MX680RD

(71876)

Intel® R680E PCH
Supports LGA1700
Alder Lake-S (12th Gen),
Raptor Lake-S (13th Gen),
Raptor Lake-Refresh (14th Gen)
(BCM P/N# 71876 ONLY)

Core™ i9, Core i7, Core i5, Core i3,
Pentium, Celeron
(up to 65W TDP max)
with DDR5-4800 SODIMM
Mini-ITX Motherboard

User's Manual

Edition 1.03 – March, 2024

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(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

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OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Notice

This guide is designed for experienced users to set up the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your good return more quickly.
4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Manual Objectives

This manual describes in detail the BCM MX680RD mainboard.

We strongly recommend that you study this manual carefully before attempting to interface with this mainboard or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

Safety Precautions

Warning!

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!

Always ground yourself to remove any static charge before touching the mainboard. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Document Amendment History

Revision	Date	Comment
1st (1.00)	Jan, 2023	Initial Release
2nd (1.01)	Feb, 2023	Added LED information under section 1.4
3rd (1.02)	July, 2023	Added Raptor Lake-S processors support (65W TDP Max)
4th (1.03)	March, 2024	1. Update information for Raptor Lake Refresh (14th gen) processor support. 2. Update Application Note section for adding driver installation recommendations.

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Mainboard Specifications

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<tr><th>Model</th><th>MX680RD</th></tr>
<tr><td>Processor</td><td>Supports LGA1700 Alder Lake-S (12th Gen), Raptor Lake-S (13th Gen), Raptor Lake Refresh (14th Gen) processors (BCM P/N: 71876 ONLY) Core™ i9, Core i7, Core i5, Core i3, Pentium, Celeron
(up to 65W TDP max)</td></tr>
<tr><td>Chipset</td><td>Intel® R680E PCH</td></tr>
<tr><td>Memory</td><td>2x 262-pins SODIMM sockets support 1.1V, Non-ECC, or ECC DDR5-4800 memory module, up to 64GB (32GB maximum/ socket)</td></tr>
<tr><td>Display</td><td>Intel® Integrated HD Graphic Engine</td></tr>
<tr><td>Maximum Resolution</td><td>. DP alone:
<table>
<tr><th>Number of Simultaneous Displays</th><th>Max Common Resolution</th></tr>
<tr><td>1</td><td>8k 60Hz HDR or 5k 120Hz HDR</td></tr>
<tr><td>2</td><td>8K 60Hz SDR or 5k 60Hz HDR</td></tr>
<tr><td>3 or 4</td><td>4k 60Hz HDR</td></tr>
</table>
. LVDS alone: Support VESA and CEA timing standards up to 1920 x 1200 resolution in 8-bit input with 60Hz refresh.
. eDP alone: 5K 120Hz HDR
NOTE:
If DP is combined with either LVDS or eDP display (eDP & LVDS can't be used simultaneously), the resolution may be lower, limited by the connected display device with lower resolution.</td></tr>
<tr><td>SATA</td><td>2 x SATA III connectors</td></tr>
<tr><td rowspan="3">M.2</td><td>1x M.2 Type M 2242/ 2280 Slot (PCIe x4 & SATA III) (At Top Side)</td></tr>
<tr><td>1x M.2 Type M 2280 Slot (PCIe x4 & SATA III) (At Bottom Side)</td></tr>
<tr><td>1 x M.2 Type E 2230 with CNVi Support (PCIe x 1 & USB2.0)</td></tr>
<tr><td rowspan="4">USB</td><td>6 x USB 3.2 Gen 2x1 Type-A ports (3x stack-up @ Rear I/O)</td></tr>
<tr><td>1 x USB 3.2 Gen 2x2 Type-C port @ Rear I/O</td></tr>
<tr><td>2 x USB 3.2 Gen 1 ports (1x Header with Shroud)</td></tr>
<tr><td>2 x USB 2.0 ports (1x Header)</td></tr>
<tr><td>Super I/O Controller</td><td>NCT6126D</td></tr>
<tr><td>Serial Ports</td><td>1 x RS-232 (1x 2.0mm Locking Type Header (with Voltage Selection))</td></tr>
</table>

	1 x RS-232/ 422/ 485 (1x 2.0mm Locking Type Header (with Voltage Selection))
Expansion Slot	1 x Gen 5 PCIe x16 Slot
Watch Dog Timer	1sec ~ 255 sec timer
HW Monitor	CPU & System temperature monitoring, Voltages Monitoring
Audio	Realtek® ALC888 HD Audio Codec
LAN	2 x Intel® i255-LM 2.5 Gigabit Ethernet Controllers, support 2x 10M/100M/1G/2.5Gbps Ethernet LAN Ports @ rear I/O
GPIO	8 Bit Header
BIOS	AMI® UEFI BIOS
	AMI BIOS with 256Mb SPI ROM
TPM	1 x TPM 2.0 Security Device (Infineon® TPM Chip SLB9670VQ2.0) or Intel PTT
Onboard I/O Headers	
SATA	2 x Std. SATA III Connectors
USB	1 x USB2.0 Header (2 ports on Header)
	1 x USB3.2 Gen 1 Header (2 ports on Header with Shroud)
RS232	1 x Locking Type Header
RS232/ RS422/ RS485	1 x Locking Type Header
Front Audio	1 x Header with Shroud
Audio Amplifier	1 x Locking Type Header
Front Panel	1 x Header with Shroud
Fan Header	2 x Headers (12V, 4-pins PWM)
LVDS	1 x Header for LVDS Panel Connection
	1 x Locking Type Header for LVDS Panel Backlight Connector
eDP	1 x Header (At bottom side)
SMBus	1 x Header
I2C	1 x Header
GPIO	1 x Header with Shroud
Chassis Intrusion	1 x Locking Type Header
Onboard Jumpers	
COM Port Ring-In/ Power Select	1 x Dip Switch provides signal selection of "12V" or "5V" or "Ringin" on 2 COM ports
AT/ATX Mode Select	1 x Header
Clear CMOS	1 x Header
LVDS PWM Backlight Voltage Select	1 x Header

LVDS Brightness Control Mode Select	1 x Header
Rear I/O Ports	
DP (Display Port)	4 x DP Connector
USB 3.2	3 x USB3.2 Gen 2x1 Type-A Connectors (1x Dual Stack, 2x Dual Stack with LAN)
	1 x USB3.2 Gen 2x2 Type-C Connector
LAN	2 x 10M/100M/1G/2.5G bps LAN Ports
Audio	1 x Line-Out
	1 x Mic-In
DC_IN Connector	1 x DC Power Jack (DIA 5.5mm (Outer), 2.5mm (Inner))
Power & Connector	
	1 x 4 pin power Connector
	1 x DC Power Jack (DIA 5.5mm (Outer), 2.5mm (Inner))
Form Factor	
	Mini-iTX 6.7" x 6.7" (170mm x 170mm)

Chapter 1: System Setup

This chapter describes the mainboard features and the new technologies it supports

1.1 Welcome!

The mainboard delivers a host of new features and latest technologies, making it another line of BCM long life mainboards! Before you start installing the mainboard, and hardware devices on it, check the items in your package with the list below.

If any of the items listed below is damaged of missing, please contact with your vendor.

1.2 Packing Contents

- **Mainboard**
  - **1 x MX680RD**

- **Accessories**
  - **1 x MX680RD I/O Shield**
  - **1 x SATA Power Cable**

-

1.3 Before you proceed

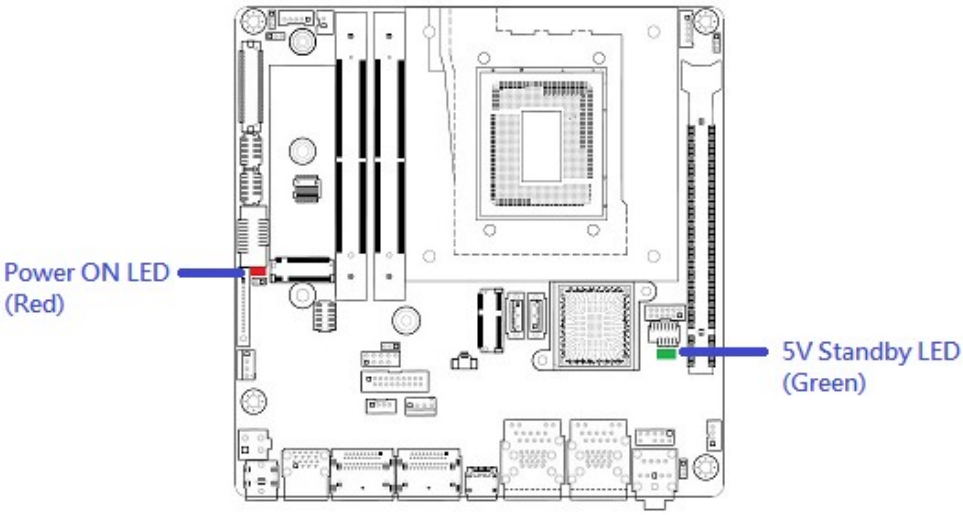
Take note of the following precautions before you install mainboard components or change any mainboard settings.

- **Unplug the power cord from the wall socket before touching any component inside the system.**
- **Use a grounded wrist strap or touch a safely grounded object or to a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.**
- **Hold components by the edges to avoid touching the ICs on them.**
- **Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.**
- **Before you install or remove any component, ensure that the power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the mainboard, peripherals, and/or components.**

1.4 Mainboard Overview

Before you install the mainboard, study the configuration of your chassis to ensure that the mainboard fits into it.

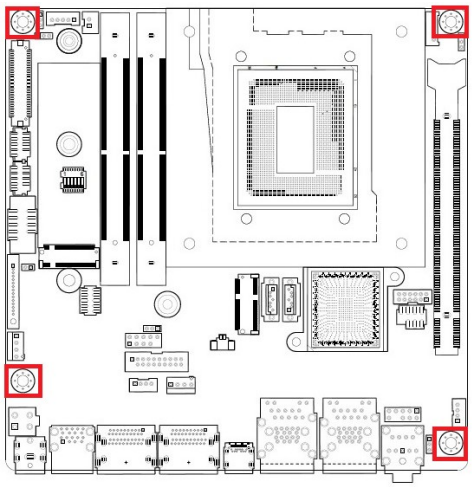
Make sure to unplug the power cord before installing or removing the mainboard. Failure to do so can cause you physical injury and damage mainboard components.



1.4.1 Mounting Holes

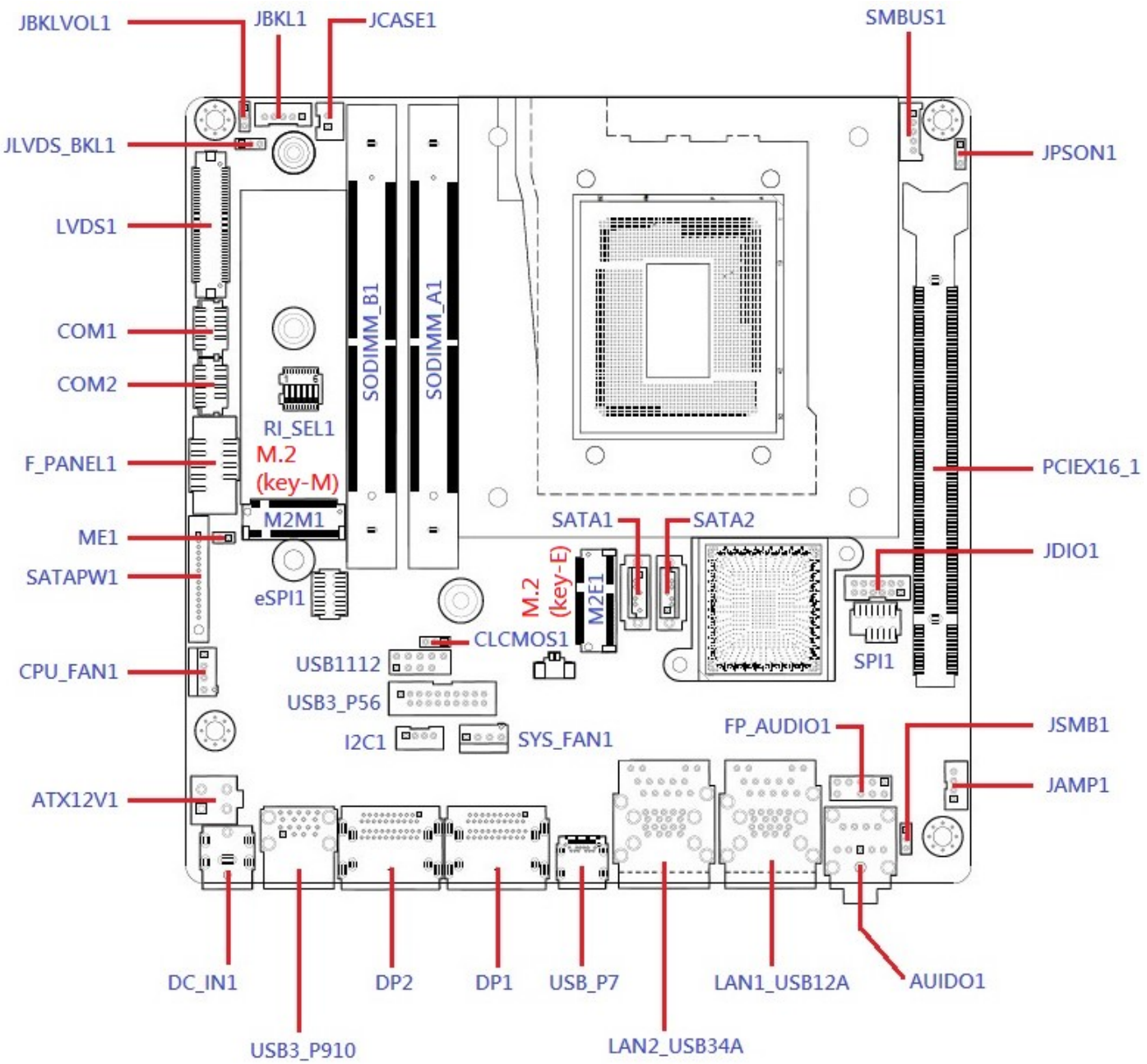
Place the screws into the mounting holes indicated by red squares to secure the mainboard to the chassis.

Do not overtighten the screws! This may damage the mainboard.

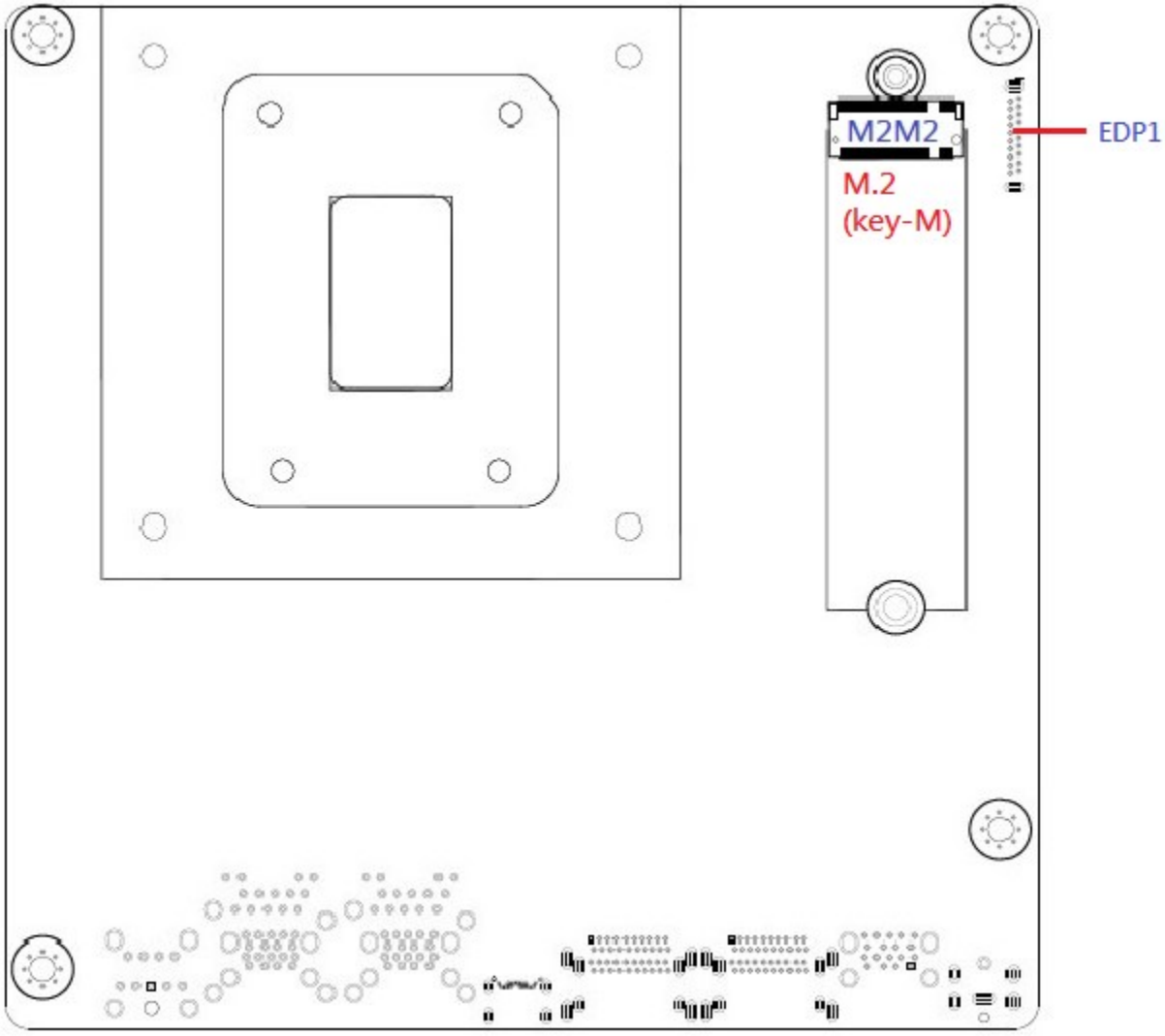


1.4.2 Mainboard Layout

(Top View)



(Bottom View)



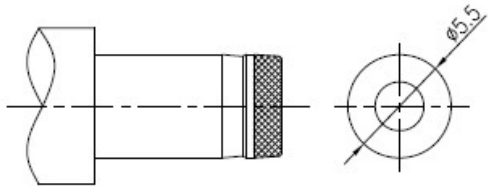
1.4.3 Layout Content List

• 1.4.3.1 Slots			
Label	**Function**	**Note**	**Page**
SODIMM_A1	262-pin DDR5 SODIMM slot 1	32MB maximum per slot	34
SODIMM_B1	262-pin DDR5 SODIMM slot 2	32MB maximum per slot	34
M2E1	M.2 Key-E Slot (2230)	Supports PCIe x1, USB2.0, CNVi	41
M2M1	M.2 Key-M Slot (2242/ 2280) (Top Side)	Supports PCIe x4, SATA	41
M2M2	M.2 Key-M Slot (2280) (Bottom side)	Supports PCIe x4, SATA	41
PCIEX16_1	PCIe x16 slot	Supports PCIe x16 (Gen 5)	53

• 1.4.3.2 Internal Jumpers			
Label	**Function**	**Note**	**Page**
CLCMOS1	Clear CMOS	1 x 3 header, pitch 2.00mm	51
JPSON1	ATX/AT Mode Select (ATX Mode (default) / AT Mode)	1 x 3 header, pitch 2.00mm	49
JBKLVOL1	LVDS Panel Voltage Selection	1 x 3 header, pitch 2.00mm	49
JLVDS_BKL1	LVDS Brightness Control Mode Selection	1 x 3 header, pitch 2.00mm	50

• 1.4.3.3 Dip Switch			
Label	**Function**	**Note**	**Page**
RI_SEL1	COM Mode Setting for COM1, COM2	Provides slection between 5V, 12V, or Ringin (default)	50

• 1.4.3.4 Internal Headers			
Label		**Note**	**Page**
ATX12V1	ATX 4-Pins Power Connector	2 x 2 Mini Fit 4.20mm Straight Type Power Header. (12V~24V, A PSU with 23A min (34A for CPU peak current) on its "12V2" rail (for connecting with this 2x2 connector) is recommended)	37
F_PANEL1	Front Panel Connector	2 x 5 Box Header, Pitch 2.54mm	40
CPU_FAN1	CPU Fan Connector	1 x 4 wafer, Pitch 2.54mm	42
SYS_FAN1	System Fan Connector	1 x 4 wafer, Pitch 2.54mm	42
COM1 COM2	Serial Port Connectors 1, 2	2 x 5 wafer header, Pitch 2.00mm	45
SATA1 SATA2	Serial ATA 3.0 Connectors 1, 2	7-pin header (Red)	43
USB3_P56	Front USB3.2 Header	2 x 10 box header, Pitch 2.00mm	45
USB1112	Front USB2.0 Header	2 x 5 box header, Pitch 2.54mm	44
LVDS1	LVDS Panel Connector	2 x 20 wafer header, Pitch 1.25mm	46
JBKL1	LVDS Panel Backlight Connector	1 x 5 wafer header, Pitch 2.00mm	46
FP_AUDIO1	Front Panel Audio Connector	2 x 5 header, pitch 2.54mm	43
JAMP1	Audio Amplifier Connector	1 x 4 wafer header, pitch 2.00mm	44
JDIO1	Digital IO (GPIO) Header	2 x 6 wafer header, pitch 2.00mm	47
SMBUS1	SMBus Header	1 x 5 wafer header, 2.00mm	47
I2C1	I2C Connector	1 x 4 wafer header, 2.00mm	48
JCASE1	Chassis Intrusion Connector	1 x 2 wafer header, 2.54mm	48

• 1.4.3.5 Back Panel Connectors (Rear I/O)			
Label	**Function**	**Note**	**Page**
DC_IN1	DC-in Connector	This connector is for AC Adapter DC_IN connection (12V~24V, 19V recommended, 8A max) DC Mate Plug: DIA. 5.5mm (Outer) x 2.5mm (Inner). 	38
USB3_P910 (Red)	USB 3.2 Connectors (Dual-Stacked, Type A)	These two USB ports are available for connecting USB 3.2 devices.	38
DP2	Display Port (Dual-Stacked)	Two Display Port Connectors. DP++ (1.4a) supported.	38
DP1	Display Port (Dual-Stacked)	Two Display Port Connectors. DP++ (1.4a) supported.	38
USB_P7	USB 3.2 Connector (Type C)	This USB port is available for connecting USB 3.2 Type C devices.	38
USB34A (Red)	USB 3.2 Connectors (Dual-Stacked, Type A)	These two USB ports are available for connecting USB 3.2 devices.	38
USB12A (Red)	USB 3.2 Connectors (Dual-Stacked, Type A)	These two USB ports are available for connecting USB 3.2 devices.	38
LAN2 (Intel i225-LM)	2.5G LAN Connector	This port allows 2.5G connection to a Local Area Network (LAN) through a network hub.	39
LAN1 (Intel i225-LM)	2.5G LAN Connector	This port allows 2.5G connection to a Local Area Network (LAN) through a network hub.	39
AUDIO (Pink) (MIC-IN)	Microphone Port	This port connects a microphone.	39
AUDIO (Green) (Line-Out)	Line-Out Port	This port connects a headphone or speaker.	39

1.5 Central Processing Unit (CPU)

This mainboard supports the Intel® LGA1700 socket Alder Lake S (12th Generation), Raptor Lake-S (13th Generation), Raptor Lake-Refresh (14th Generation); (BCM P/N# 71876 ONLY) Core™ i9, Core i7, Core i5, Core i3, Pentium, Celeron processor (up to 65W TDP max).

