disabled) to 255.

Note:
The sub-menus are detailed in following sections.

▶ Advanced

NCT6126D HW Monitor



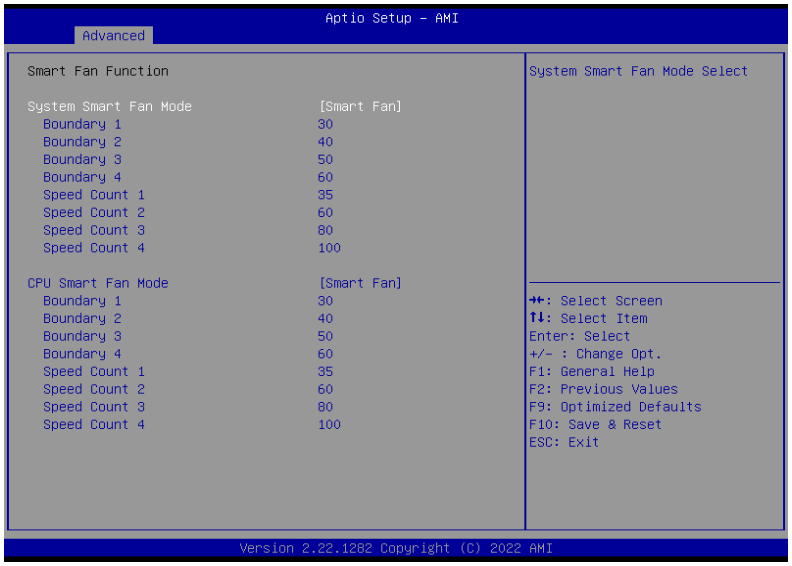
This section displays the system's health information, i.e. voltage readings, CPU and system temperatures, and fan speed readings

Case Open

Enable or disable the case open detection function.

▶ Advanced

NCT6126D HW Monitor ▶ Smart FAN Function



Smart Fan is a fan speed moderation strategy dependent on the current system temperature. When the system temperature goes higher than the Boundary setting, the fan speed will be turned up to the setting of the Fan Speed Count that bears the same index as the Boundary field.

SYS Smart Fan/CPU Smart Fan Control = [Enabled]

- **Boundary 1 to Boundary 4**

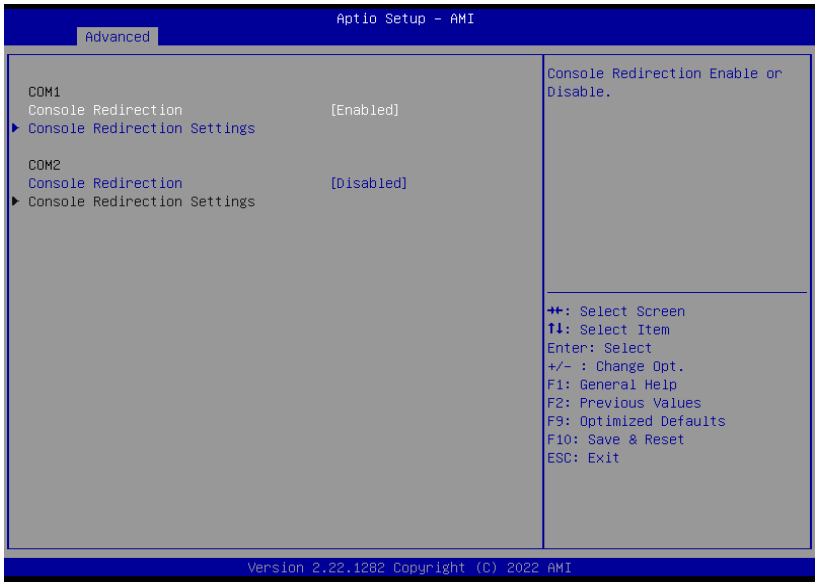
  Set the boundary temperatures that determine the fan speeds accordingly, the value ranging from 0-127°C. For example, when the system temperature reaches Boundary 1 setting, the fan speed will be turned up to the designated speed of the Fan Speed Count 1 field.

- **Fan Speed Count 1 to Fan Speed Count 4**

  Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will operate according to the specified boundary temperatures above-mentioned.