- Your boxed Intel® LGA1700 processor package should come with installation instructions for the CPU, fan, heatsink, and the retention assembly.
- Upon purchase of the mainboard, make sure that the PnP cap is on the socket and the socket pins are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket pins/mainboard components. BCM will shoulder the cost of repair only, if the damage is shipment/ transit-related.
- Keep the PnP cap after installing the mainboard. BCM will process Return Merchandise Authorization (RMA) requests only if the mainboard comes with the cap installed on the LGA1700 socket.
- The product warranty does not cover damage to the socket pins resulting from incorrect CPU installation/ removal, or misplacement/ loss/ incorrect removal of the PnP cap.

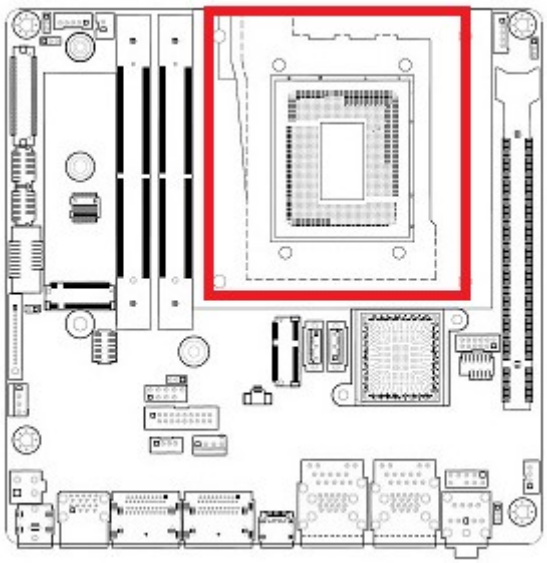
NOTES:

1. **Overheating: Overheating will seriously damage the CPU and mainboard. Always make sure the cooling fan can work properly to protect the CPU from overheating.**
2. **If you purchased a separate CPU heatsink and fan assembly. Make sure that you applied an even layer of thermal paste between the CPU and the heatsink to enhance heat dissipation.**
3. **Replacing the CPU: While replacing the CPU, always turn off the ATX power suppply or unplug the power supply's power cord from the grounded outlet first in order to prevent damage to the system.**
4. **If you changed with different model of CPU with this mainboard, it is recommended to clear the CMOS with the board, in order to prevent CPU information stored in NVRAM not getting cleared properly.**

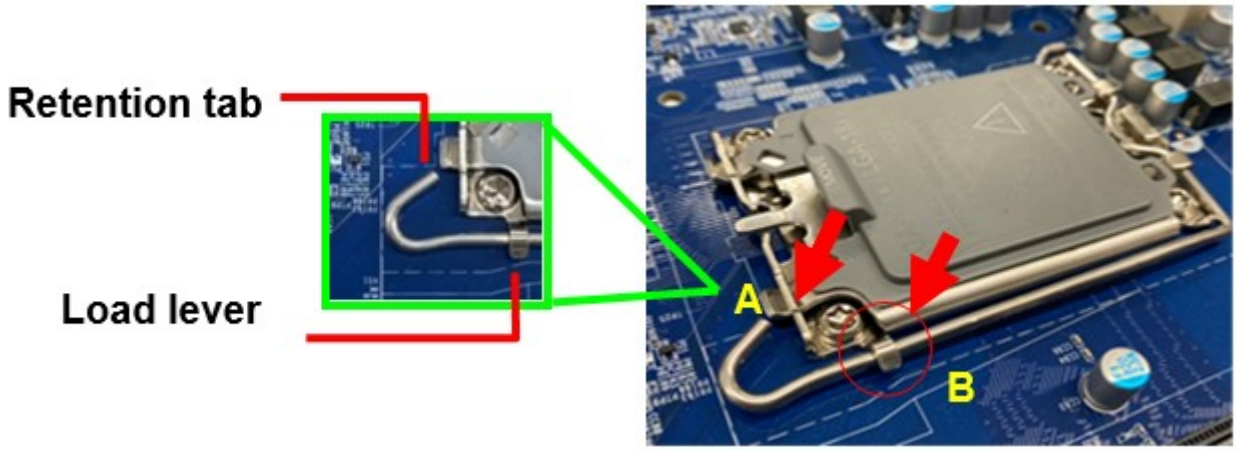
1.5.1 Installing the CPU

The CPU installation related information.

1. Locate the CPU socket (LGA1700 Socket) on the mainboard.



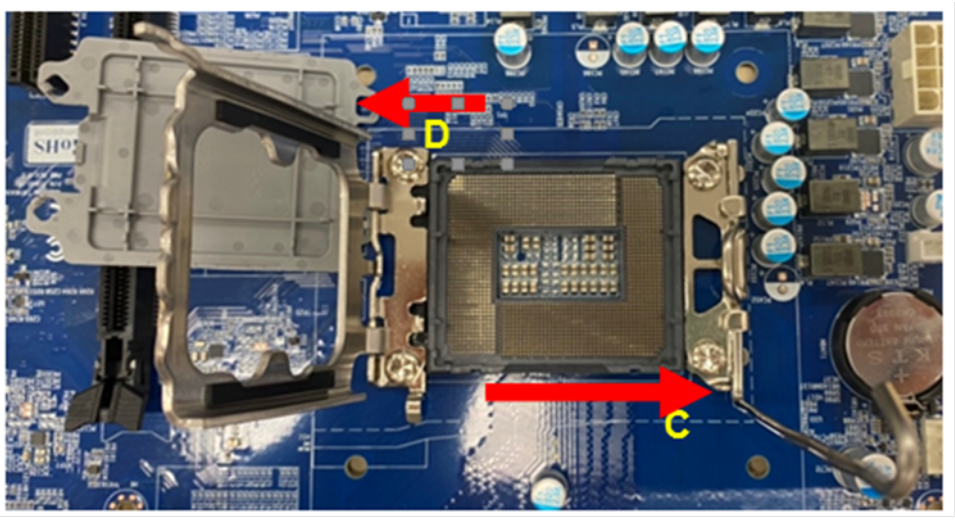
2. Press the load lever with your thumb at location (A), then move it toward right side (B) until it is released from the retention tab.



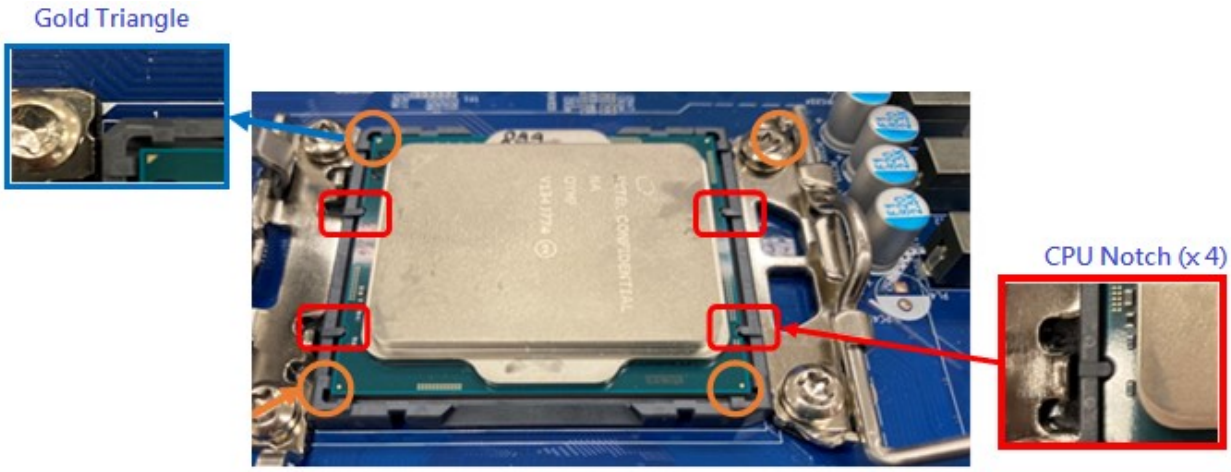
NOTE:

To prevent damage to the socket pins, do not remove the "CPU Socket Cover", unless you are going to install a CPU.

3. Lift the load lever with your thumb and forefinger to around 120º angle (C), then pull the CPU Socket Cover (D) from the CPU socket.



4. Position the CPU over the socket, make sure that the gold triangle is on the top-left corner of the socket Then fit the socket alignment key with CPU notch.



NOTE:

Do not discard this plastic "CPU socket cover". Just in case if you need to RMA this board in the future, you need to install this plastic protection cap in order to protect the CPU socket.

5. Pull back the load lever down, then push the load lever (E) until it snaps into the retention tab.

NOTE:

The CPU fits in correct orientation only. DO NOT force the CPU into the socket to prevent bending the pins on the CPU socket and damaging the CPU and/or socket.

1.5.2 Installing the CPU Heatsink and Fan

The Intel LGA1700 processor requires a specially designed CPU heatsink and fan assembly to ensure optimum thermal condition and performance.

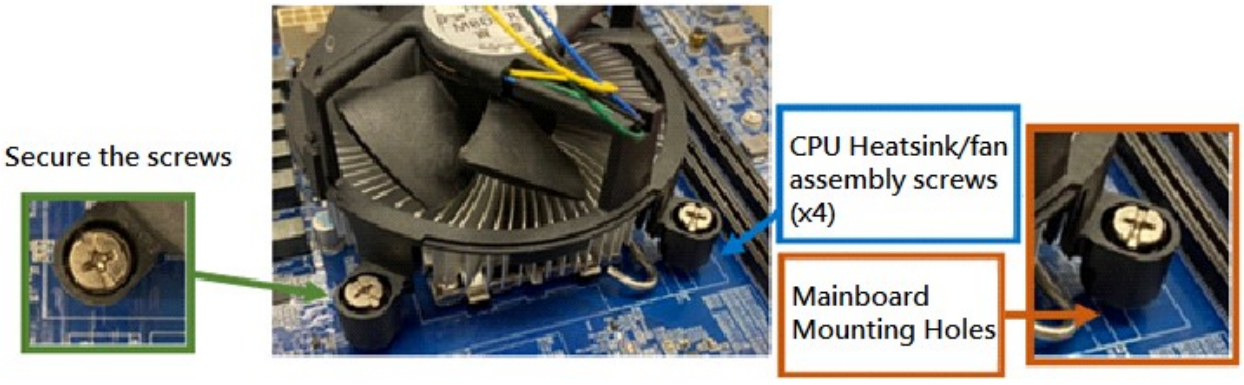
- When you purchase a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.
- If you purchased a separate CPU heatsink and fan assembly, make sure that:

  a. The CPU heatsink and fan assembly is designed to withstand the "TDP" (Thermal Dissipation Power) specified by Intel specification of corresponding CPU that you are going to install.

  b. You have properly applied an even layer of "Thermal Interface Material" (thermal compound) to between the CPU heatsink and the top of CPU before you install the heatsink and fan assembly (please check with your CPU fan/heatsink vendor for details).

1.5.3 To Install the CPU Heatsink and Fan

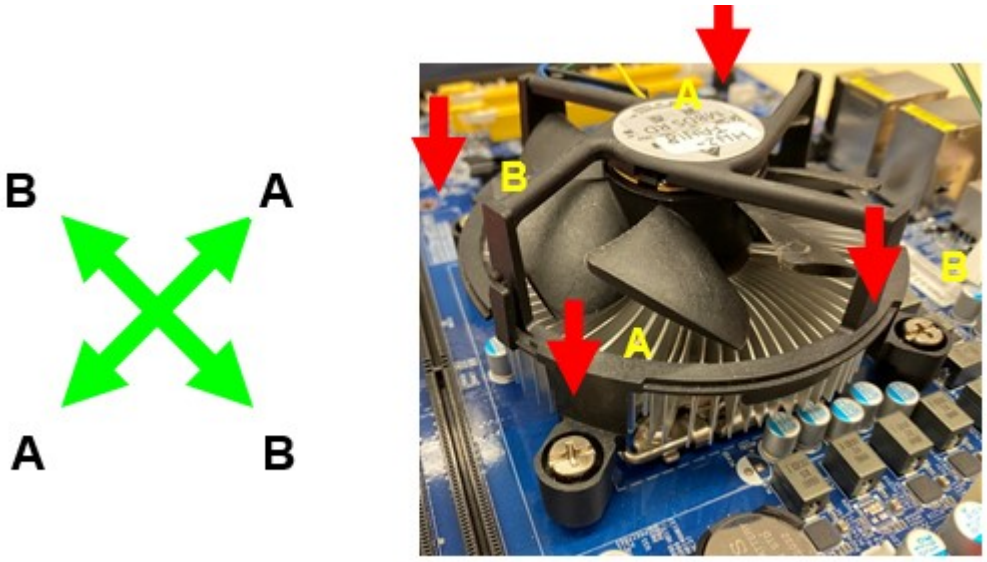
1. Place the CPU heatsink on top of the installed CPU and heatsink mounting plate (if needed). Make sure that the four fasteners or screws match the mounting holes around the CPU socket.



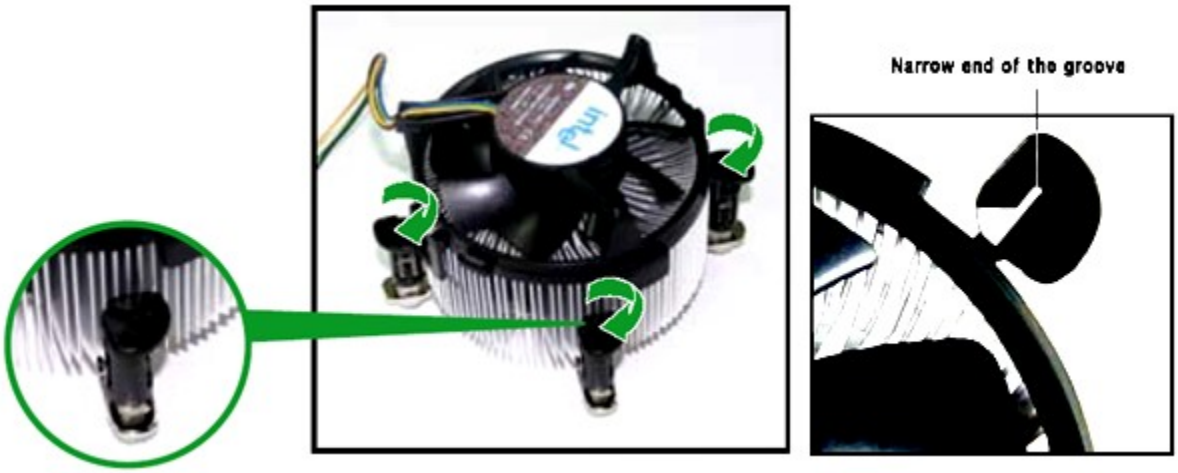
NOTE:

Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector ("CPU_FAN1").

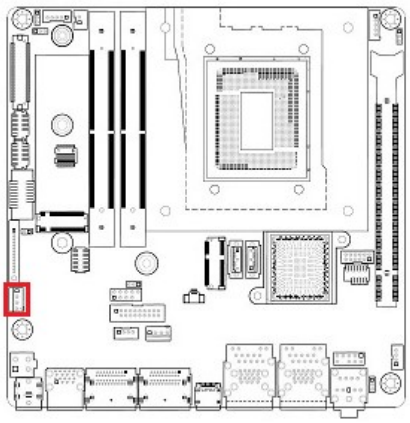
2A. **If the heatsink/fan assembly is installed through 4 screws**, install two screws at a time in a diagonal sequence to secure the heatsink and fan assembly in place.

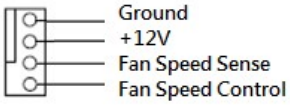


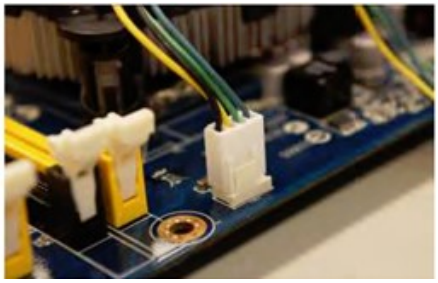
2B. **If the heatsink/fan assembly is installed through fasteners**, push down two fasteners at a time in a diagonal sequence into the 4 mounting holes around the CPU socket, then rotate each fastener clockwise to secure it with the mainboard.



3. Connect the CPU fan cable to the CPU fan connector on the mainboard labeled "CPU_FAN1".







NOTE:

1. **Do not forget to connect the CPU fan connector. Insufficient air flow inside the system chassis may damage the mainboard components. Hardware monitoring errors can occur if you fail to plug in this connector.**
2. **Do not install any jumper connector on the header "CPU_FAN", doing so may damage the mainboard.**

1.5.4 Uninstalling the CPU Heatsink and Fan

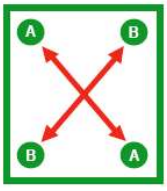
To uninstall the CPU heatsink and fan:

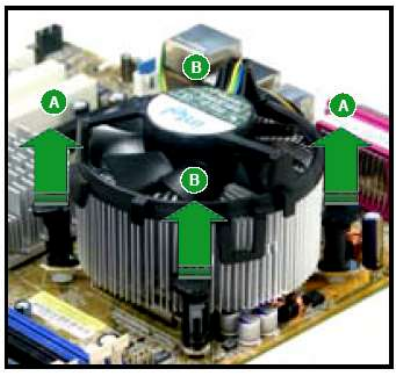
1. Disconnect the CPU fan cable from the CPU fan connector ("CPU_FAN1") on the mainboard.

2A. **If the heatsink/fan assembly is secured through 4 screws**, loosen the screws. And then remove the hestsink/fan and its mounting plate from the mainboard.

2B. **If the heatsink/fan assembly is secured through the fasteners**, rotate each fastener counterclockwise.

And then pull up two fasteners at a time in a diagonal sequence to disengage the heatsink/fan assembly from the mainboard.





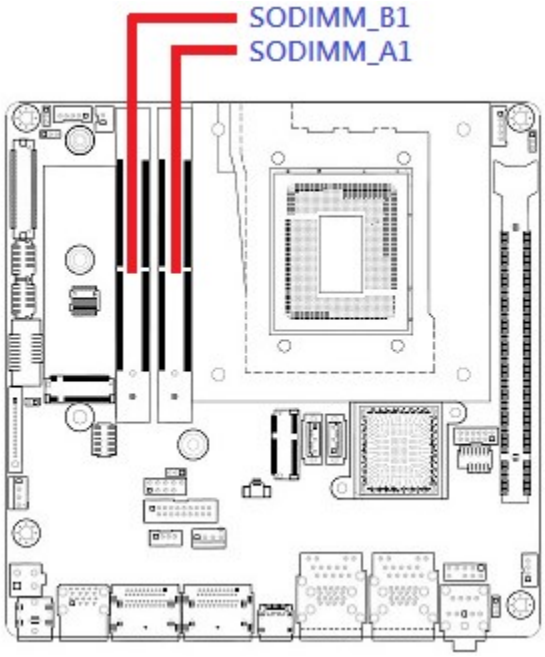
1.6 System Memory

1.6.1 Overview

The mainboard comes with two 262-pin Double Data Rate 5 (DDR5) Dual Inline Memory Modules (SODIMM) sockets.

DDR5 memory brings several key performance and power gains to the table, as well as new design challenges. From the JEDEC JESD79-5 DDR5 standard. DDR5 specification has significant improvement in capacity, speed, and voltage. Structure-wise, the power management IC (PMIC) is moved onto the DIMM, reducing redundant power management circuitry on the mainboard for unused DIMM slots in previous generations.

The following figure illustrates the location of the sockets:



1.6.2 Memory Configurations

The MX680RD board supports 1.1V, Non-ECC or ECC, 262-pins DDR5-4800 SODIMM up to 64GB (32GB maximum/ slot).

NOTE:

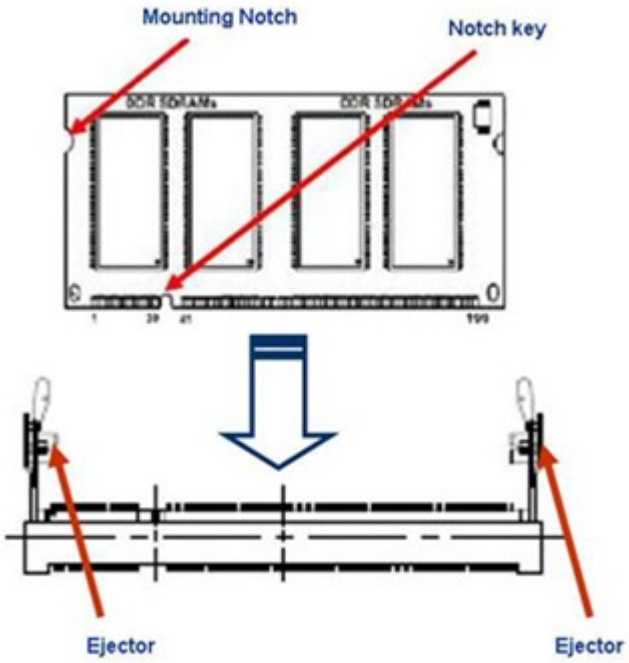
1. **When two SODIMMs are being populated, only install identical (same type, same size, same CAS latency) DDR5 SODIMMs.**
2. **For optimum compatibility, it is recommended to obtain the exact same model (and same batch) of memory modules from the same SODIMM manufacturer.**

1.6.3 Installing the DDR5 SODIMM

NOTE:

Make sure to unplug the power connection before installing or removing SODIMMs, or other peripherals from the system. Failure to do so may cause severe damage to both the mainboard and the peripherals.

1. Locate the SODIMM sockets onboard.
2. Hold two edges of the SODIMM module carefully and keep away from touching its connectors
3. Align the notch key on the SODIMM module with the rib on the slot.
4. Firmly press the SODIMM module into the socket which will be snapped into the mounting notch automatically. Do not force the SODIMM module in with extra force as the SODIMM module can only fits in one direction.



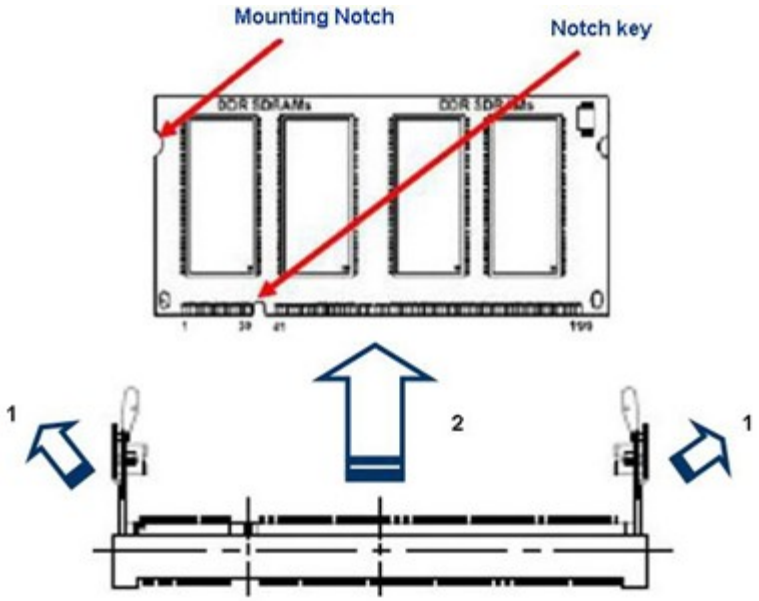
NOTE:

1. **DDR5 memory module is keyed with a notch so that it fits in only one direction.**
2. **DO NOT force the memory module into the socket in order to avoid damaging the memory module and the socket.**
3. **DDR5 memory modules are not interchangeable with DDR/ DDR2/ DDR3/ DDR4. Do not install DDR, DDR2, DDR3, or DDR4 SODIMMs to the DDR5 SODIMM sockets.**

1.6.4 Uninstalling the DDR5 SODIMM

Follow these steps to remove SODIMM.

1. Press the two ejector tables on the socket outward simultaneously.
2. Pull out the SODIMM module from the socket.



NOTE:

Hold the SODIMM module gently when pressing the ejector tabs. The SODIMM might get damaged when it flips out with extra force.

1

1.7 Power Supply

1.7.1 ATX Power Connector: ATX_12V

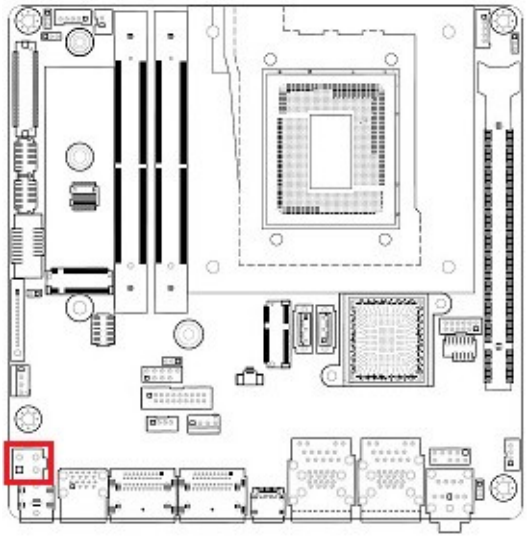
The connector is for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

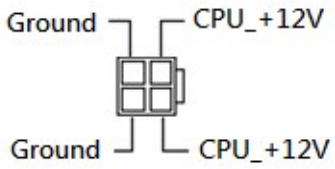
The MX680RD board can be power on EITHER through:

A. Use 4-pin ATX power connector of an industrial type ATX power supply (PSU) and connect it with this "ATX_12V" header. It is recommended that you use an industrial type ATX power supply unit (PSU) that complies with ATX 12V specification 2.0 (or later version) (12V~24V, A PSU with 23A min (34A for CPU peak current) on its "12V2" rail (for connecting with this 2x2 connector) is recommended).

or

B. Use an AC power adapter and connect it to "DC_IN" connector on the rear I/O of MX680RD board ("DC_IN" header accepts 12V~24V wide range. A 19V AC adapter is recommended, Max. Current Limit: 8A).

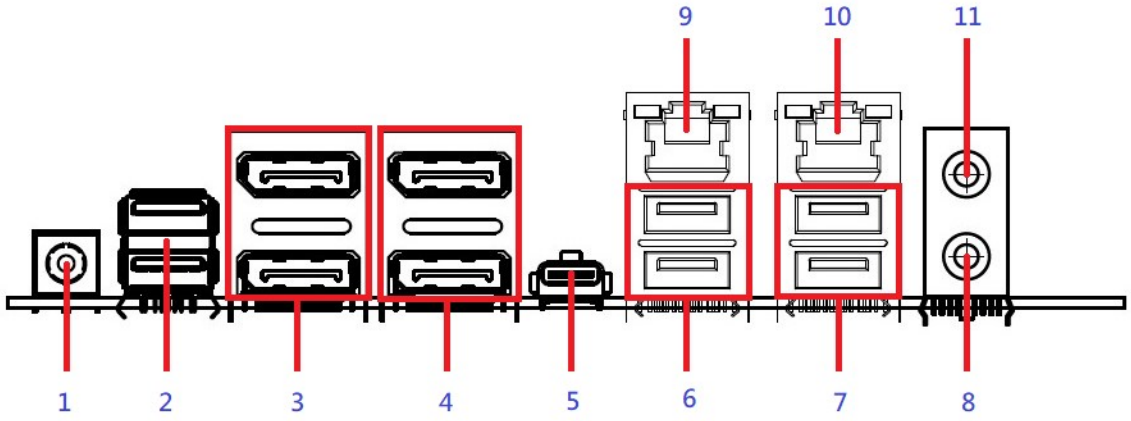


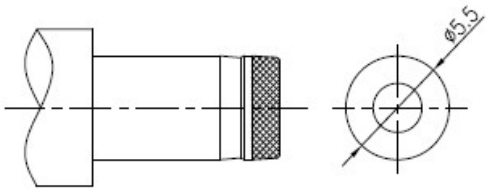


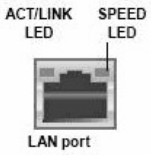
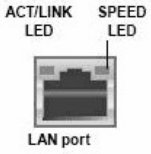
Use a PSU with adequate power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot if the power supply wattage is inadequate.

1.8 Back Panel (Rear I/O Ports)

1.8.1 Back Panel Connectors



Item	Name	Function	Description
1	DC_IN	DC-in connector	The connector is for DC_in (12V~24V) (19V recommended/ 8A max) DC Mate Plug: DIA. 5.5mm (Outer) x 2.5mm (Inner). 
2	USB3_P910 (Red)	USB 3.2 Connectors (Dual-Stacked, Type A)	These two Universal Serial Bus (USB) ports are available for connecting USB 3.2 devices.
3	DP2	Display Port (Dual-Stacked)	Two Display Port Connectors (DP++, 1.4a supported)
4	DP1	Display Port (Dual-Stacked)	Two Display Port Connectors (DP++, 1.4a supported)
5	USB_P7	USB 3.2 Connector (Type C)	This Universal Serial Bus (USB) port is available for connecting USB 3.2 Type C devices.
6	USB34A (Red)	USB 3.2 Connectors (Dual-Stacked, Type A)	These two Universal Serial Bus (USB) ports are available for connecting USB 3.2 devices.
7	USB12A (Red)	USB 3.2 Connectors (Dual-Stacked, Type A)	These two Universal Serial Bus (USB) ports are availa ble for connecting USB 3.2 devices.

<table>
<tr>
<td>9</td>
<td>LAN2</td>
<td>2.5G LAN
(RJ-45) Connectors
 
</td>
<td>This port allows 2.5G connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
<table>
<tr><th colspan="2">ACT/Link LED</th><th colspan="2">Speed LED</th></tr>
<tr><th>Status</th><th>Description</th><th>Status</th><th>Description</th></tr>
<tr><td>OFF</td><td>No link</td><td>OFF</td><td>10/100Mbps connection</td></tr>
<tr><td>Orange</td><td>Linked</td><td>Green</td><td>1Gbps connection</td></tr>
<tr><td>Blinking</td><td>Data activity</td><td>Orange</td><td>2.5Gbps connection</td></tr>
</table></td>
</tr>
<tr>
<td>10</td>
<td>LAN1</td>
<td>2.5G LAN
(RJ-45) Connectors
 
</td>
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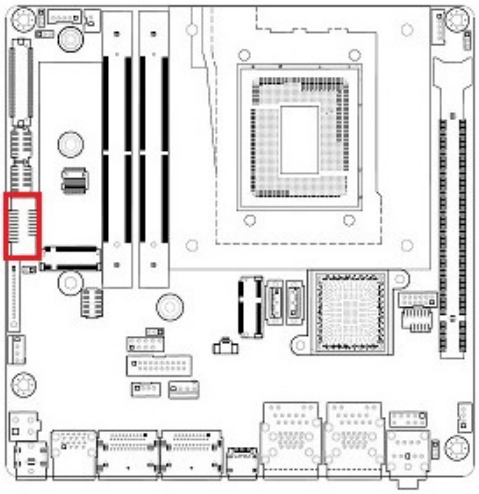
<table>
<tr><th colspan="2">ACT/Link LED</th><th colspan="2">Speed LED</th></tr>
<tr><th>Status</th><th>Description</th><th>Status</th><th>Description</th></tr>
<tr><td>OFF</td><td>No link</td><td>OFF</td><td>10/100Mbps connection</td></tr>
<tr><td>Orange</td><td>Linked</td><td>Green</td><td>1Gbps connection</td></tr>
<tr><td>Blinking</td><td>Data activity</td><td>Orange</td><td>2.5Gbps connection</td></tr>
</table></td>
</tr>
<tr>
<td>8</td>
<td>AUDIO
(Pink)</td>
<td>Microphone port</td>
<td>This port connects a microphone.</td>
</tr>
<tr>
<td>11</td>
<td>AUDIO
(Green)</td>
<td>Line-out port</td>
<td>This port connects a headphone or a speaker.</td>
</tr>
</table>

1.9 Connectors/ Headers

1.9.1 Front Panel Connector: F_PANEL1

These connectors are for electrical connections to the front panel switches and LEDs. The "F_PANEL" connector is compliant with Intel® Front Panel I/O Connectivity Design Guide.



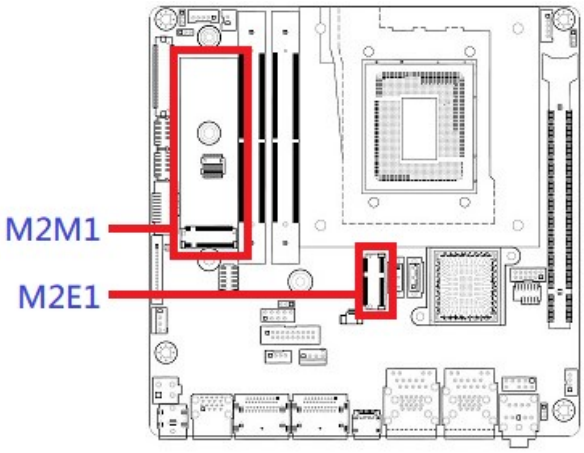
1. HDD LED+	2. Power LED+
3. HDD LED-	4. Power LED-
5. Ground	6. Power Button#
7. Reset#	8. Ground
9. NC	

- **Power Button/Soft-off Button (Pin 6-8)**
  This 2-pin connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch and holding it for more than four seconds while the system is ON turns the system OFF.
- **Reset Button (Pin 5-7)**
  This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.
- **Power LED (Pin 2-4)**
  This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.
- **HDD LED (Pin 1-3)**
  This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD LED lights up or flashes when data is read from or written to the HDD.

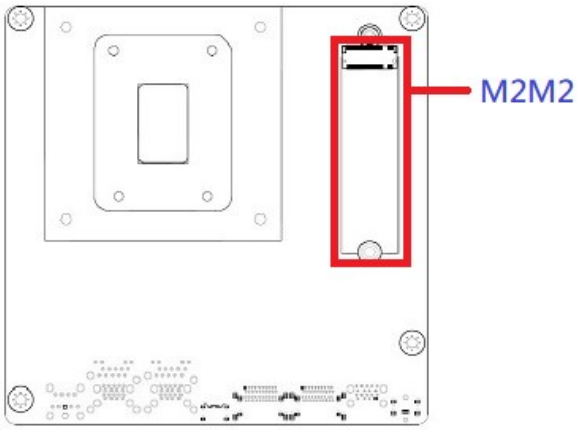
1.9.2 M.2 Connectors: M2M1, M2E1, M2M2

The M.2 connectors provide different supports for PCIe, SATA III, and USB interfaces.

Top Side:



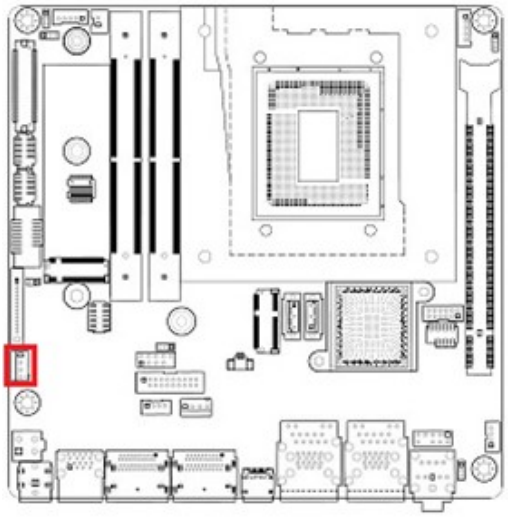
Bottom Side:

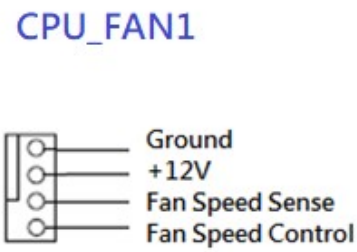


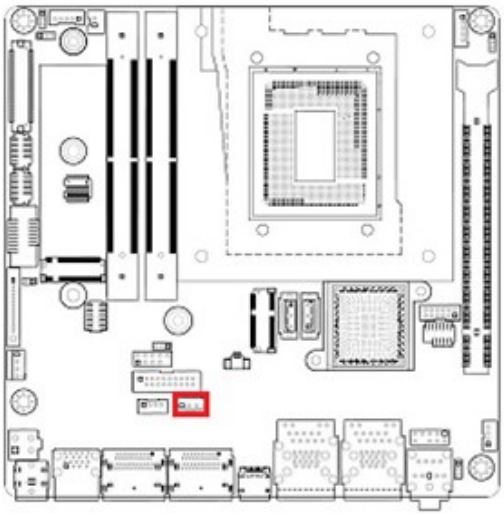
Item	Description	Note
M2E1	M.2 Key-E Slot (2230)	Supports PCIe x1, USB2.0, CNVi
M2M1	M.2 Key-M Slot (2242/ 2280) (Top Side)	Supports PCIe x4, SATA3.0
M2M2	M.2 Key-M Slot (2280) (Bottom side)	Supports PCIe x4, SATA3.0

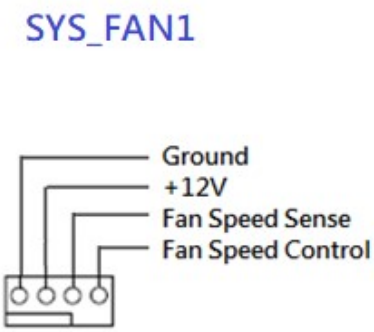
1.9.3 CPU & System Fan Connectors: CPU_FAN1, SYS_FAN1

The fan power connectors support system cooling fan with +12V. When connecting the wire to these fan connectors, please note that the red wire is designated as "Power" and should be connected to "+12V" pin; the black wire is designated as "Ground" and connected to "Ground". In order to take advantage of System Hardware Monitor and Smartfan feature, be sure to use the fan which is specifically designed with speed sensor.







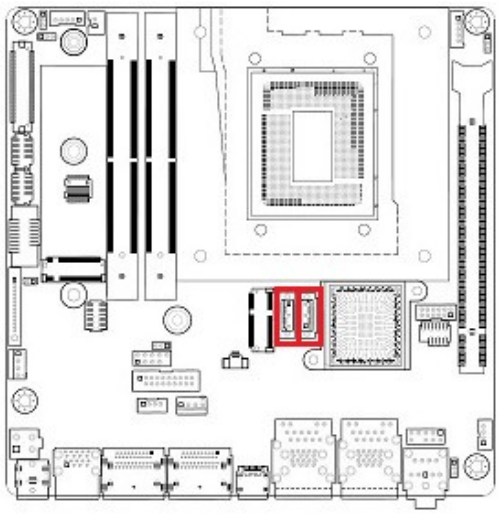


NOTE:

Please refer to the recommended CPU fans at processor's official website or consult with the fan vendor for proper CPU cooling fan.

1.9.4 Serial ATA 3.0 Connectors: SATA1, SATA2

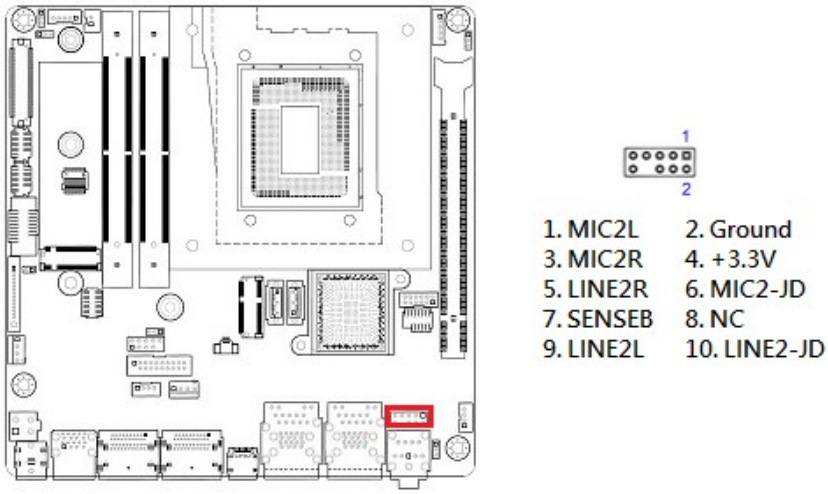
SATA ports "SATA1", "SATA2" support SATA3.0 standard.



Do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during data transmission.

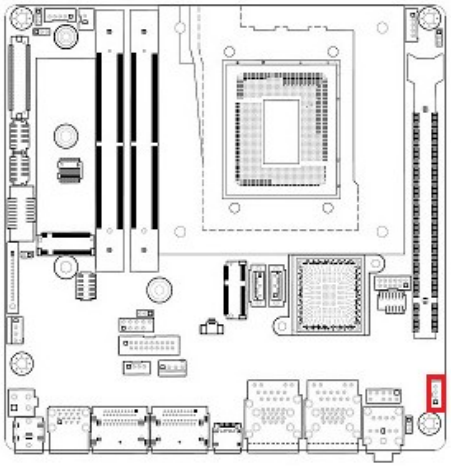
1.9.5 Front Panel Audio Connector: FP_AUDIO1

This connector is prepared for a chassis-mounted front panel audio I/O module that supports HD Audio standard. Connect one end of the front panel audio I/O module cable to this connector. "F_AUDIO" volume can be adjusted through OS volume control.



1.9.6 Audio Amplifier Connector: JAMP1

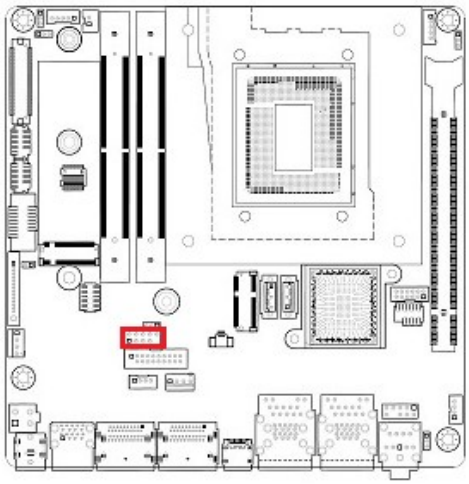
This header provides amplified audio signals to external speakers (2-channels). The BIOS option "Amplifier GAIN (dB)" supports its volume control.

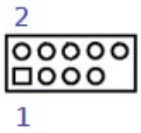


4. AMP_R+
3. AMP_R-
2. AMP_L+
1. AMP_L-

1.9.7 Front USB2.0 Header: USB1112

This header provides two USB2.0 connections (An USB2.0 cable is required).



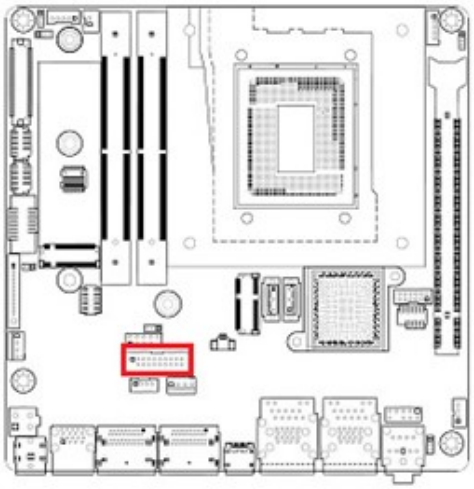


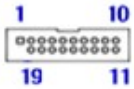
1. USB+5V	2. USB+5V
3. USB-	4. USB-
5. USB+	6. USB+
7. Ground	8. Ground
	9. NC

Be sure the pins of USB+5V and GND signals on USB2.0 cable are connected to the corresponding USB2.0 headers correctly. Otherwise, it may cause damage to the USB port and/or the connected USB device.

1.9.8 Front USB3.2 Header: USB3_P56

This header provides two USB3.2 Gen 1 port connections (An USB3.2 cable is required).





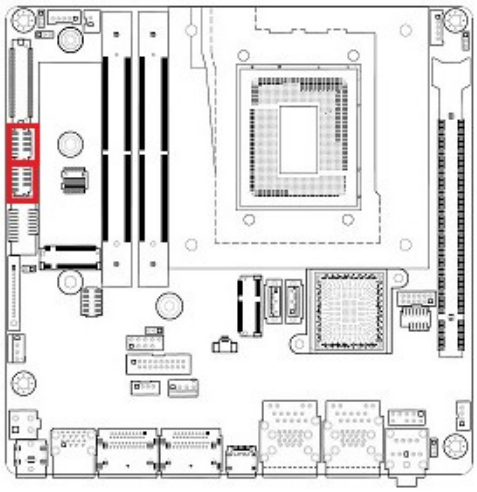
1. +5V	
2. USB3_RX-	19. +5V
3. USB3_RX+	18. USB3_RX-
4. Ground	17. USB3_RX+
5. USB3_TX-	16. Ground
6. USB3_TX+	15. USB3_TX-
7. Ground	14. USB3_TX+
8. USB-	13. Ground
9. USB+	12. USB-
10. NC	11. USB+

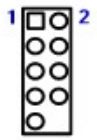
1.9.9 Serial Port Connectors: COM1, COM2

These headers provides serial connections with serial port COM.

COM1 supports RS232, RS422, RS485 protocols (selected through BIOS).

COM2 supports RS232 protocol.