▶ Advanced

Serial Port Console Redirection

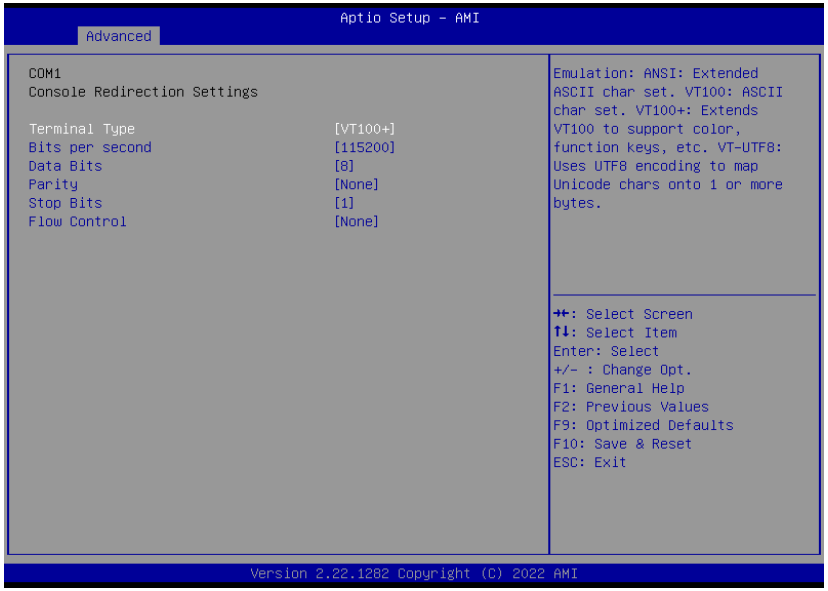


Console Redirection

By enabling Console Redirection of a COM port, the sub-menu of console redirection settings will become available for configuration as detailed in the following.

▶ Advanced

Serial Port Console Redirection ▶ Console Redirection Settings



Configure the serial settings of the current COM port.

Terminal Type

Select terminal type: VT100, VT100+, VT-UTF8 or ANSI.

Bits per second

Select serial port transmission speed: 9600, 19200, 38400, 57600 or 115200.

Data Bits

Select data bits: 7 bits or 8 bits.

Parity

Select parity bits: None, Even, Odd, Mark or Space.

Stop Bits

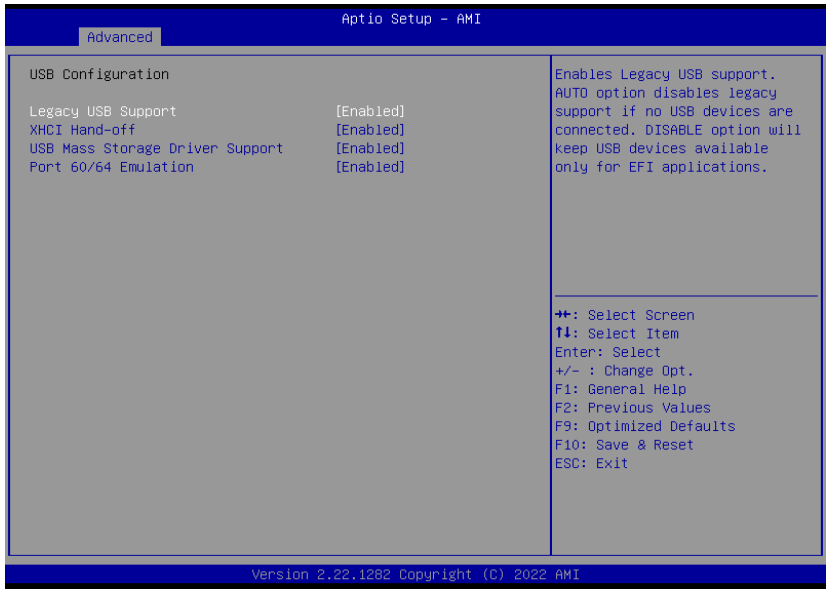
Select stop bits: 1 bit or 2 bits.

Flow Control

Select flow control type: None or Hardware RTS/CTS. Flow Control is for RS485 mode and is only supported by Serial Port 1 (COM1).

▶ Advanced

USB Configuration



Legacy USB Support

- **Enabled** Enable Legacy USB support.
- **Disabled** Keep USB devices available only for EFI applications.
- **Auto** Disable Legacy support if no USB devices are connected.

XHCI Hand-off

Enable or disable XHCI Hand-off.