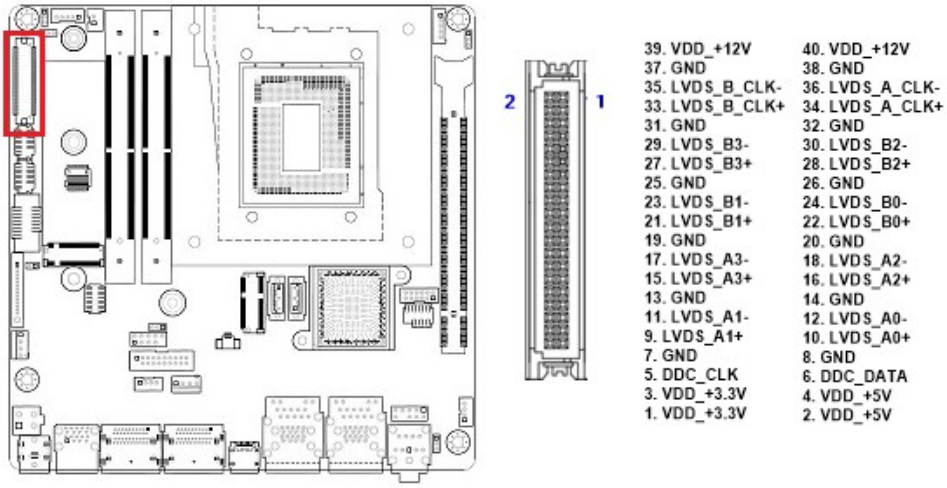




1. DCD#	2. RX
3. TX	4. DTR#
5. Ground	6. DSR#
7. RTS#	8. CTS#
9. RI#	

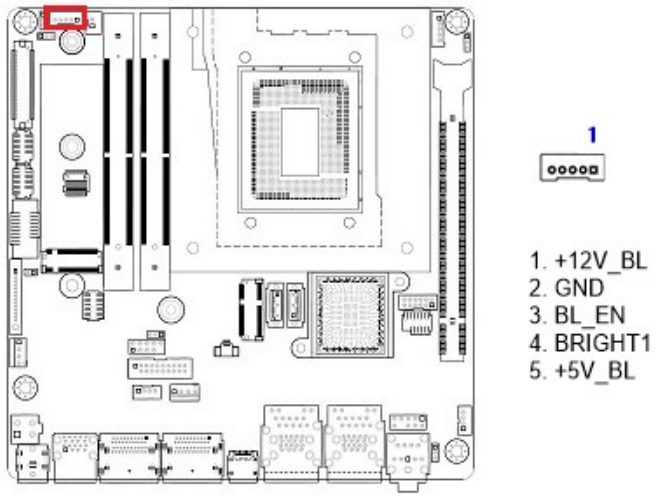
1.9.10 LVDS Header: LVDS1

This header provides connection to LVDS type panels.



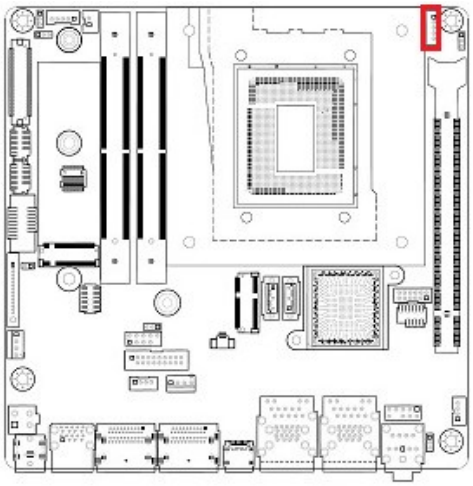
1.9.11 LVDS Panel Backlight Connector: JBKL1

This header provides connection for LVDS panel backlight control connections.



1.9.12 SMBUS Header: SMBUS1

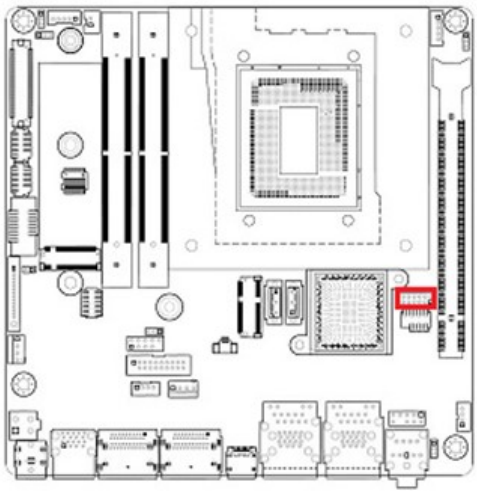
This header provides SMBUS signal connections.



1. SMB_CLK
2. SMB_DATA
3. SMB_ALT
4. Ground
5. +3.3V

1.9.13 Digital I/O (GPIO) Header: JDIO1

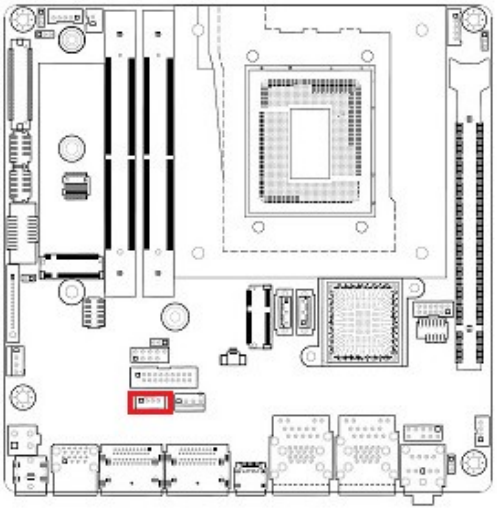
This header provides a 8-bits input or output for general purposes.



1. SIO_GPIO0	2. SIO_GPIO4
3. SIO_GPIO1	4. SIO_GPIO5
5. SIO_GPIO2	6. SIO_GPIO6
7. SIO_GPIO3	8. SIO_GPIO7
9. SMB_CLK_RESUME	10. SMB_DATA_RESUME
11. Ground	12. +5VSB

1.9.14 I2C Header: I2C1

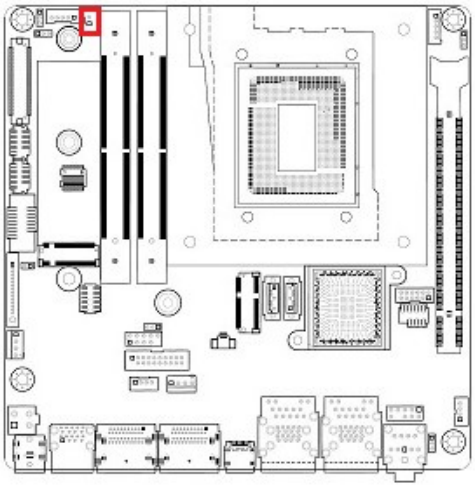
This header provides I2C signal connections.



1. +3.3V
2. I2C_SCL
3. I2C_SDA
4. Ground

1.9.15 Chassis Intrusion Header: JCASE1

This 2-pins header provides chassis intrusion warning connection.

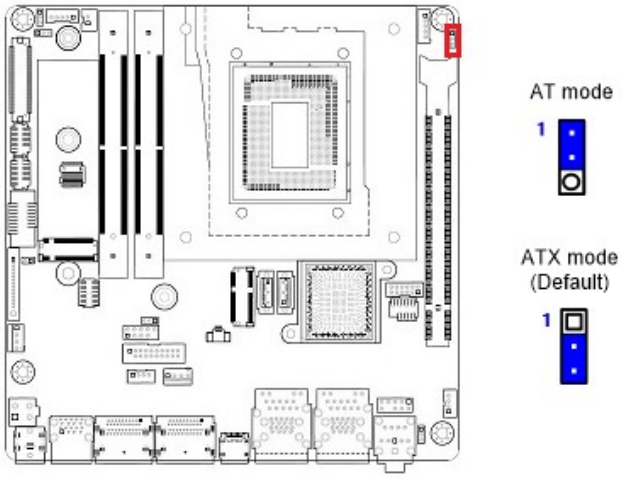


1. SIO_CASEOPEN#
2. Ground

1.10 Jumpers

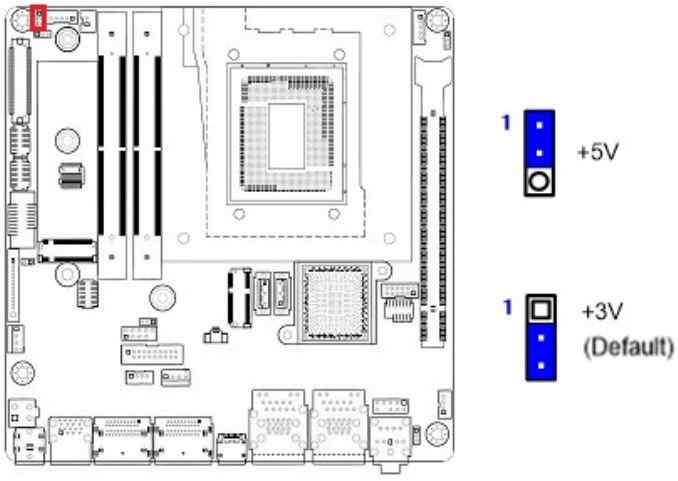
1.10.1 ATX/AT Mode Selection: JPSON1

This jumper provides the option to boot the system in the form of ATX mode (default) or AT mode. When the system is set in AT mode, the system power on/off will be controlled directly by the power switch on the power supply. And some of the power saving modes will not function as ATX mode provided.



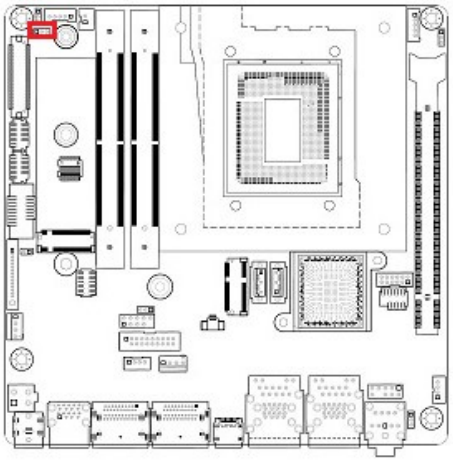
1.10.2 LVDS Backlight Power Select: JBKLVOL1

This header provides the options for selecting the LVDS backlight control power in "+3.3V" (default) or "+5V".



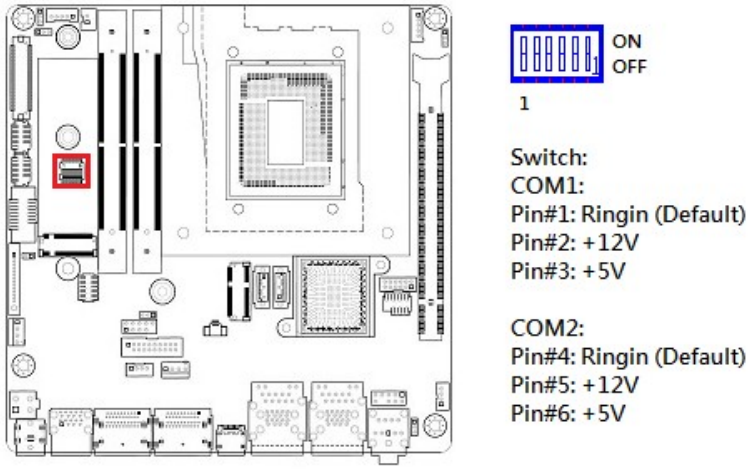
1.10.3 LVDS Brightness Control Mode Selection: JLVDS_BKL1

This jumper provides the selection for control mode of LVDS backlight.



1.10.4 COM Mode Setting for COM1, COM2: RI_SEL1

This dip switch provides COM Mode settings for COM1, COM2 between "+12V", "+5V", or "Ringin (default)".

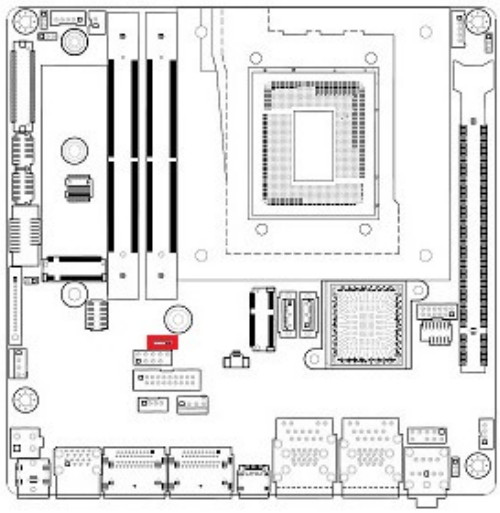


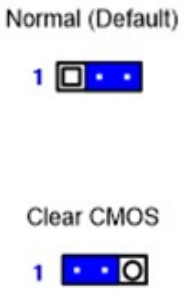
1.10.5 Clear CMOS Header: CLCMOS1

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information.

Here is the procedure for clear CMOS:

1. Turn off the system and unplug all power connections to MX680RD mainboard.
2. Disconnect the onboard battery from mainboard.
3. Relocate the jumper connector on "CLCMOS1" from pin 2-3 to pin 1-2 for at least 30 seconds. Then move the jumper connector back to pin 2-3.
4. Re-connect the onboard battery back to the mainboard.
5. Re-connect all power connections back to the mainboard.
6. Turn-on system, enter BIOS menu by pressing <DEL> key during system post.
7. Under BIOS menu, enter "Save & Exit" menu, load the option "Restore Defaults", and then load the option "Save Changes and Exit".





NOTE:

1. **Avoid clearing the CMOS while the system is ON; this may damage the mainboard.**
2. **Except when clear CMOS, never remove the jumper connector on "CLCMOS1" from its default position (pin 2-3). Removing the jumper connector may cause system boot failure.**

1.11 The Expansion Slots

In the future, you may need to install expansion cards. The following sub-sections describe the expansion slots and the expansion cards that they support.

NOTE:
Make sure to unplug the power cord before adding or removing expansion cards. Failing to do so may cause injury and damage mainrboard.

1.11.1 Installation of Expansion Card

To install an expansion Card:

1. Before install the expansion card, read the documentation that came with it and make the necessary hardware setting for the card.
2. Be sure there is no power connection to the system.
3. Remove the chassis cover (if the mainboard is installed in the chassis).
4. Remove the expansion slot bracket from the chassis on the slot that you intend to use. Keep the screw for later use.
5. Align the card connector with the slot and press it firmly until the card is completely seated on the slot.
6. Secure the card to the chassis with the screw that have been removed earlier (in step 4).
7. Place the chassis cover back on.

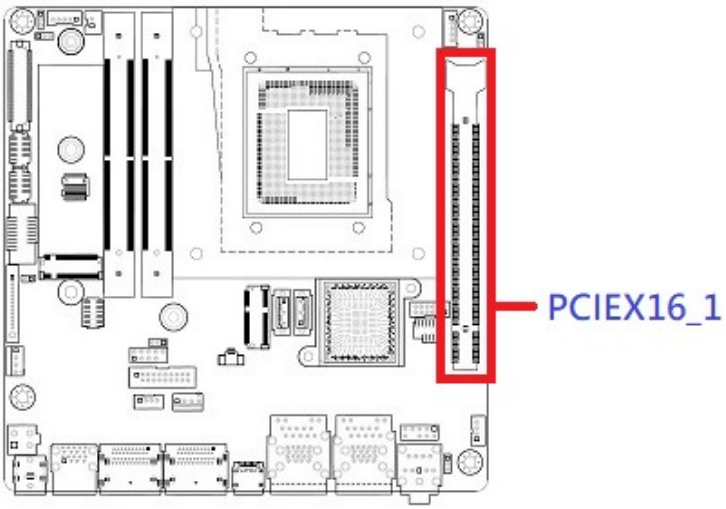
1.11.2 Setup an Expansion Card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the BIOS settings if necessary. See Chapter 2 for information on BIOS setup.
2. Assign an IRQ to the card if necessary.
3. Install the software drivers for the expansion card (provided by expansion card manufacturer).

1.11.3 PCIe x16 Slot: PCIEX16_1

The PCIe x16 slot supports PCIe x1, PCIe x4, PCIe x16 cards (e.g. PCIe LAN cards, or some of the PCIe x16 video cards).



Chapter 2: BIOS Setup

BIOS Update Related Procedure

1. After the BIOS is flashed, shut down the system.
2. Disconnect all power connections from power supply to the mainboard.
3. Clear the CMOS (For at least 30 seconds) (Check Section 1.10.5 for details).
4. Reconnect all power connections from power supply to the mainboard.
5. When the system is booting at first time after the new BIOS is flashed, it is recommended to enter the BIOS; load the option "Restore Defaults", and then "Save Changes and Exit".

IF ANY OF THE ABOVE STEPS IS NOT FOLLOWED, IT MAY CAUSE THE FLASHED BIOS NOT FUNCTION PROPERLY.

The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

2.1 BIOS Setup Program

This motherboard supports a programmable firmware chip that you can update using the provided utility. Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to "Run Setup." This section explains how to configure your system using this utility.

The firmware hub on the motherboard stores the BIOS Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter BIOS Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two methods mentioned above fail.

The BIOS Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the "Restore Defaults" from the BIOS menu screen.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

2.1.1 Legend Box

The keys in the legend bar allow you to navigate through the various setup menus

Key(s)	Function Description
→←	Select Screen
↑↓	Select Item
Enter	Select
+ -	Change Opt.
F1	General Help
F2	Previous Values
F3	Optimal Defaults
F4	Save and Exit
ESC	Exit

2.1.2 List Box

This box appears only in the opening screen. The box displays an initial list of configurable items in the menu you selected.

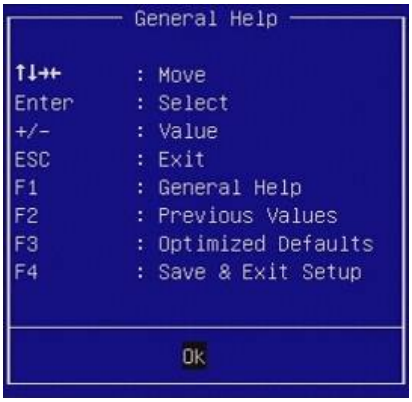
2.1.3 Sub-menu

Note that a right pointer symbol appears to the left of certain fields. This pointer indicates that you can display a sub-menu from this field. A sub-menu contains additional options for a field parameter. To display a sub-menu, move the highlight to the field and press <Enter>. The sub-menu appears. Use the legend keys to enter values and move from field to field within a sub-menu as you would within a menu. Use the <Esc> key to return to the main menu.

Take some time to familiarize yourself with the legend keys and their corresponding functions. Practice navigating through the various menus and submenus. If you accidentally make unwanted changes to any of the fields, press <F3> to load the optimal default values. While moving around through the Setup program, note that explanations appear in the Item Specific Help window located to the right of each menu. This window displays the help text for the currently highlighted field.

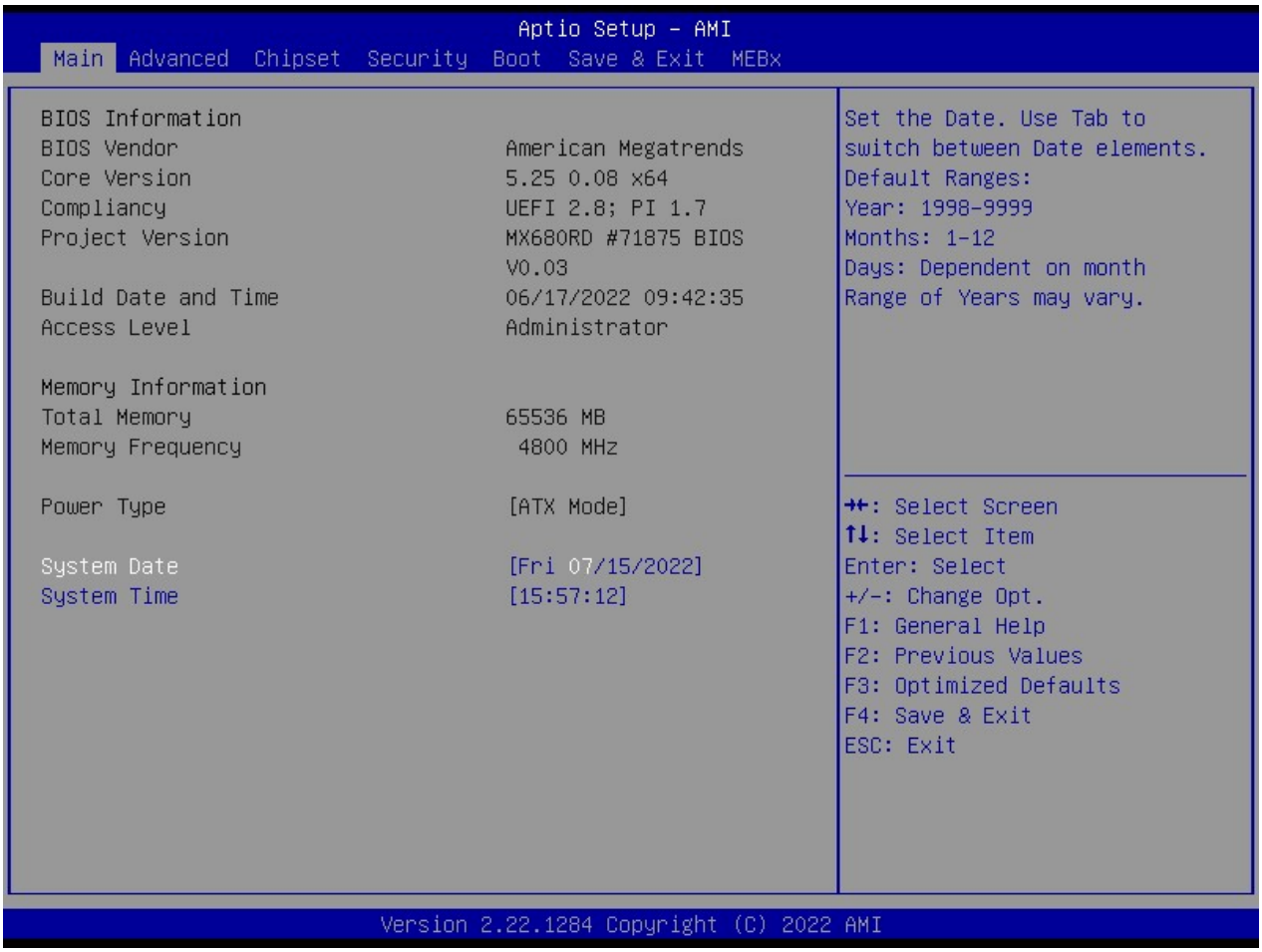
2.2 BIOS Menu Screen

When you enter the BIOS, the following screen appears. The BIOS menu screen displays the items that allow you to make changes to the system configuration. To access the menu items, press the up/down/right/left arrow key on the keyboard until the desired item is highlighted, then press [Enter] to open the specific menu.