USB Mass Storage Driver Support

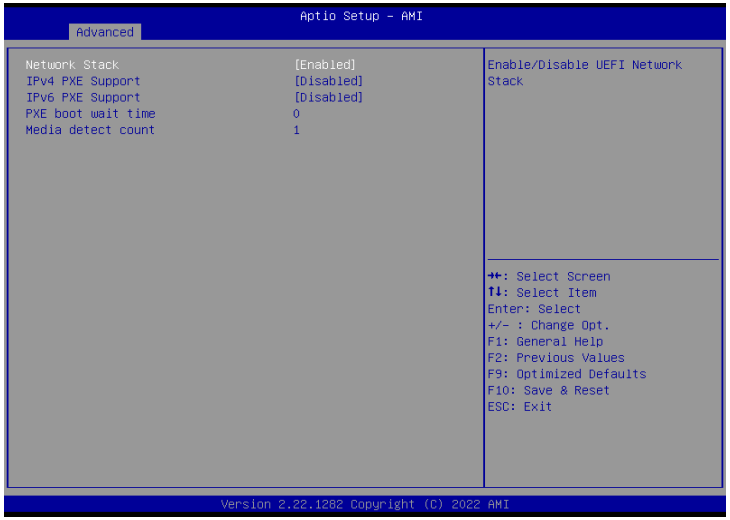
Enable or disable USB Mass Storage Driver Support.

Port 60/64 Emulation

Enables I/0 port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware Oses.

▶ Advanced

Network Stack Configuration



Network Stack

Enable or disable UEFI network stack. The following fields will appear when this field is en-abled.

Ipv4 PXE Support

Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be avail-able.

Ipv6 PXE Support

Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be avail-able.

PXE boot wait time

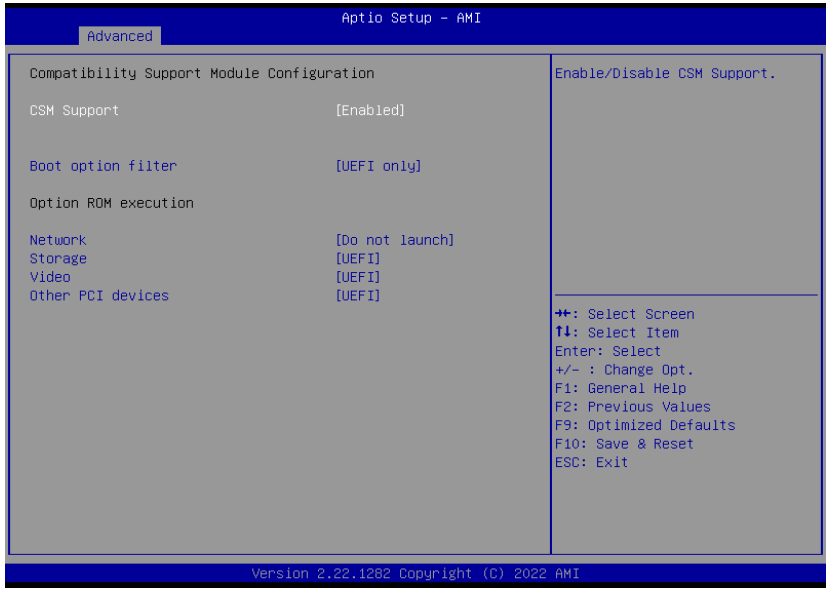
Set the wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

Set the number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

▶ Advanced

CSM Configuration



CSM Support

This section is used to enable or disable CSM Support. The following fields are only available when "CSM Support" is enabled.

Boot option filter

This field controls Legacy/UEFI ROMs priority. Select among UEFI and Legacy, Legacy only or UEFI only.

Network

This field controls the execution of UEFI and Legacy Network OpROM.

Storage

This field controls the execution of UEFI and Legacy Storage OpROM.

Video

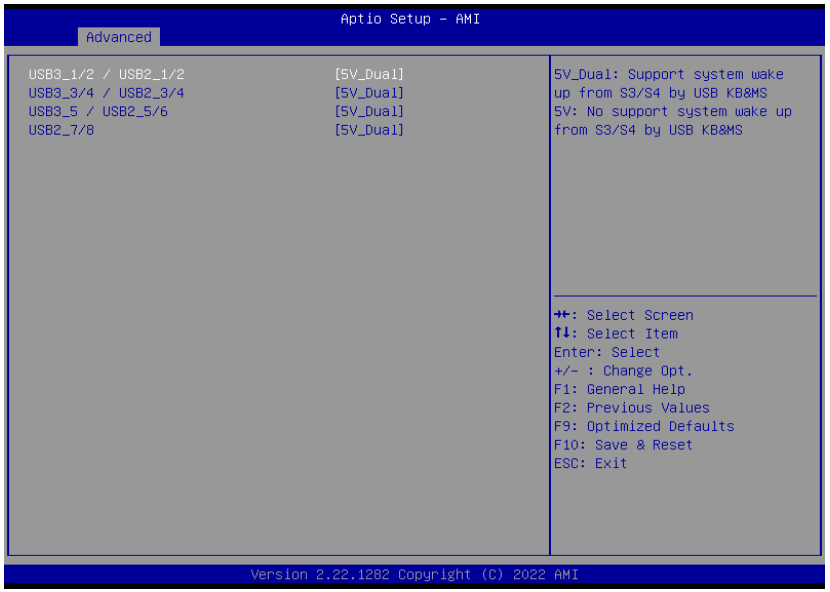
This field controls the execution of UEFI and Legacy Video OpROM.

Other PCI devices

This field determines OpROM execution policy for devices other than Network, Storage or Video.

▶ Advanced

USB Power Control



Server CA Configuration

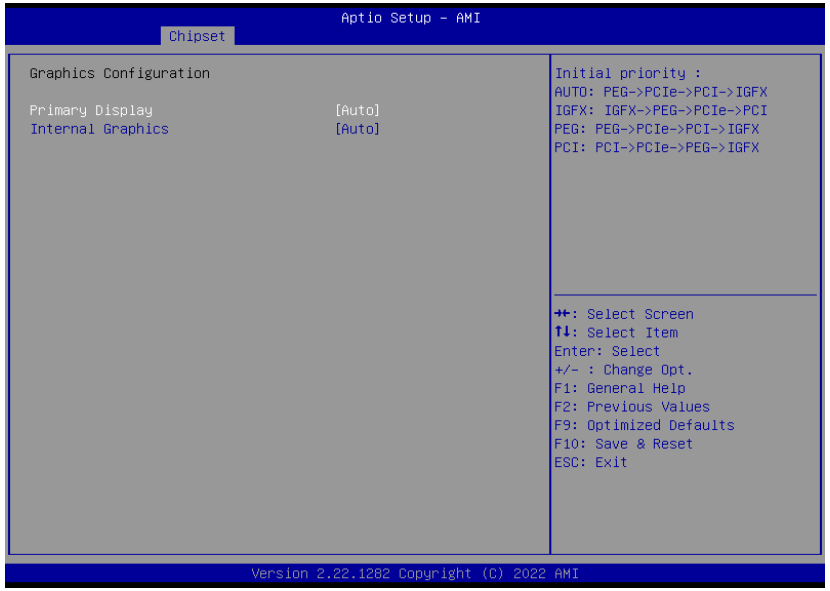
5_Dual: Support system wake up from S3/S4 by USB KB&MS

5V: No support system wake up from S3/54 by USB KB&MS

▶ Chapter

Please select a submenu and press Enter. The submenus are detailed in the following pages.

Graphics Configuration



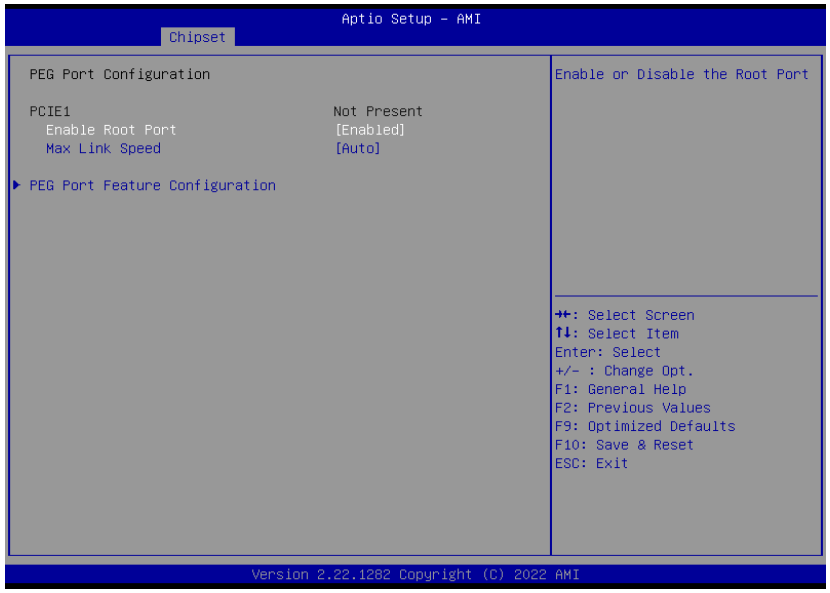
Primary Display

Select which of IGFX/PEG/PCI Graphics device to be the primary display.