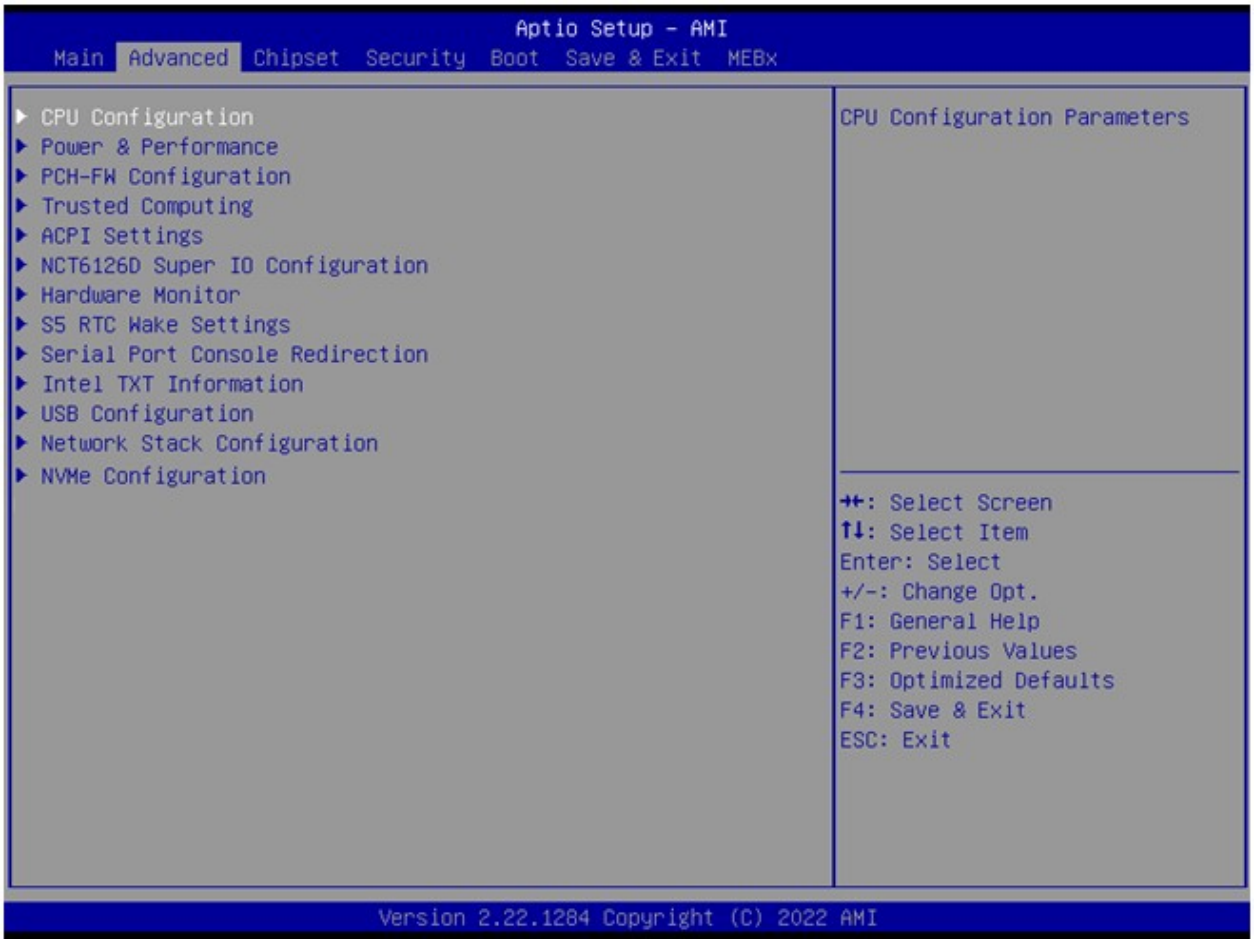
2.3 Main Menu

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu. Use this menu for basic system configurations, such as time, date etc.



2.4 Advanced BIOS Setup

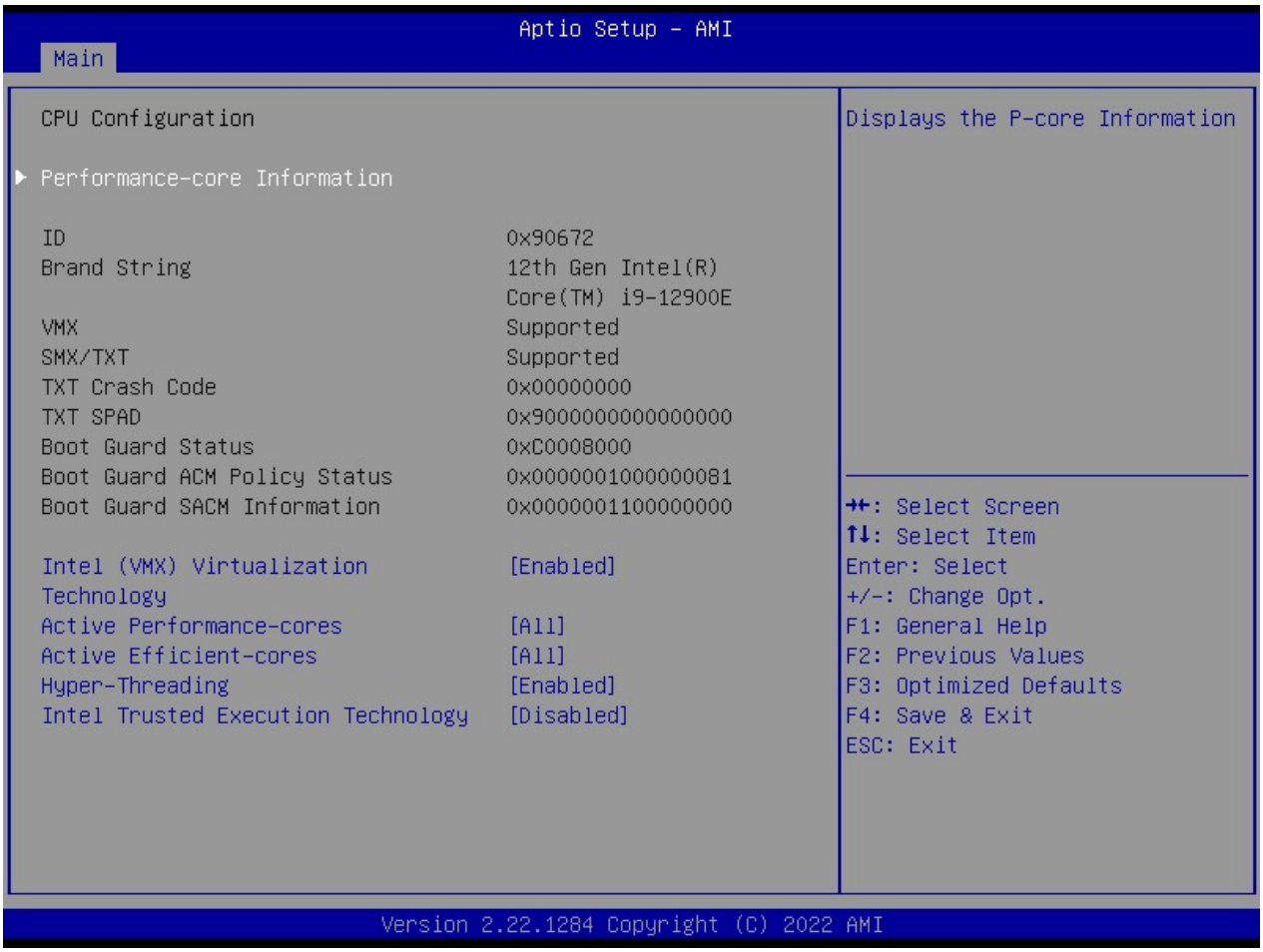
Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Chipset configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.



Take caution when changing the settings of Advanced menu items. Incorrect field settings may cause the system unstable.

2.4.1 CPU Configuration

Display CPU information and related setting



2.4.1.1 Intel (VMX) Virtualization [Enabled]

When enabled, a VMX can utilize the additional hardware compatibilities provided by Vanderpool Technology

Configuration options: [Enable] [Disable]

2.4.1.2 Active Performance-cores [All]

Number of P-core to enable in each processor package

2.4.1.3 Active Efficient-cores [Enable]

Number of E-core to enable in each processor package

2.4.1.4 Hyper-Threading [Enabled]

Enable or disable Hyper-Threading technology

Configuration options: [Enabled], [Disabled]

2.4.1.5 Intel Trusted Execution Technology [Disabled]

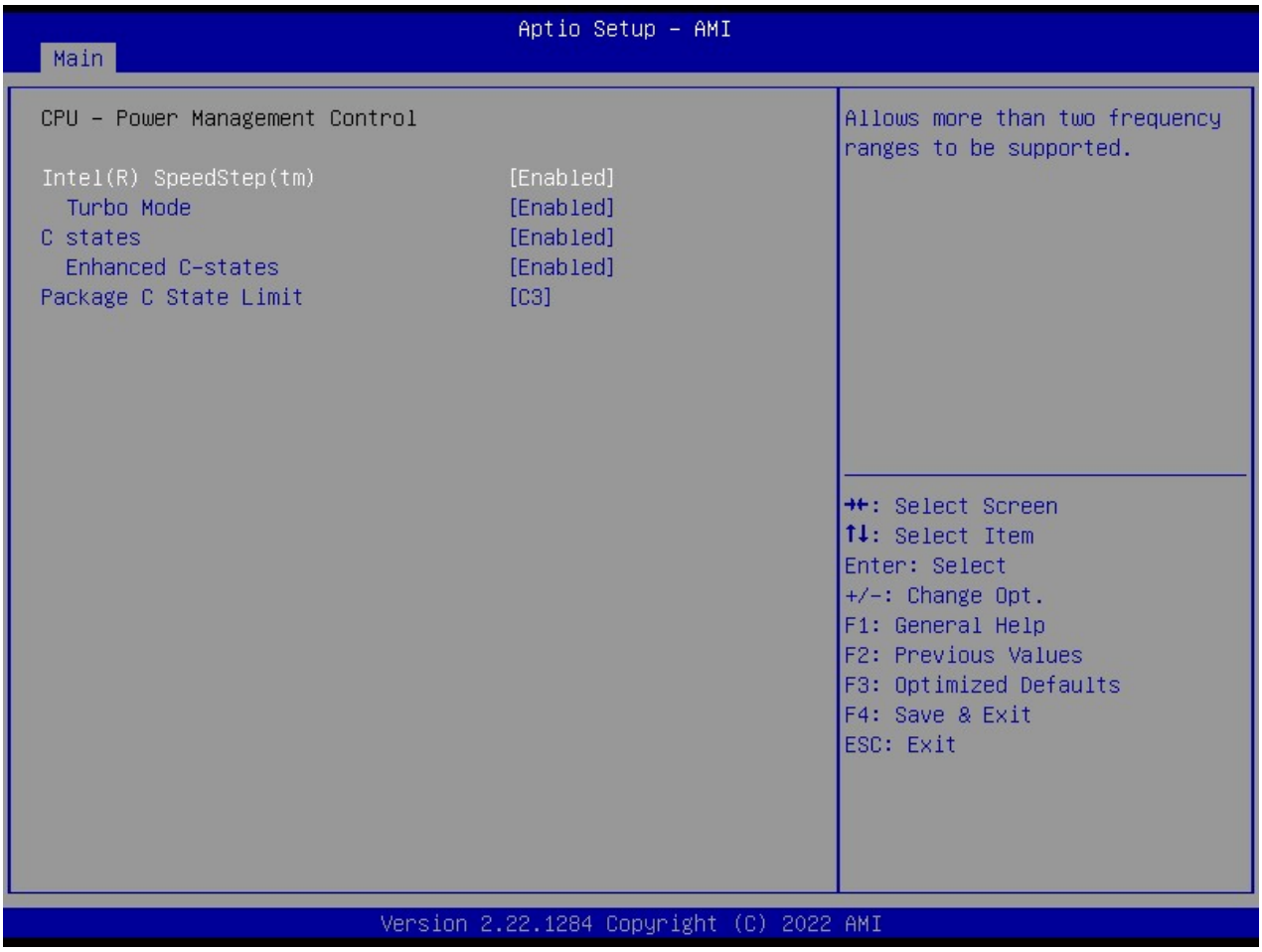
Enabled utilization of additional hardware capabilities provided by Intel Trusted execution technology

Configuration options: [Enabled], [Disabled]

Some of the features might not be displayed on this BIOS menu, depending on the specific CPU type that is being installed onboard.

2.4.2 Power & Performance

Power management control for CPU



2.4.2.1 Intel® Speedstep™ [Enable]

Allow more than two frequency range to be supported

Configuration options: [Enable], [Disable]

2.4.2.2 Turbo Mode [Enable]

Enable or Disable processor Turbo mode

Configuration options: [Enable], [Disable]

2.4.2.3 C states [Enable]

Enable/Disable CPU power management. Allows CPU to go to C states when it's not 100% utilized

Configuration options: [Enable], [Disable]

2.4.2.4 Enhance C states [Enable]

When enabled, CPU will switch to minimum speed when all cores enter C state

Configuration options: [Enable], [Disable]

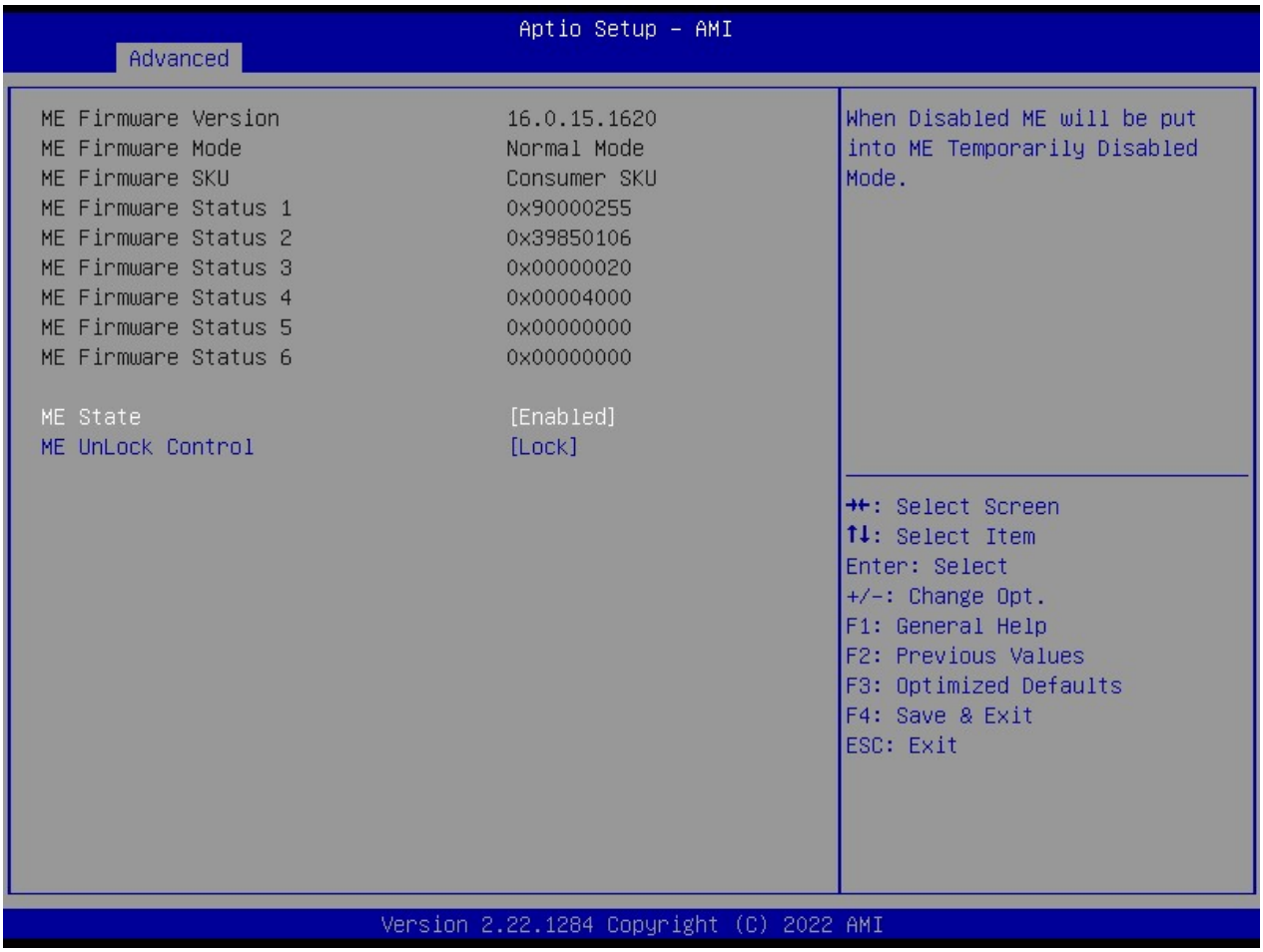
2.4.2.5 Package C state limit [C3]

Maximum package C state limit setting.

Configuration options: [C0/C1], [C2], [C3]

2.4.3 PCH-FW configuration

Configure Management Engine Technology Parameters



2.4.3.1 ME State [Enabled]

When disabled ME will be put into ME temporarily disabled mode

Configuration options: [Enable], [Disable]

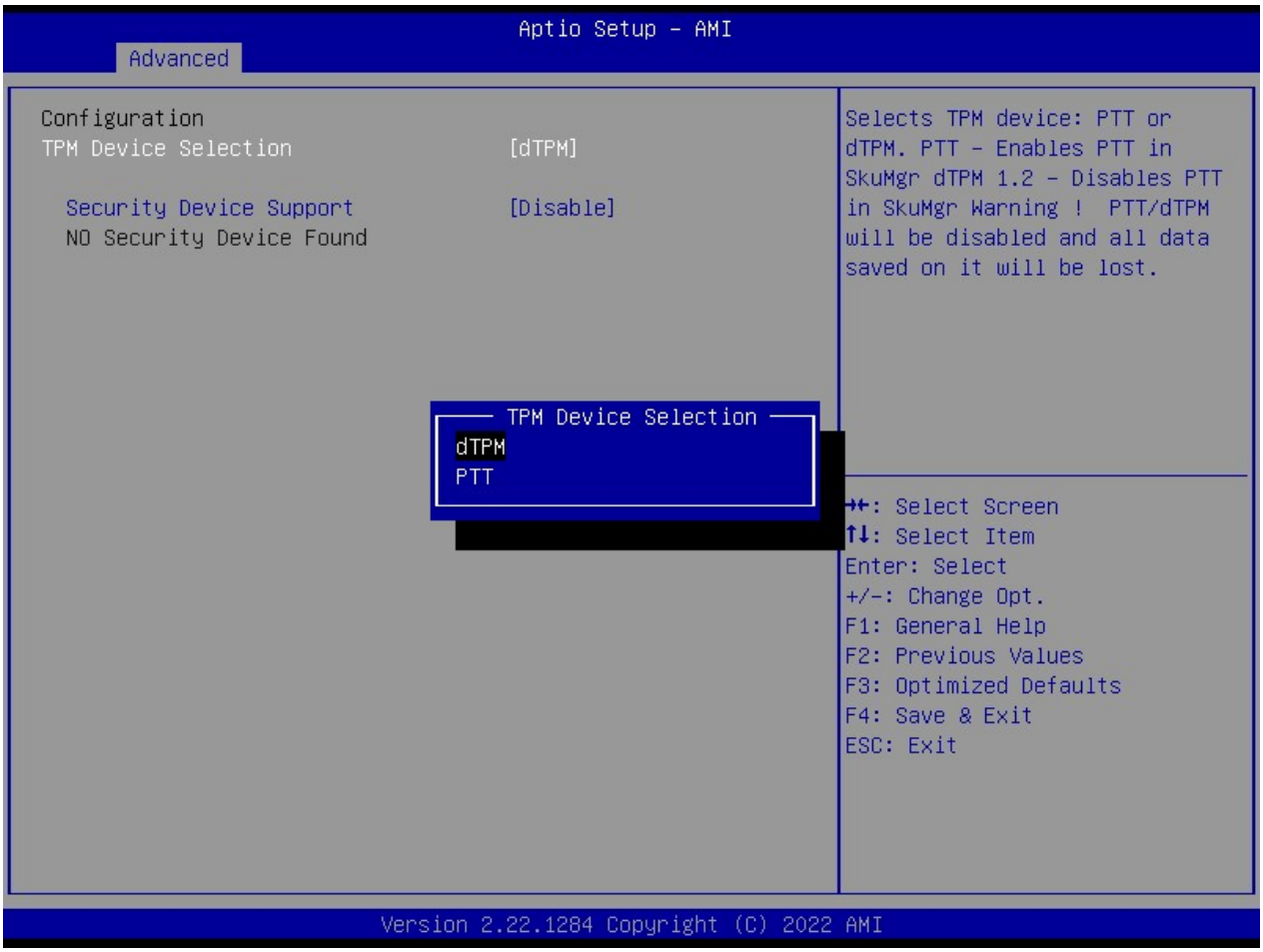
2.4.3.2 ME unlock control [Lock]

When Set unlock, system will shut down for active function

Configuration options: [Lock], [Unlock]

2.4.4 Trusted Computing

Security device settings



2.4.4.1 TPM Device Selection [dTPM]

Select TPM device between "dTPM" (Infineon TPM/ IFX), or "PTT" (Intel PTT/ INTC). The BIOS option "Security Device Support" (see below) needs to be enabled, and reboot system once in order to be able to change the setting of this BIOS option.