Internal Graphics

Keep IGFX "Enabled" or "Disabled" based on the setup options, or select "Auto" for auto-detection.

PEG Port Configuration



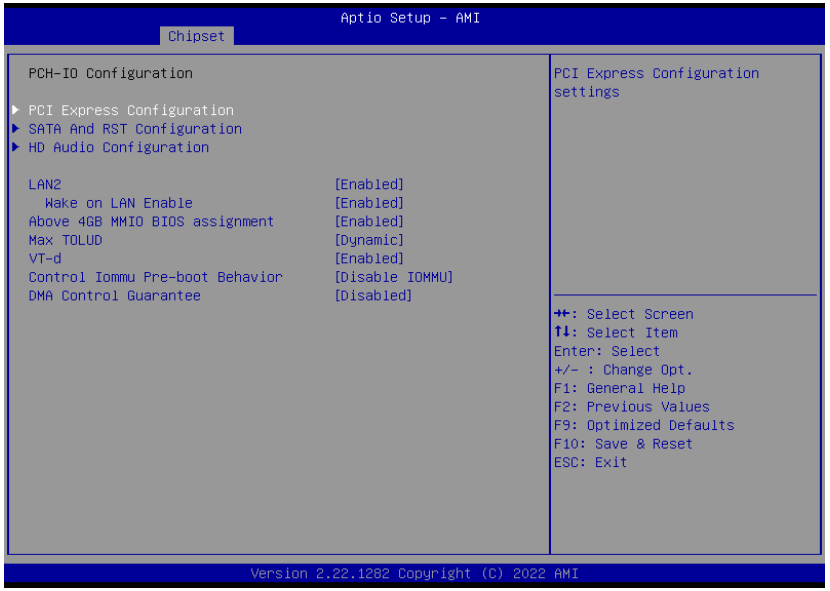
Enable Root Port

Enable or Disable the Root Port

Max Link Speed

Configure PEG 0:1:0 Max Speed

PCH-IO Configuration



PCI Express Configuration

PCI Express Configuration Settings

SATA And RST Configuration

SATA Device Otpions Settings

HD Audio Configuration

HD Audio Subsystem Configuration Settings

LAN2

Enable/Disable onboard NIC.

Wake on LAN Enable

Enable/Disable integrated LAN to wake the system.

Above 4GB MMIO BIOS assignment

Enable/Disable above 4GB MemoryHappedIO BIOS assignment.

This is enabled automatically when Aperture Size is set to 2048MB.

Max TOLUD

Maximum Value of TOLUD.

Dynamic assignment would adjust TOLD automatically based on largest MMIO length of installed graphic controller.

VT-d

VT-d capability

Control Iommu Pre-boot Behavior

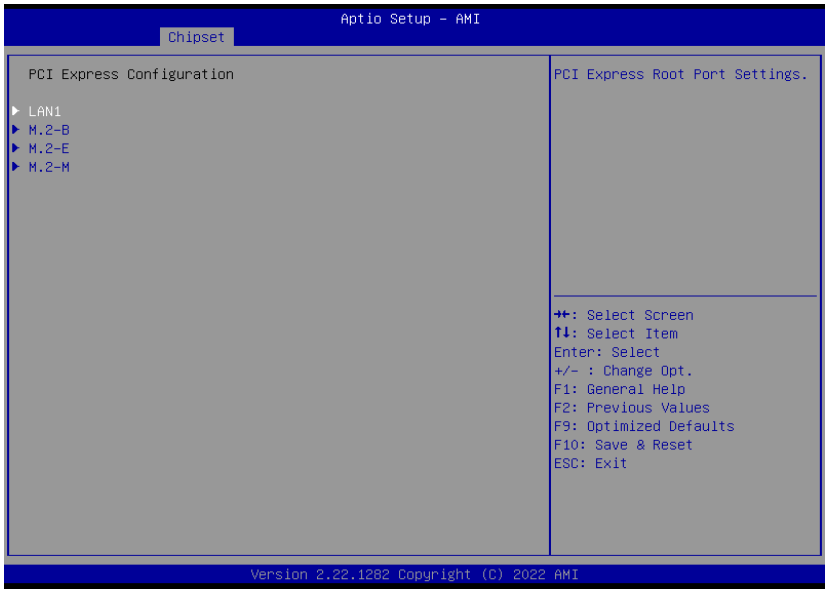
Enable dTBT and PCH USB topology IOMMU in Pre-boot environment (If DMAR table is installed in DXE and If VTD_INFO_PPI is installed in PEI.) TBT tree won't be included in the exception list.

DMA Control Guarantee

Enable/Disable DMA_CONTROL_GUARANTEE bit.

▶ Chipset

PCH-IO Configuration▶ **PCI Express Configuration**



Select one of the PCI Express channels and press enter to configure the following settings.

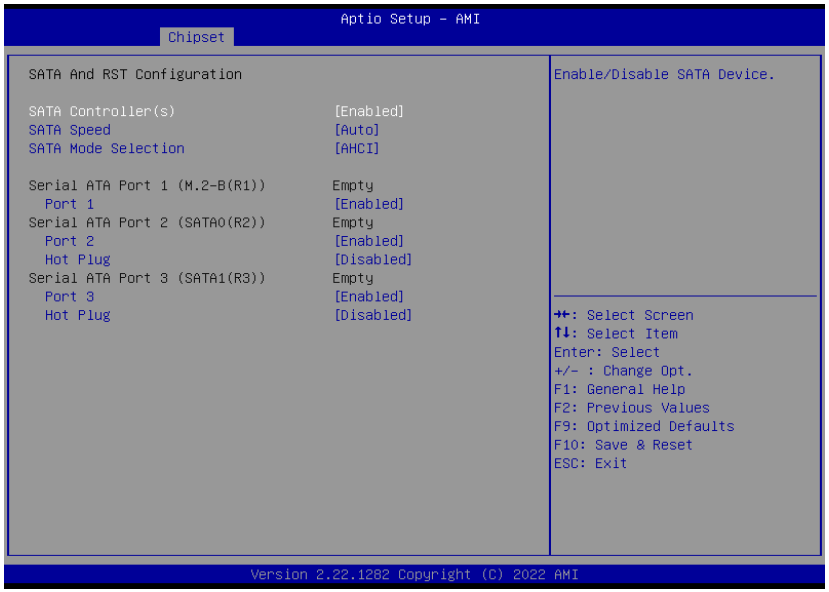
LAN 1, M.2-B, M.2-E, M.2-M

Control the PCI Express Root Port.

PCIe Speed

Select PCIe Speed of the current port — AUTO, Gen1, Gen 2, or Gen3. This field may not appear when the speed of the port is not configurable.

PCH-IO Configuration▶ SATA And RST Configuration



SATA Controller(s)

This field is used to enable or disable the Serial ATA controller.

SATA Speed

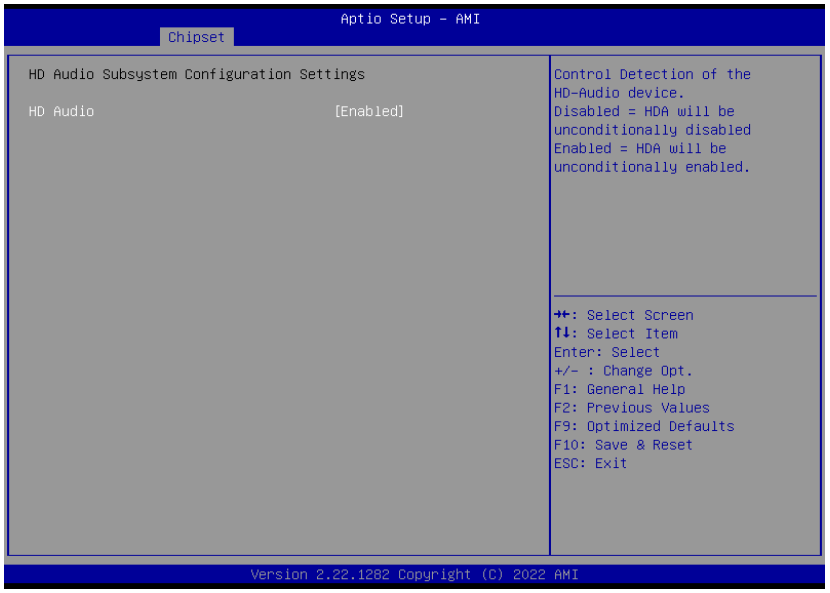
This field is used to select SATA speed generation limit: Auto, Gen1, Gen2 or Gen3.

SATA Mode Selection

The mode selection determines how the SATA controller(s) operates.

- **AHCI** This option allows the Serial ATA controller(s) to use AHCI (Advanced Host Controller Interface).
- **Intel RST Premium With Intel Optane System Acceleration** This option allows you to create RAID or Intel Rapid Storage configuration along with Intel® Optane™ system acceleration on Serial ATA devices.