Configuration options: [dTPM], [PTT]

2.4.4.2 Security Device support [Disable]

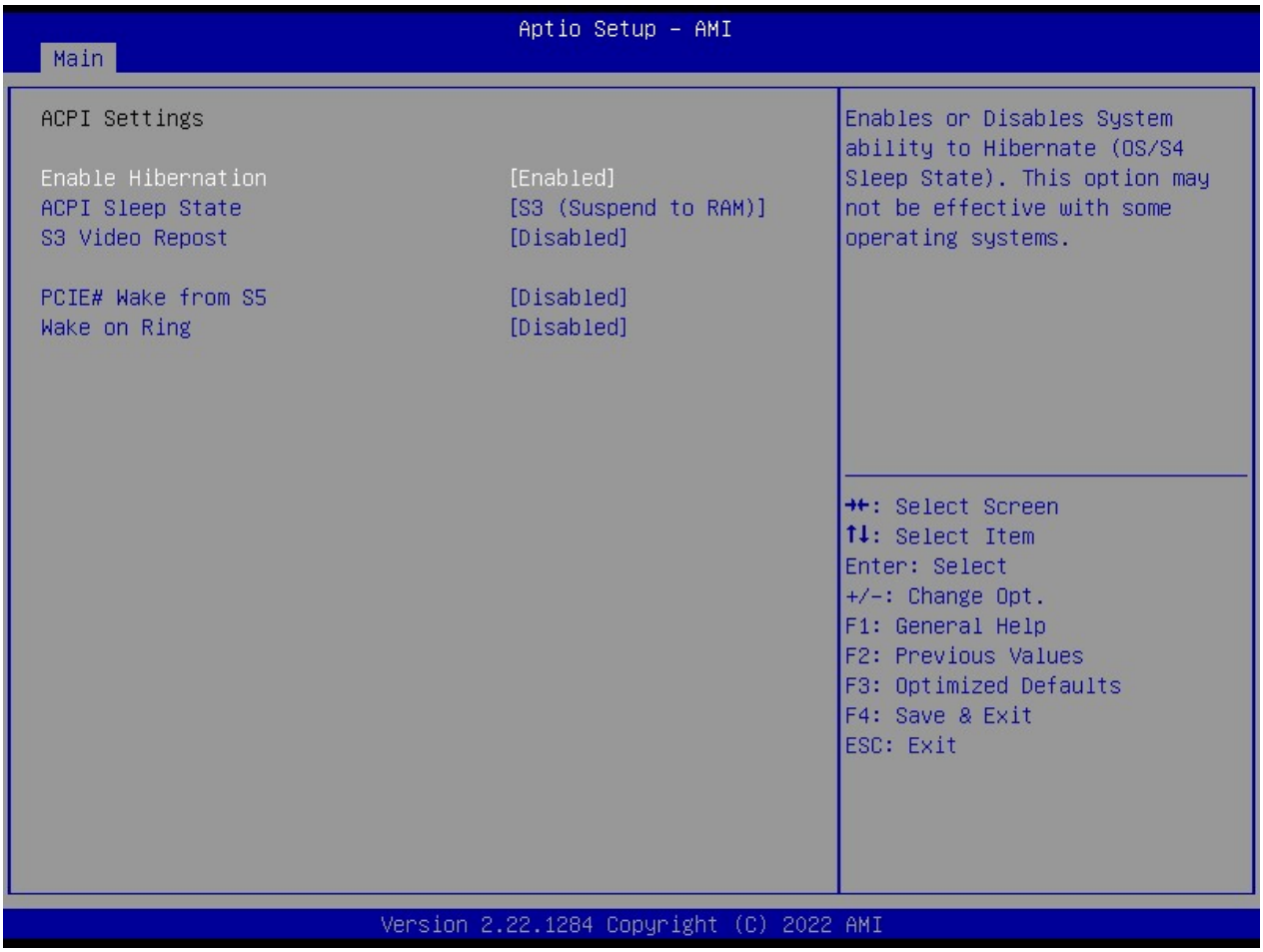
Enable or Disable BIOS support security device (TPM)

Configuration options: [Enable], [Disable]

NOTE:

1. **When "Security Device Support" is enabled, it requires to save and exit BIOS once. And then reboot the system in order to initiate the TPM support at BIOS.**
2. **When TPM is enabled and utilized through TPM software under OS, there is a possibility that the encrypted data will not be accessible, or recoverable if one of the following situations occurred:**
   1. **Lost of TPM password.**
   2. **System or board failure, or being replaced.**
   3. **Hard Drive failure.**

2.4.5 ACPI Settings



2.4.5.1 Enable Hibernation [Enable]

Enable or Disable system ability to Hibernation.

Configuration options: [Enable], [Disable]

2.4.5.2 ACPI Sleep State [S3 (Suspend to RAM)]

Select the highest ACPI sleep state the system will enter the SUSPEND button is press.

Configuration options: [Suspend Disable], [S3 (suspend to RAM)]

2.4.5.3 S3 Video Repost [Disabled]

Enable or disable S3 video repost

Configuration options: [Disabled], [Enabled]

2.4.5.4 PCIE# wake from S5 [Disabled]

Enable or disable PCIE wake the system from S5.

Configuration options: [Disabled], [Enabled]

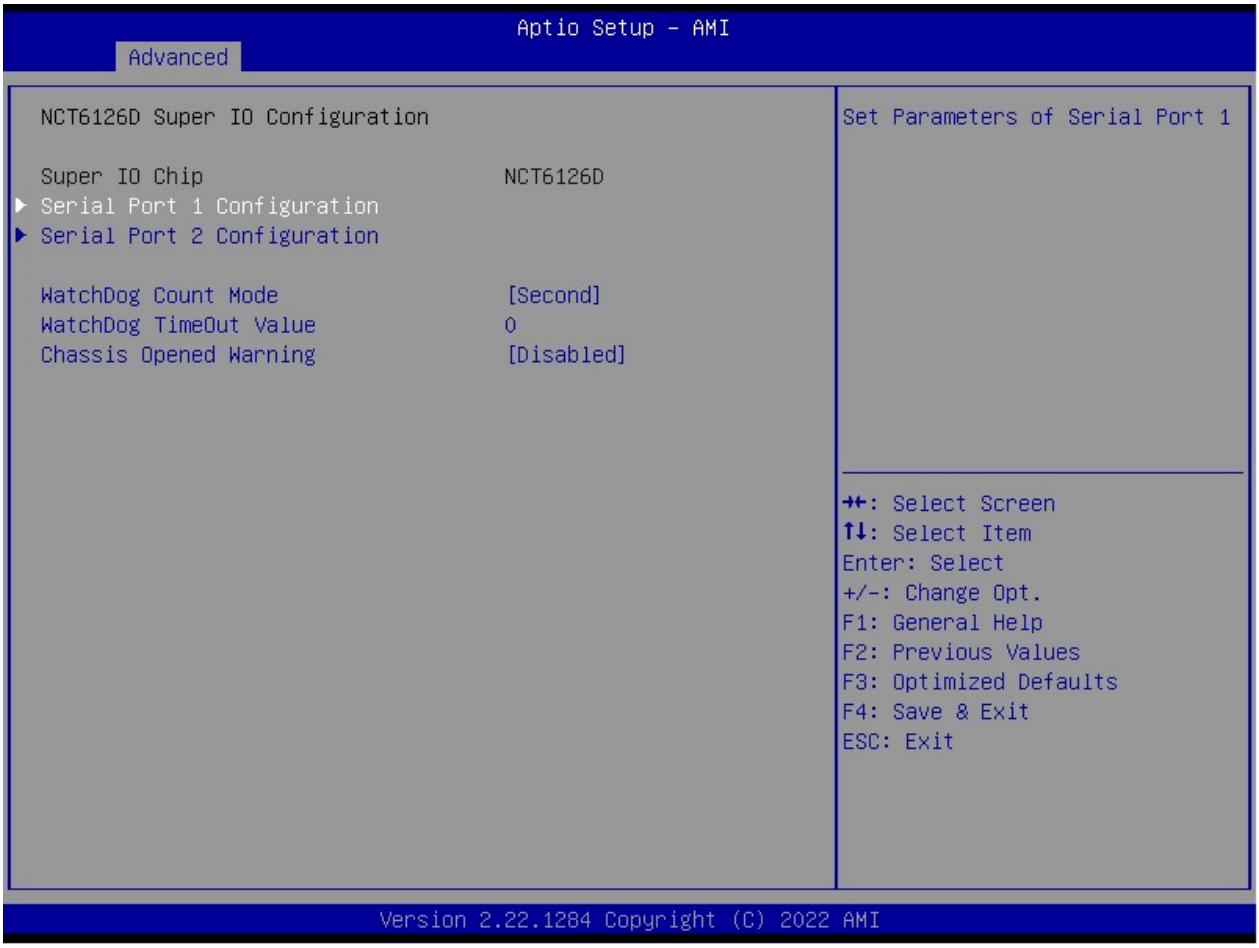
2.4.5.5 Wake on Ring [Disabled]

Enable or disable wake on ring function under ACPI S3/S4/S5.

Configuration options: [Disabled], [Enabled]

2.4.6 NCT6126D Super IO Configuration

Provide NCT6126D super IO configuration settings



2.4.6.1 WatchDog Count Mode [Second]

WatchDog count mode Selection

Configuration options: [Second], [Minute]

2.4.6.2 WatchDog Timeout Value

Fill watchdog timeout value 0 means disables

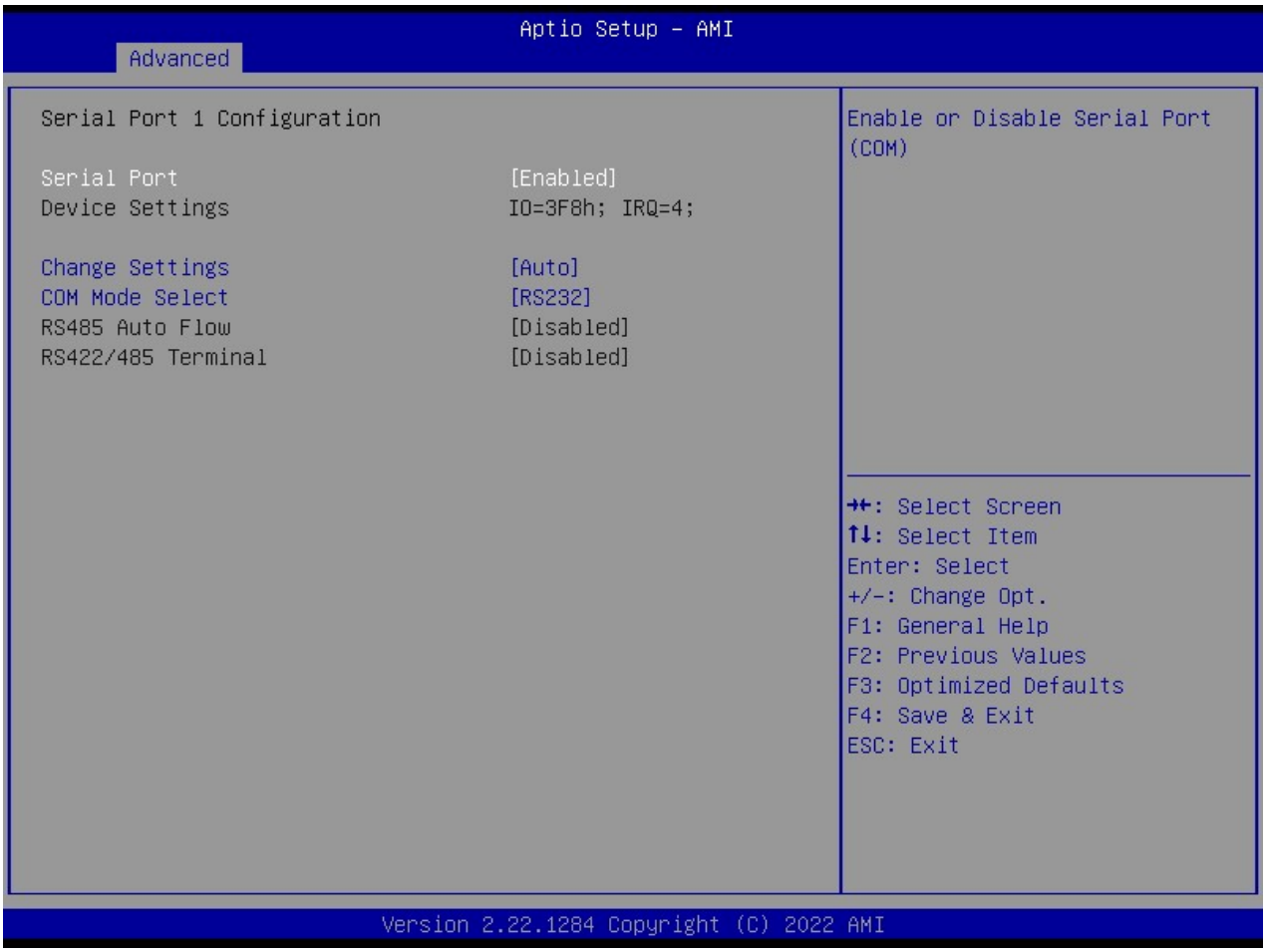
2.4.6.3 Chassis Opened Warning [Disabled]

Select chassis intrusion enabled to Disabled

Configuration options: [Disabled], [Enabled]

=

2.4.6.4 Serial Port 1 Configuration



2.4.6.4.1 Serial Port [Enabled]

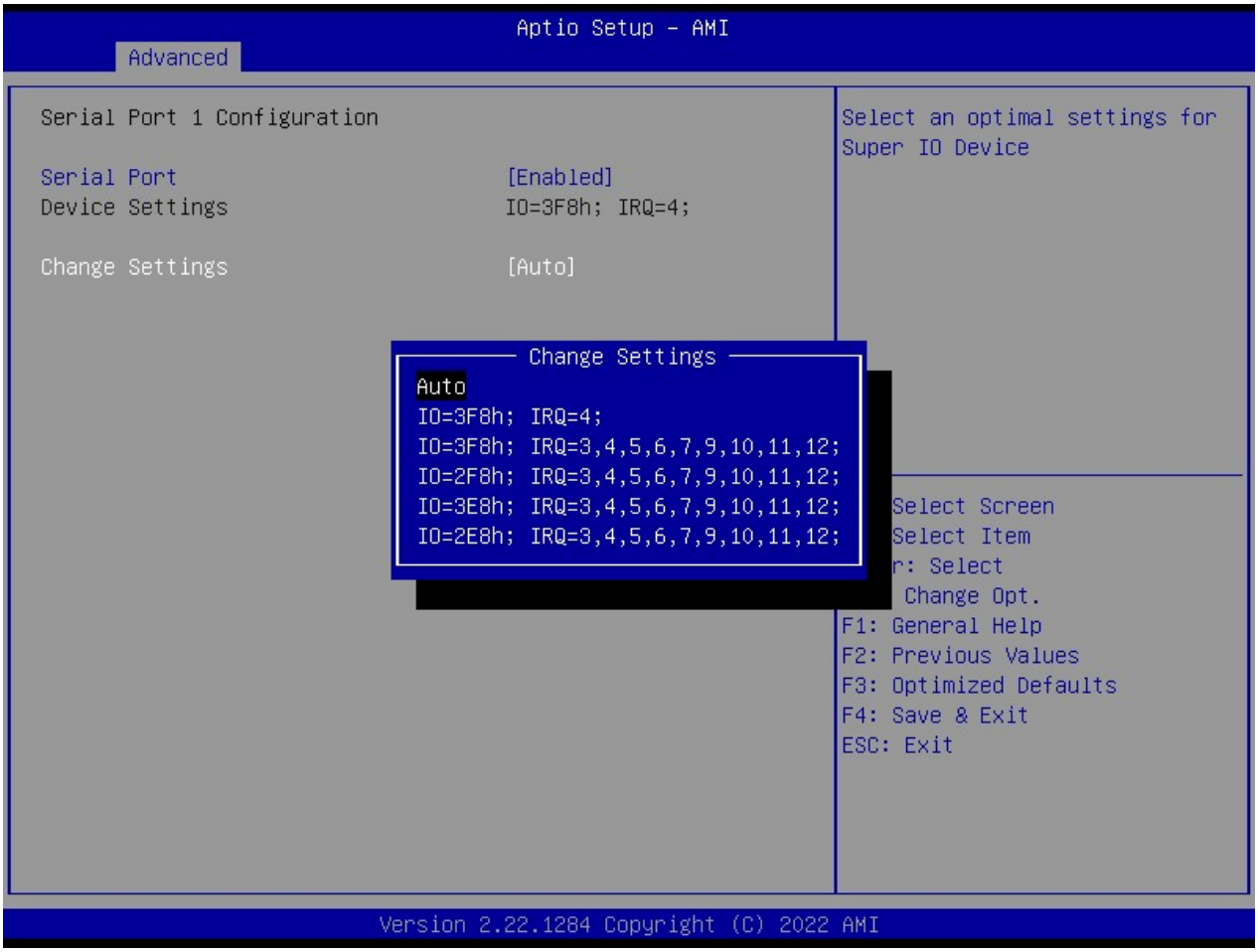
Enable or Disable serial Port 1 (COM1)

Configuration options: [Disabled], [Enabled]

2.4.6.4.2 Change Settings [Auto]

Select an optimal settings for super IO device

Configuration options: as picture below shown

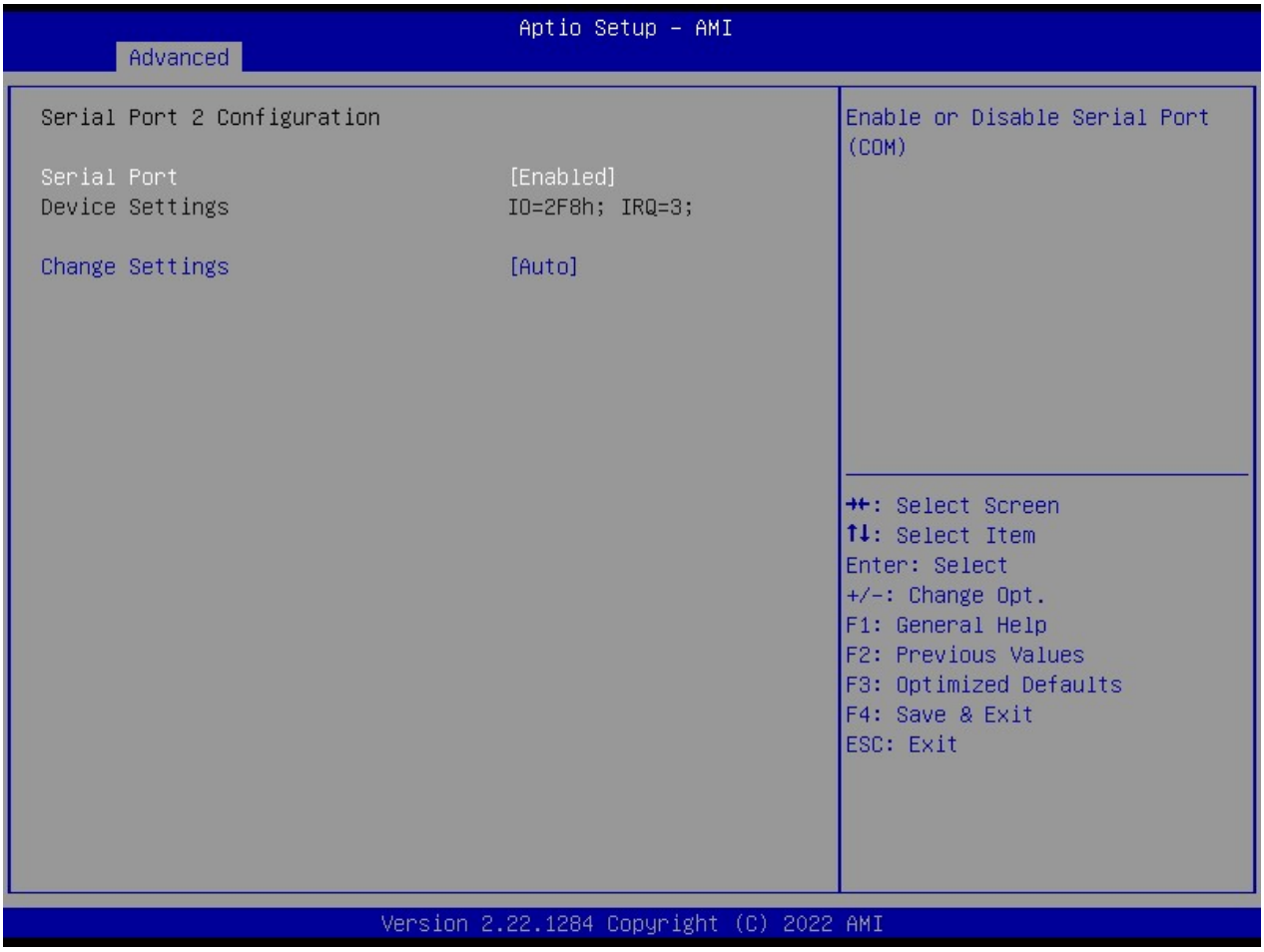


2.4.6.4.3 COM Mode Select [RS232]

Configure the COM port Mode

Configuration options: [RS232], [RS485 Half Duplex], [RS422 Full Duplex]

2.4.6.5 Serial Port 2 Configuration



2.4.6.5.1 Serial Port [Enabled]

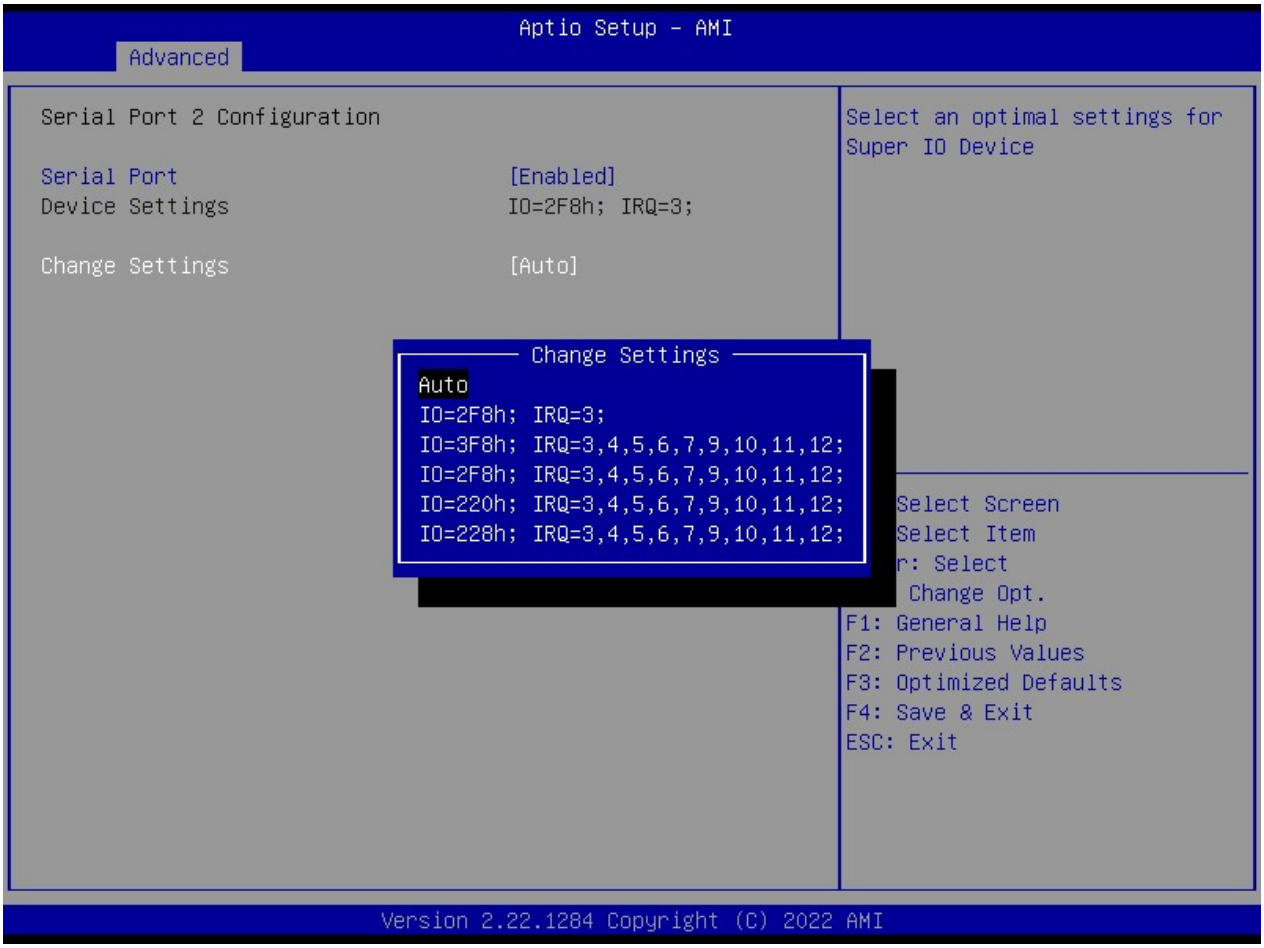
Enable or Disable serial Port (COM)