PCH-IO Configuration▶ HD Audio Configuration

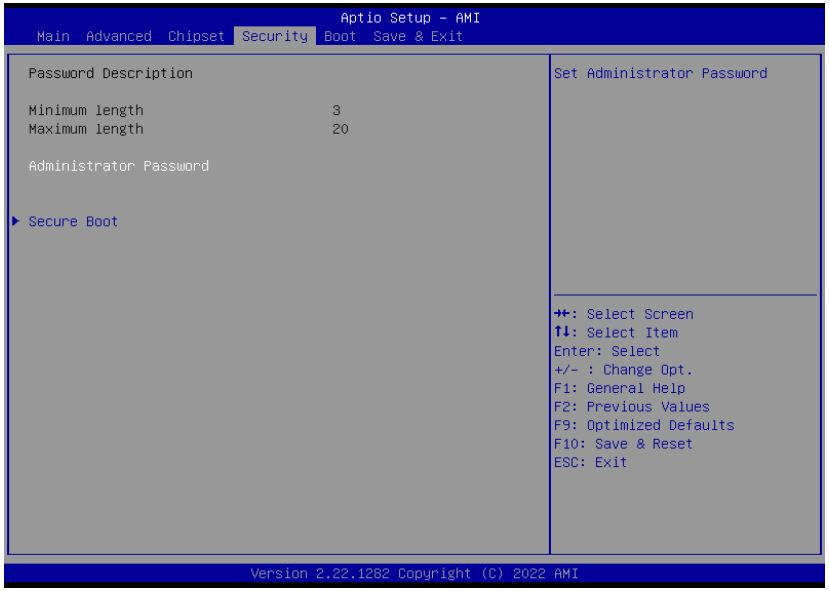


HD Audio

Control the detection of the HD Audio device.

- **Disabled** HDA will be unconditionally disabled.
- **Enabled** HDA will be unconditionally enabled.

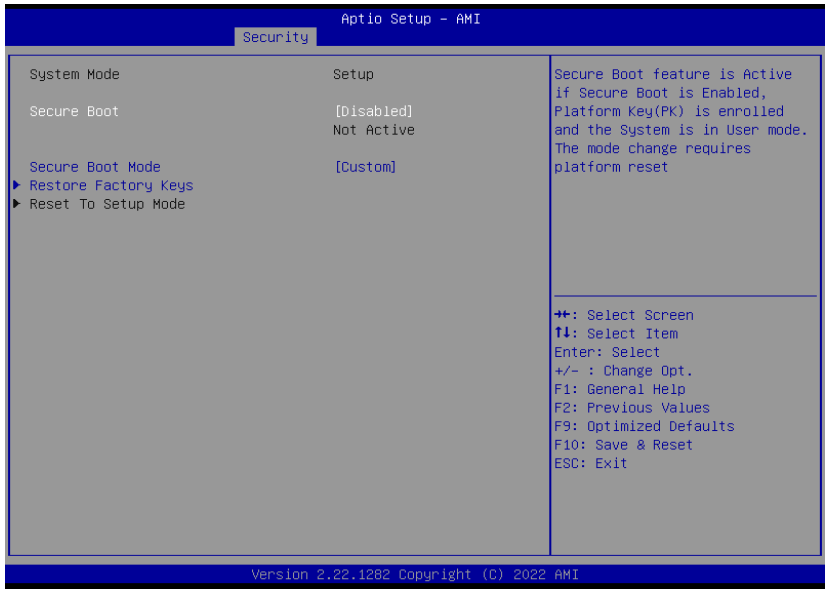
▶ Security



Administrator Password

Set the administrator password. To clear the password, input nothing and press enter when a new password is asked. Administrator Password will be required when entering the BIOS.

Secure Boot



Secure Boot

The Secure Boot store a database of certificates in the firmware and only allows the OSes with authorized signatures to boot on the system. To activate Secure Boot, please make sure that “Secure Boot” is “[Enabled]”, Platform Key (PK) is enrolled, “System Mode” is “User”, and CSM is disabled. After enabling/disabling Secure Boot, please save the configuration and restart the system. When configured and activated correctly, the Secure Boot status will be “Active”.

Secure Boot Mode

Select the secure boot mode — Standard or Custom. When set to Custom, the following fields will be configurable for the user to manually modify the key database.

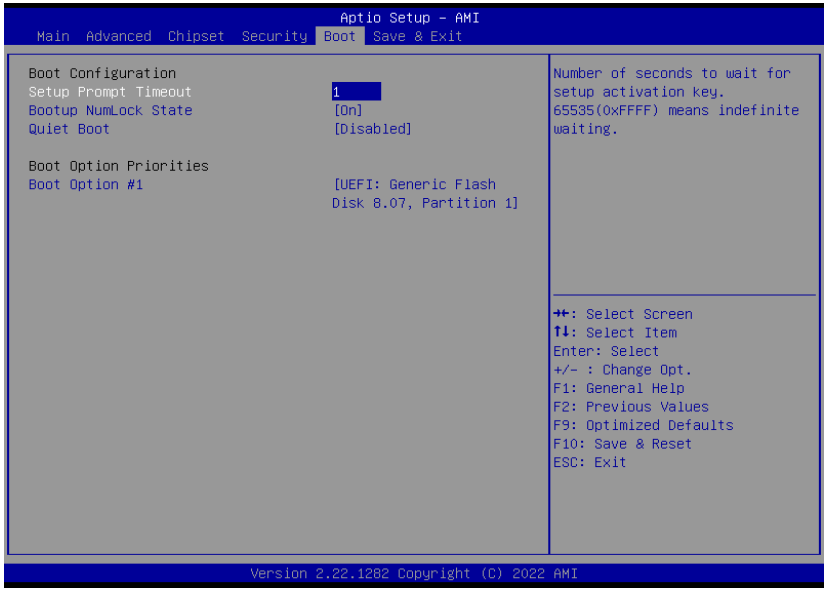
Restore Factory Keys

Force system to User Mode. Load OEM-defined factory defaults of keys and databases onto the Secure Boot. Press Enter and a prompt will show up for you to confirm.

Reset To Setup Mode

Clear the database from the NVRAM, including all the keys and signatures installed in the Key Management menu. Press Enter and a prompt will show up for you to confirm.

▶ Boot



Setup Prompt Timeout

Set the number of seconds to wait for the setup activation key. 65535 (0xFFFF) denotes indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state: On or Off.

Quiet Boot

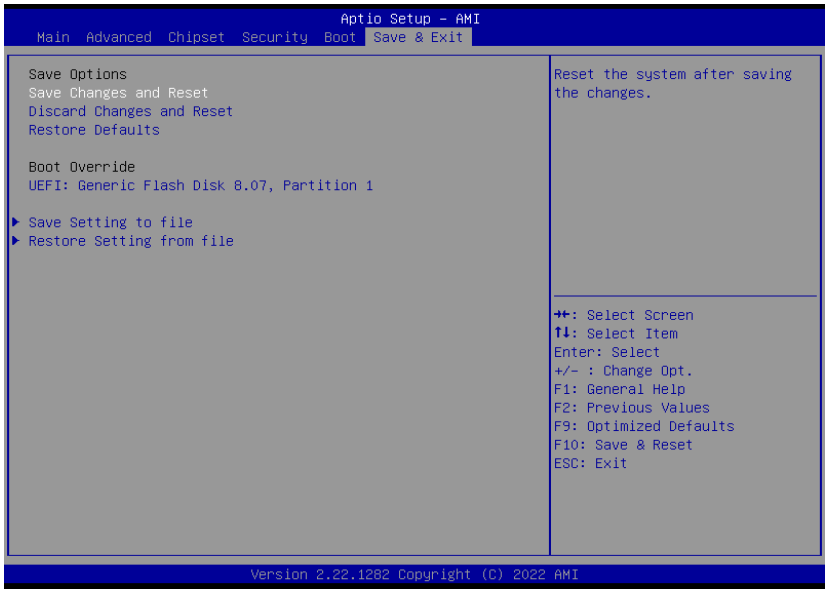
This section is used to enable or disable quiet boot option.

Boot Option Priorities

Rearrange the system boot order of available boot devices.

Note:
If "Boot option filter" of "CSM Configuration" is set to "UEFI and Legacy" or "UEFI only", and "Quiet Boot" is set to enabled, "BGRT Logo" will show up for configuration. Refer to the Advanced > CSM Configuration submenu for more information.

▶ Save & Exit



Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dia-log box will appear. Select Yes to restore the default values of all the setup options.

Boot Override

Move the cursor to an available boot device and press Enter, and then the system will immediately boot from the selected boot device. The Boot Override function will only be effective for the current boot. The "Boot Option Priorities" configured in the Boot menu will not be changed.

- **Save Setting to file** Select this option to save BIOS configuration settings to a USB flash device.
- **Restore Setting from file** This field will appear only when a USB flash device is detected. Select this field to restore set-ting from the USB flash device.

▶ Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility.

▶ Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.
2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.
3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

Note:
a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.