Configuration options: [Disabled] [Enabled]

2.4.6.5.2 Change Settings [Auto]

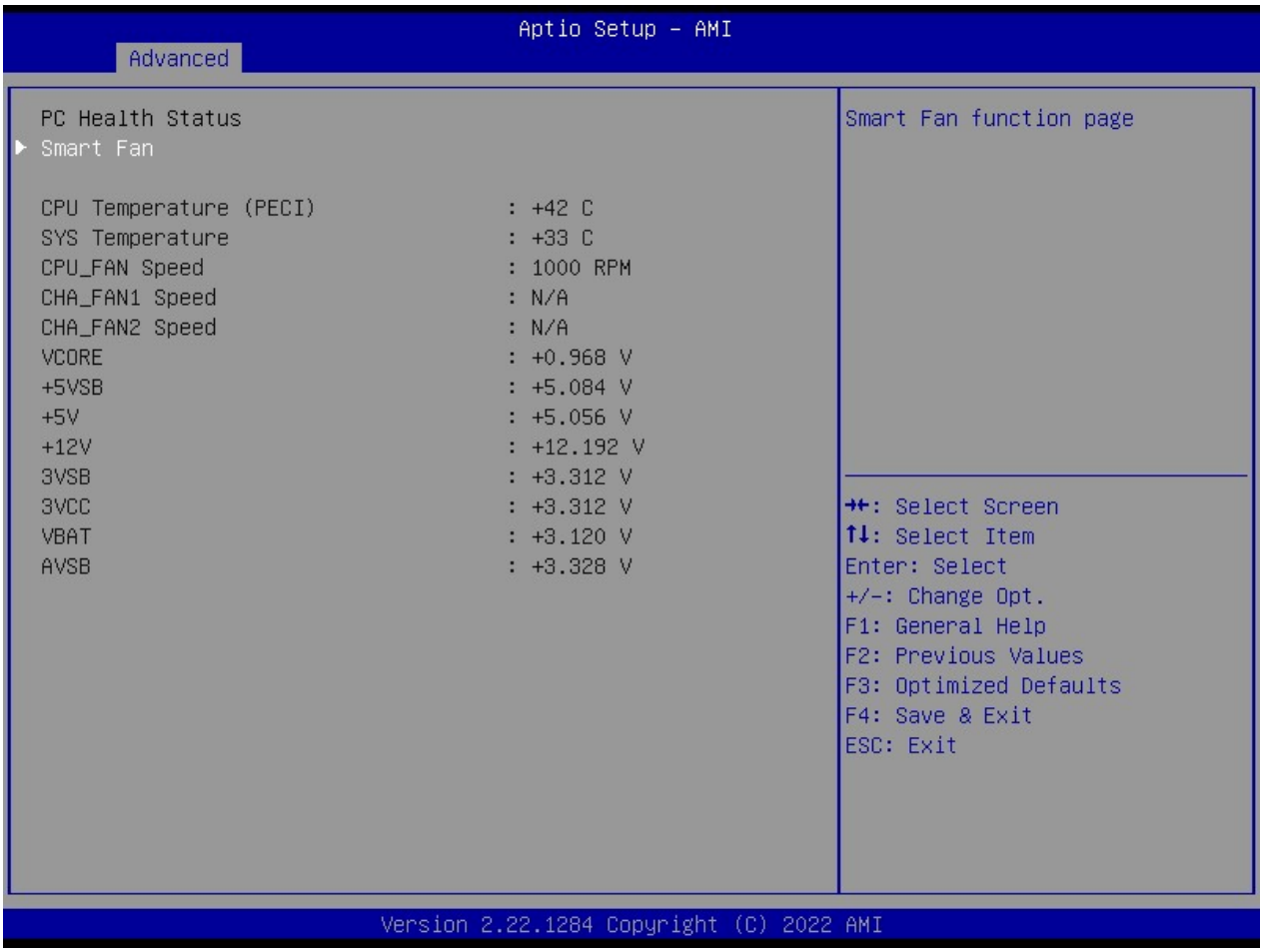
Select an optimal settings for super IO device

Configuration options: as picture below shown



2.4.7 Hardware Monitor

Display Hardware monitor information



2.4.7.1 Smart FAN

2.4.7.1.1 Smart Fan Function [Enabled]

Smart fan function Enable/Disabled

Configuration options: [Enabled], [Disabled], [Manual]

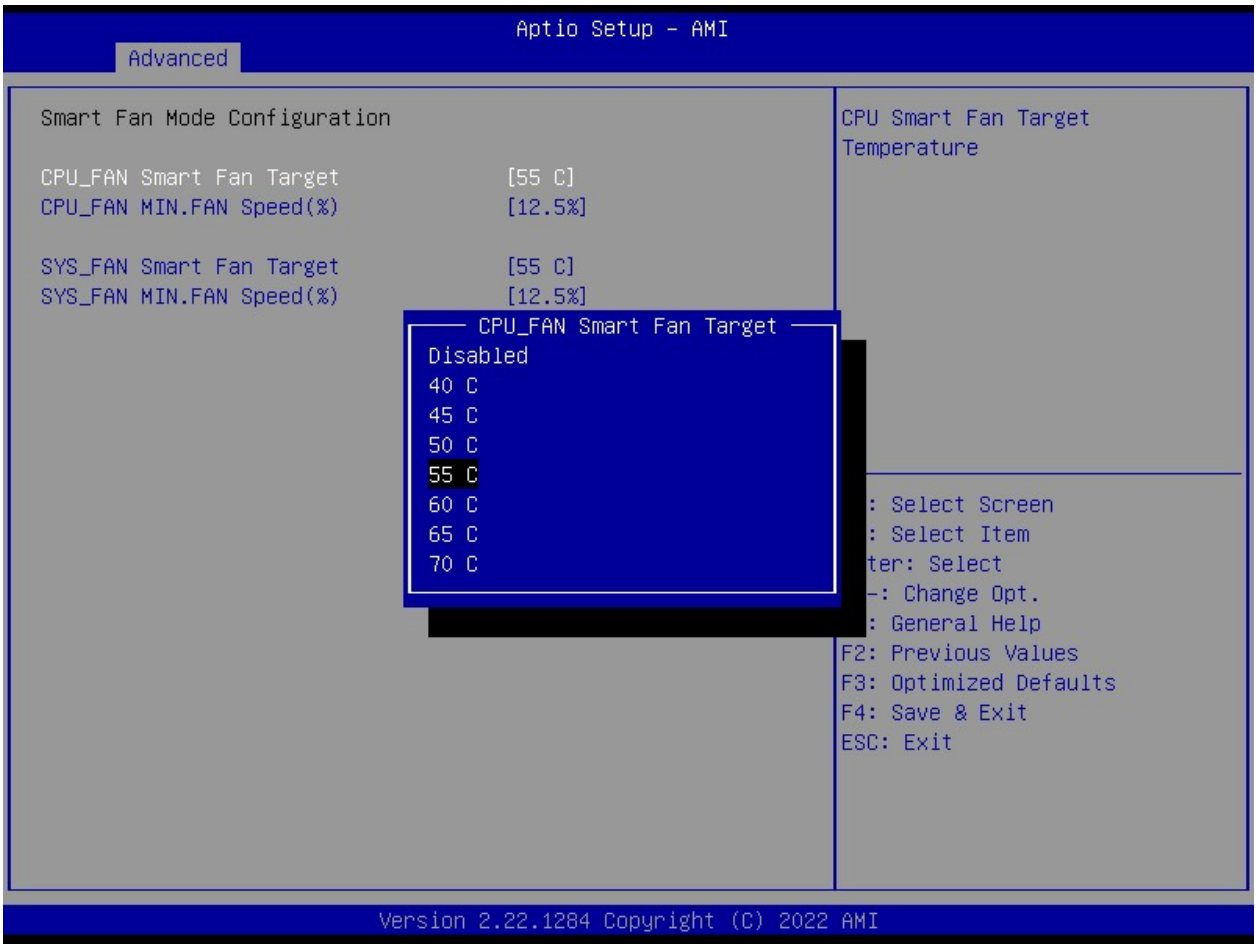
2.4.7.1.2 Smart Fan Mode Configuration

Setting different FAN on this motherboard

2.4.7.1.2.1 CPU_FAN/SYS_FAN Smart FAN Target [55 C]

Smart FAN target temperature setting

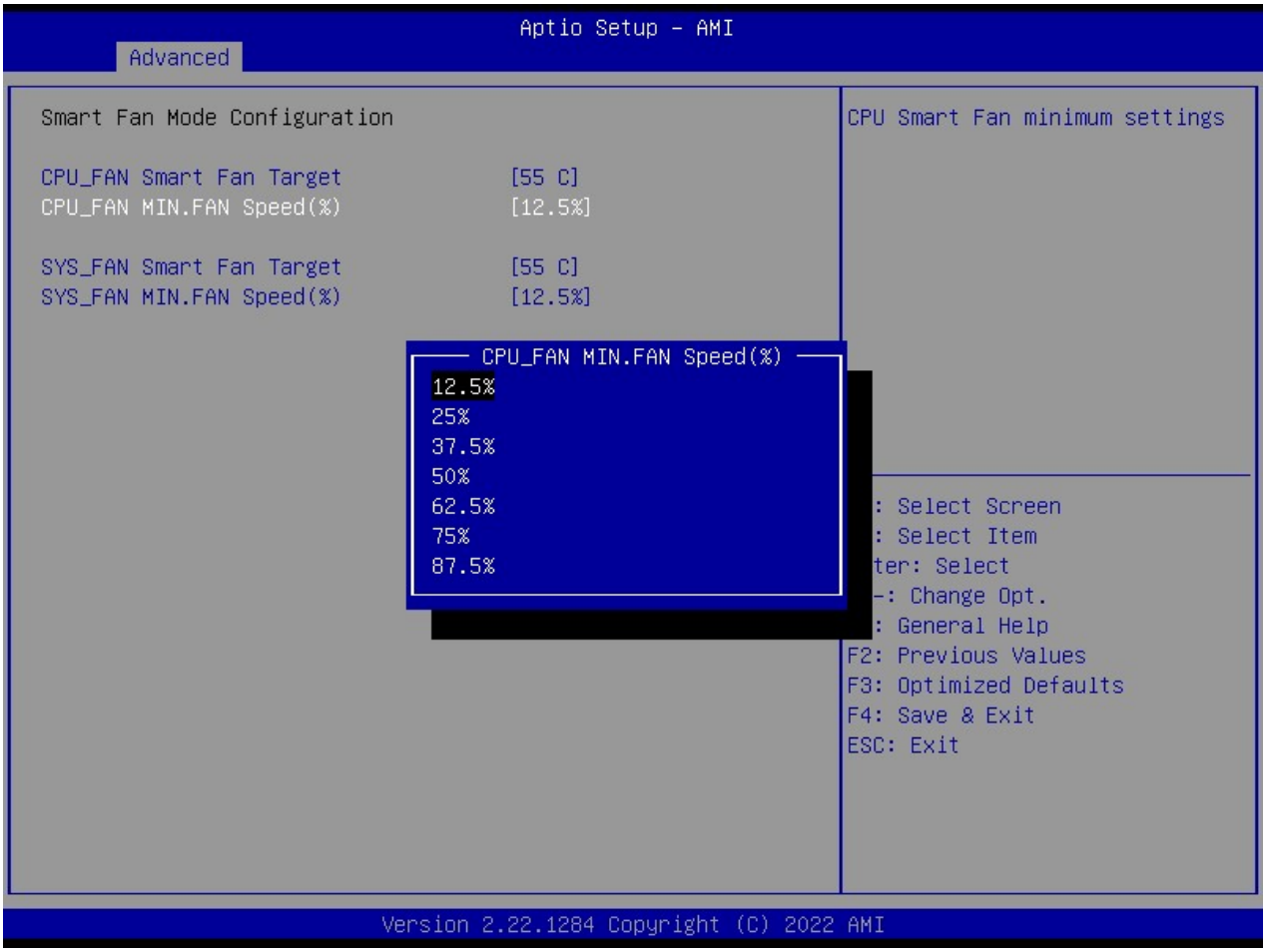
Configuration options: Please see below picture



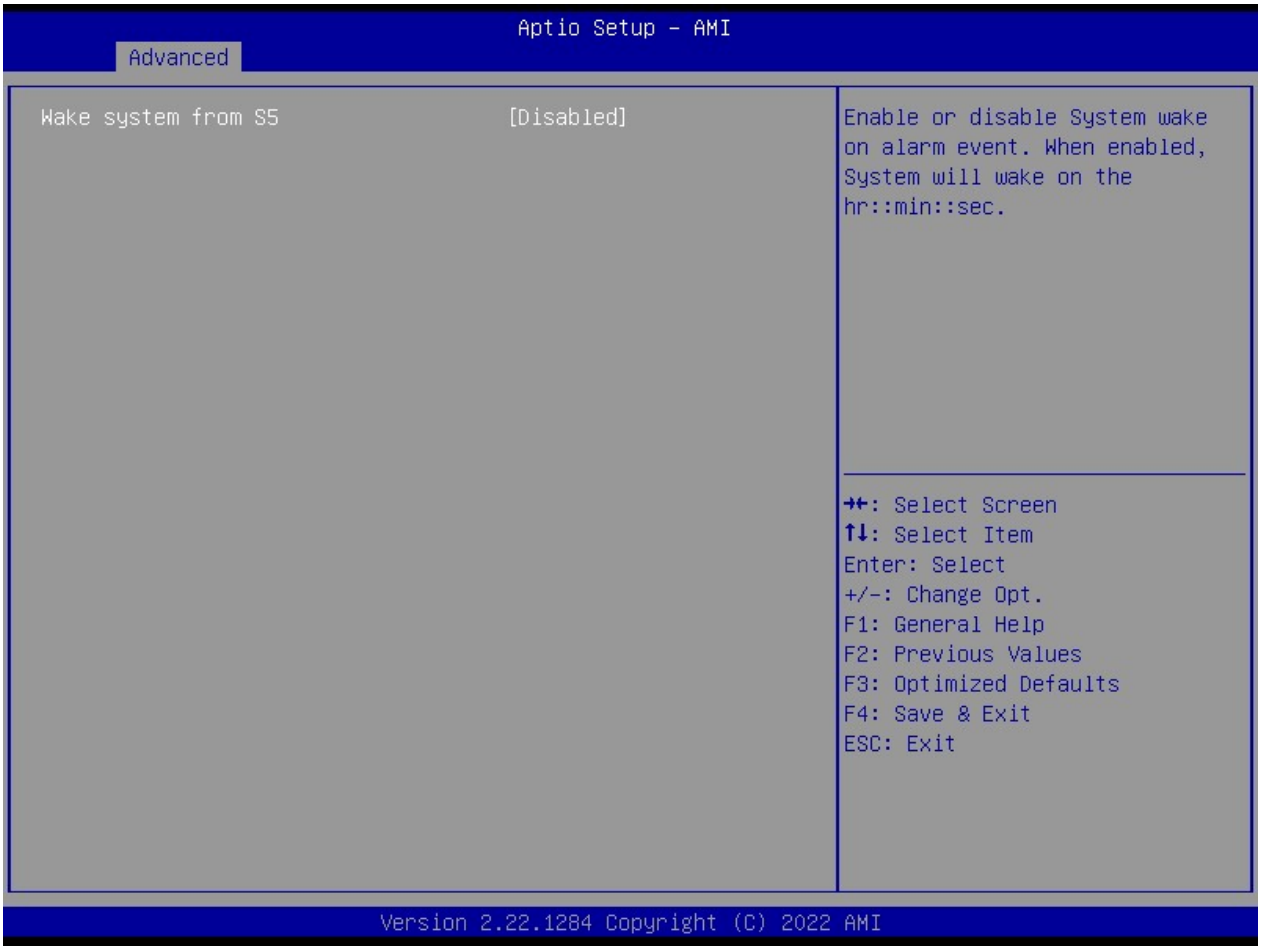
2.4.7.1.2.2 CPU_FAN/SYS_FAN MIN.FAN Speed (%) [12.5%]

CPU or Chassis Smart FAN minimum settings

Configuration options: as picture below shown



2.4.8 S5 RTC Wake Settings



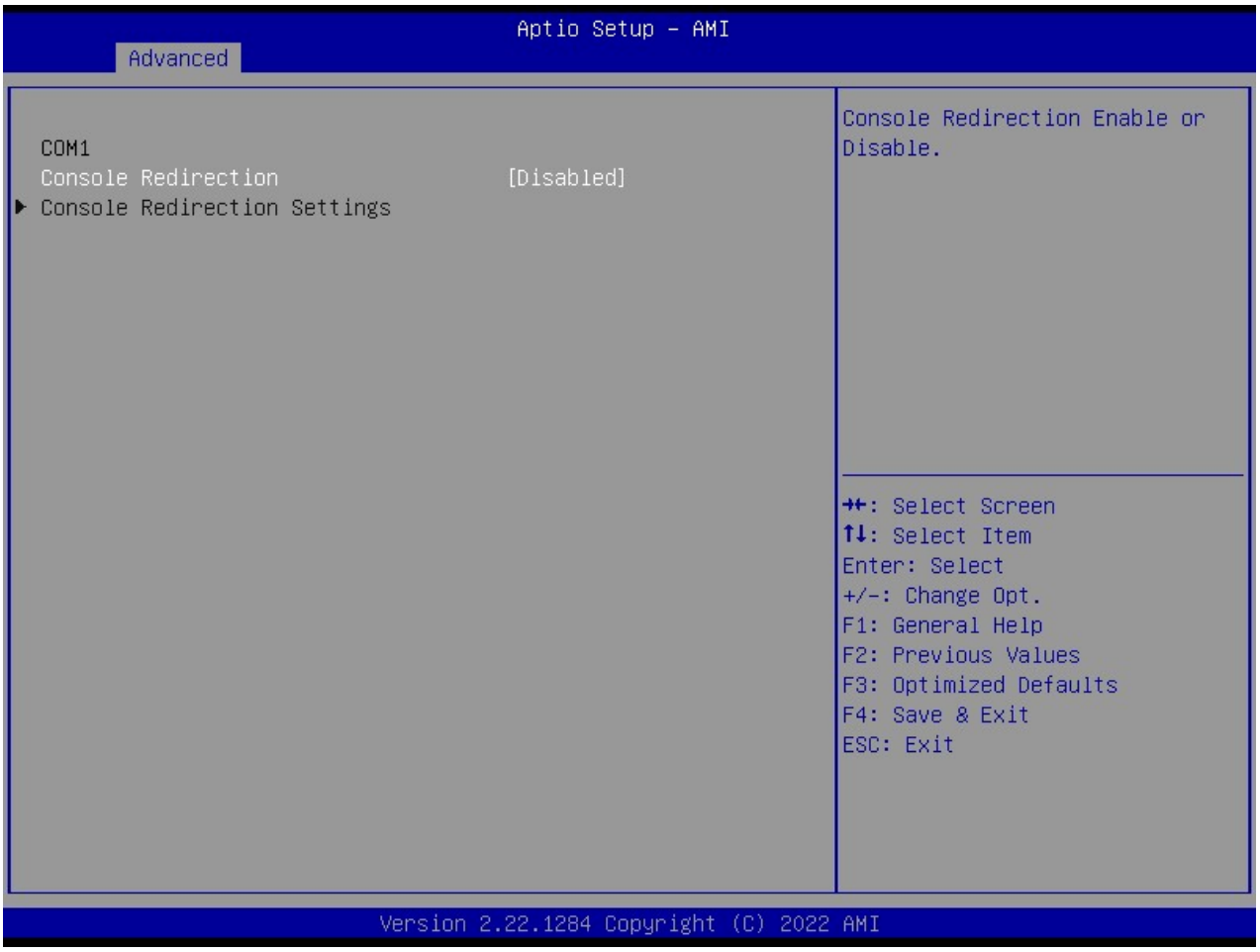
2.4.8.1 Wake System from S5 [Disabled]

Enabled or Disabled system wake on alarm event

Configuration options: [Enabled], [Disabled]

2.4.9 Serial Port Console Redirection

Console redirection enable or disable

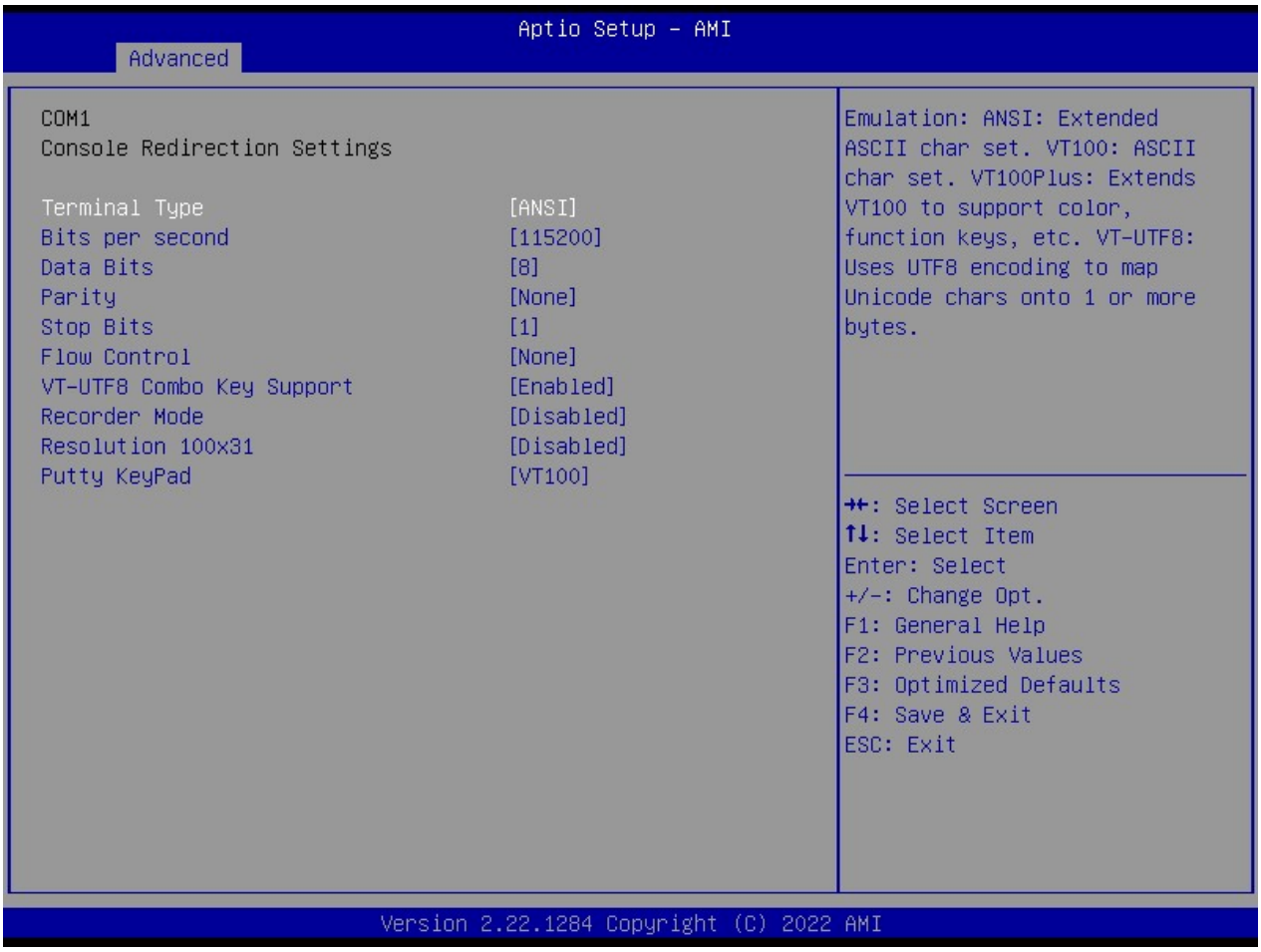


2.4.9.1 Console Redirection [Disabled]

Enabled or Disabled COM1 Console redirection

Configuration options: [Disabled], [Enabled]

2.4.9.2 Console Redirection Settings



2.4.9.2.1 Terminal Type [ANSI]

Select terminal type

Configuration options: [VT100], [VT100Plus], [VT-UTF8], [ANSI]

2.4.9.2.2 Bits per second [115200]

Select serial port transmission speed

Configuration options: [9600], [19200], [38400], [57600], [115200]

2.4.9.2.3 Data Bits [8]

Select data bits

Configuration options: [7] ,[8]

2.4.9.2.4 Parity [None]

A parity bit can be sent with the data bits to detect some transmission errors

Configuration options: [None], [Even], [Odd], [Mark], [Space]

2.4.9.2.5 Stop Bits [1]

Stop bits indicate the end of a serial data package

Configuration options: [1], [2]

2.4.9.2.6 Flow Control [None]

Flow control can prevent data loss from buffer overflow.

Configuration options: [None], [Hardware RTS/CTS]

2.4.9.2.7 VT-UTF8 Combo key Support [Enabled]

Enable VT-UTF8 combination key support for ANSI/VT100 terminals

Configuration options: [Enabled], [Disabled]

2.4.9.2.8 Recorder Mode [Disabled]

With this mode enabled only text will be sent.

Configuration options: [Enabled], [Disabled]

2.4.9.2.9 Resolution 100x31 [Disabled]

Enables or disables extended terminal resolution

Configuration options: [Enabled], [Disabled]

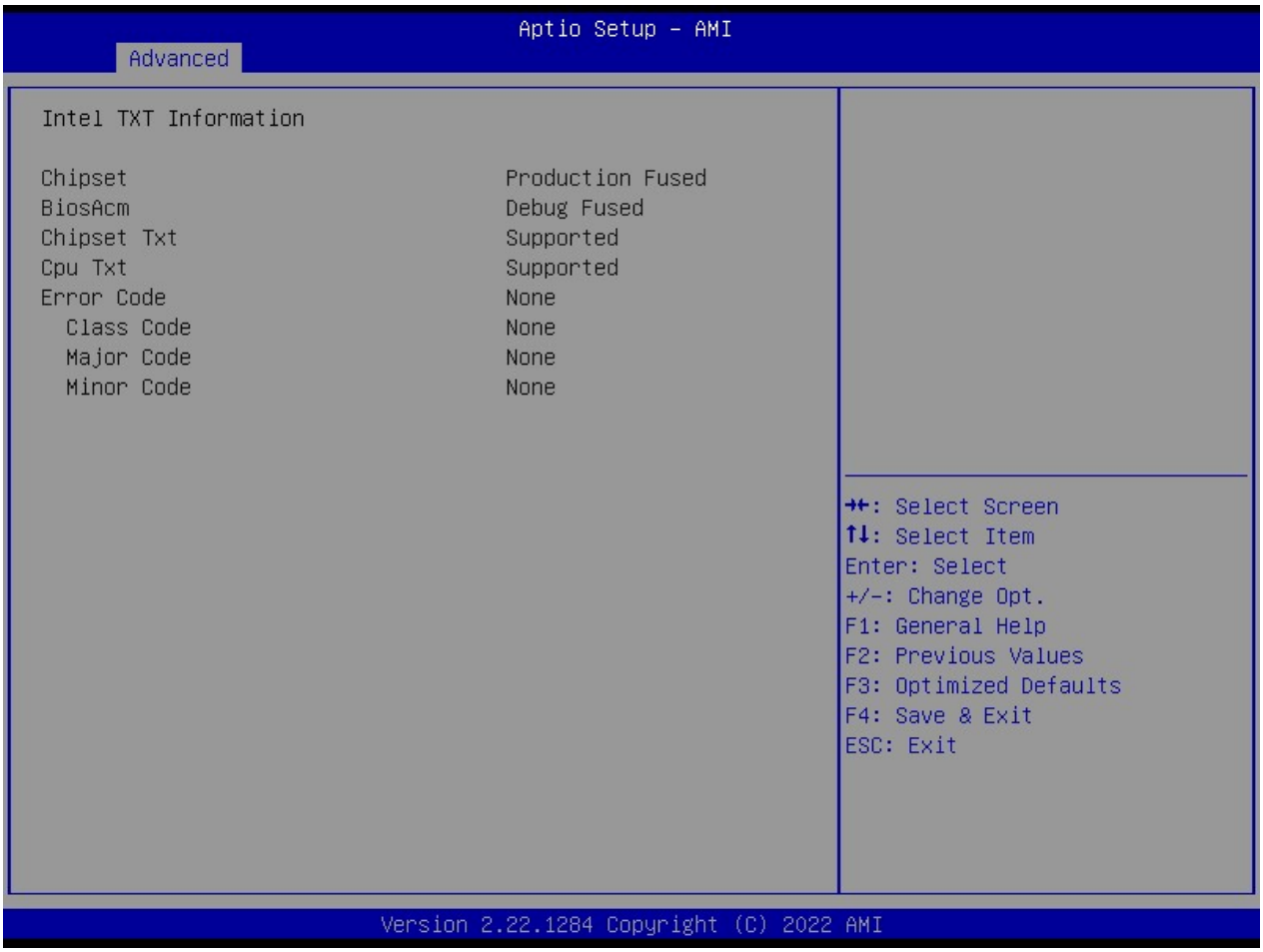
2.4.9.2.10 Putty Keypad [VT100]

Selects function key and keypad on putty

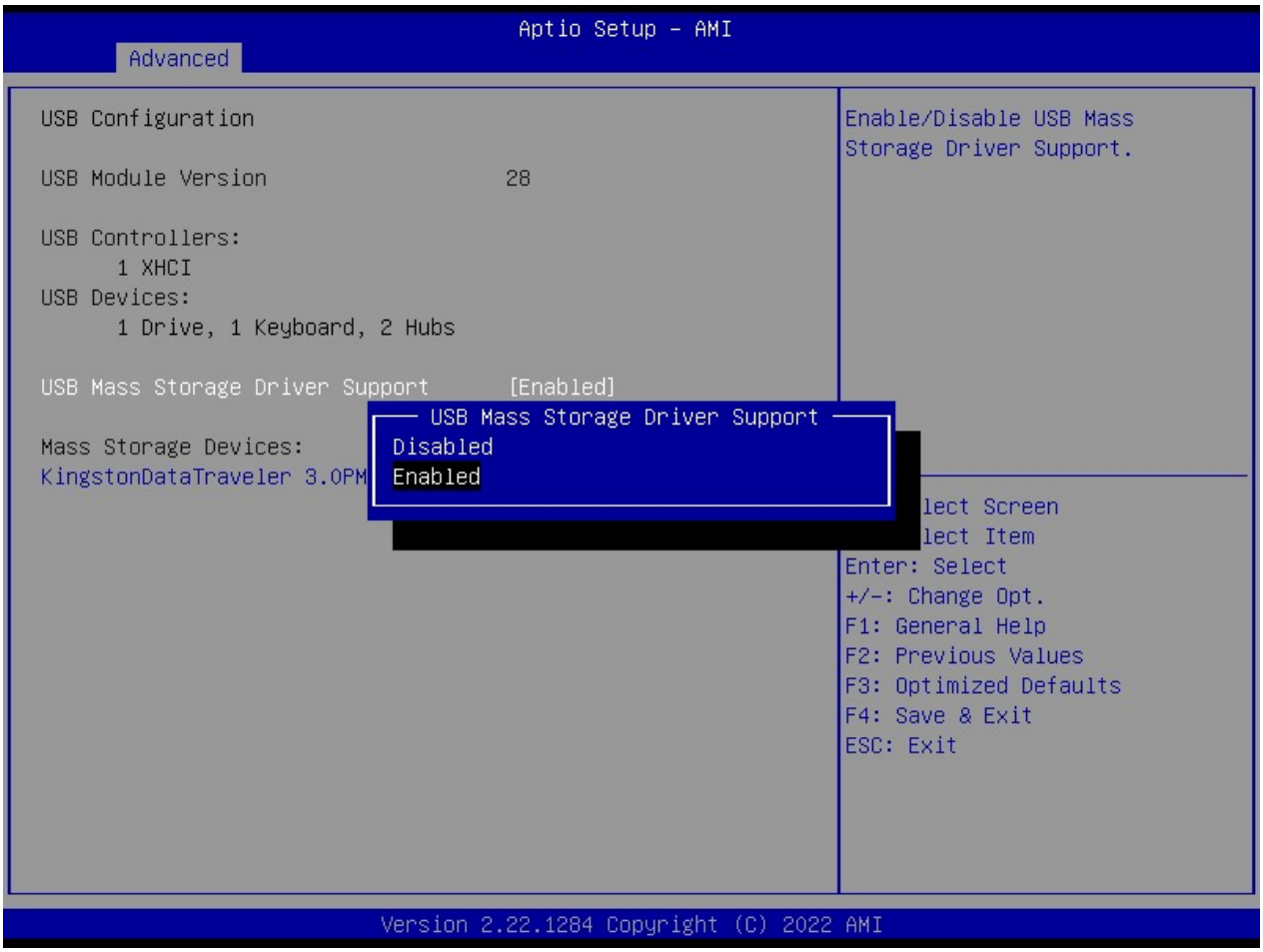
Configuration options: [VT1000], [LINUX], [XTERMR6], [SCO], [ESCN], [VT400]

2.4.10 Intel TXT Information

Display Intel TXT information. This depends on CPU model installed onboard



2.4.11 USB Configuration



2.4.11.1 USB Mass Storage Driver Support [Enabled]

Enable or Disable USB Mass Storage Driver Support

Configuration options: [Enabled], [Disabled]

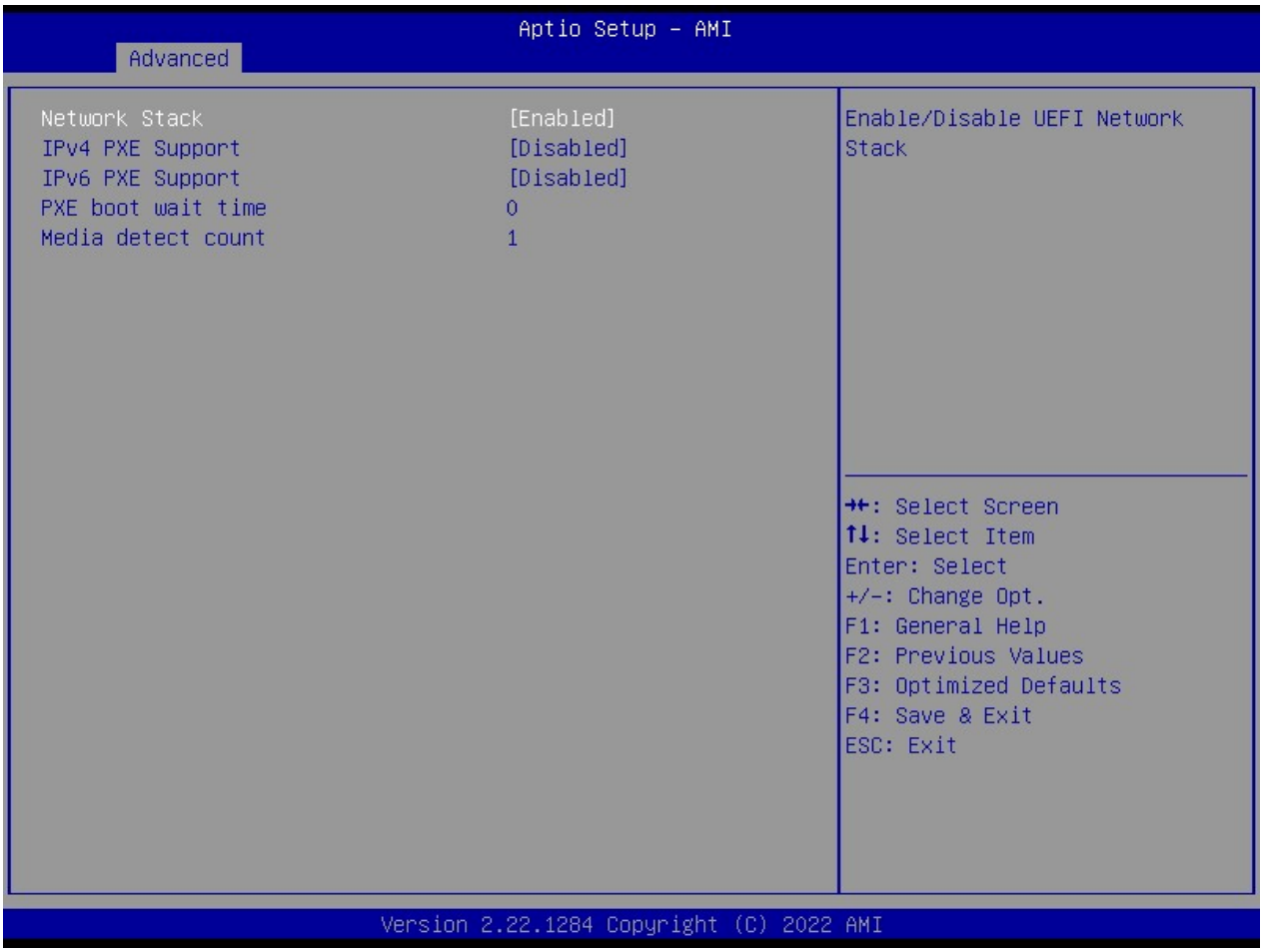
2.4.11.2 Mass Storage Devices [Auto]

Mass Storage device emulation Type. "Auto" enumerates device according to its media format.

Configuration options: [Auto], [Floppy], [Forced FDD], [Hard Disk], [CD-ROM]

2.4.12 Network Stack Configuration [Disabled]

Network Stack setting



2.4.12.1 Network Stack [Disabled]

Enabled/Disabled UEFI Network Stack

Configuration options: [Enabled], [Disabled]

2.4.12.2 IPv4 PXE Support [Disabled]

Enabled or disabled IPv4 PXE boot Support

Configuration options: [Enabled], [Disabled]

2.4.12.3 IPv6 PXE Support [Disabled]

Enabled or disabled IPv6 PXE boot Support

Configuration options: [Enabled], [Disabled]

2.4.12.4 PXE boot wait time

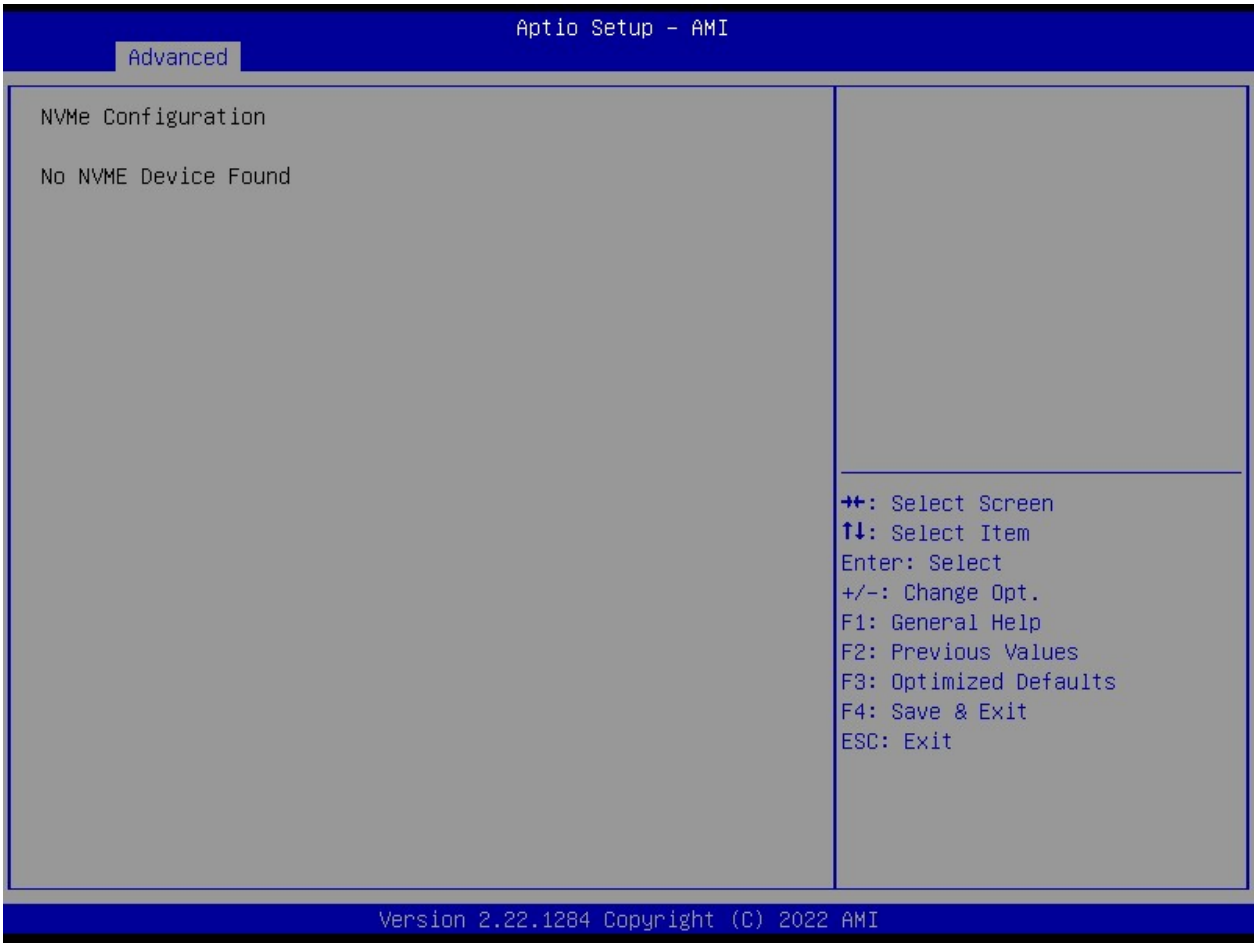
Wait time in seconds to press ESC key to abort the PXE boot.

2.4.12.5 Media detect count

Number of time the presence of media will be checked

2.4.13 NVMe Configuration

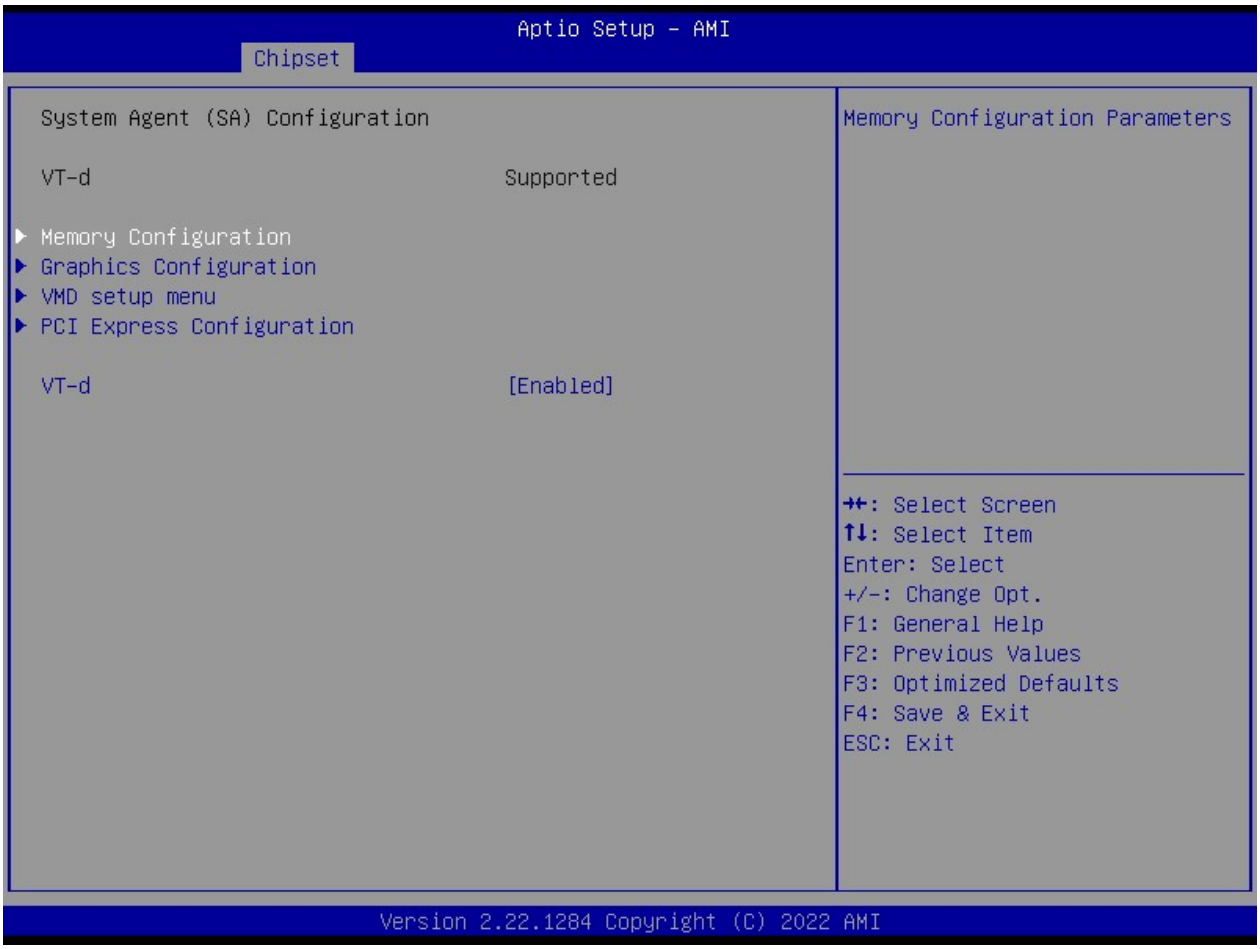
Display NVMe controller or detected drive information



2.5 Chipset

Aptio Setup – AMI
Main Advanced Chipset Security Boot Save & Exit
System Agent (SA) Configuration
PCH-IO Configuration
System Agent (SA) Parameters
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1284 Copyright (C) 2022 AMI

2.5.1 System Agent (SA) Configuration



2.5.1.1 VT-d [Enabled]

VT-d capability

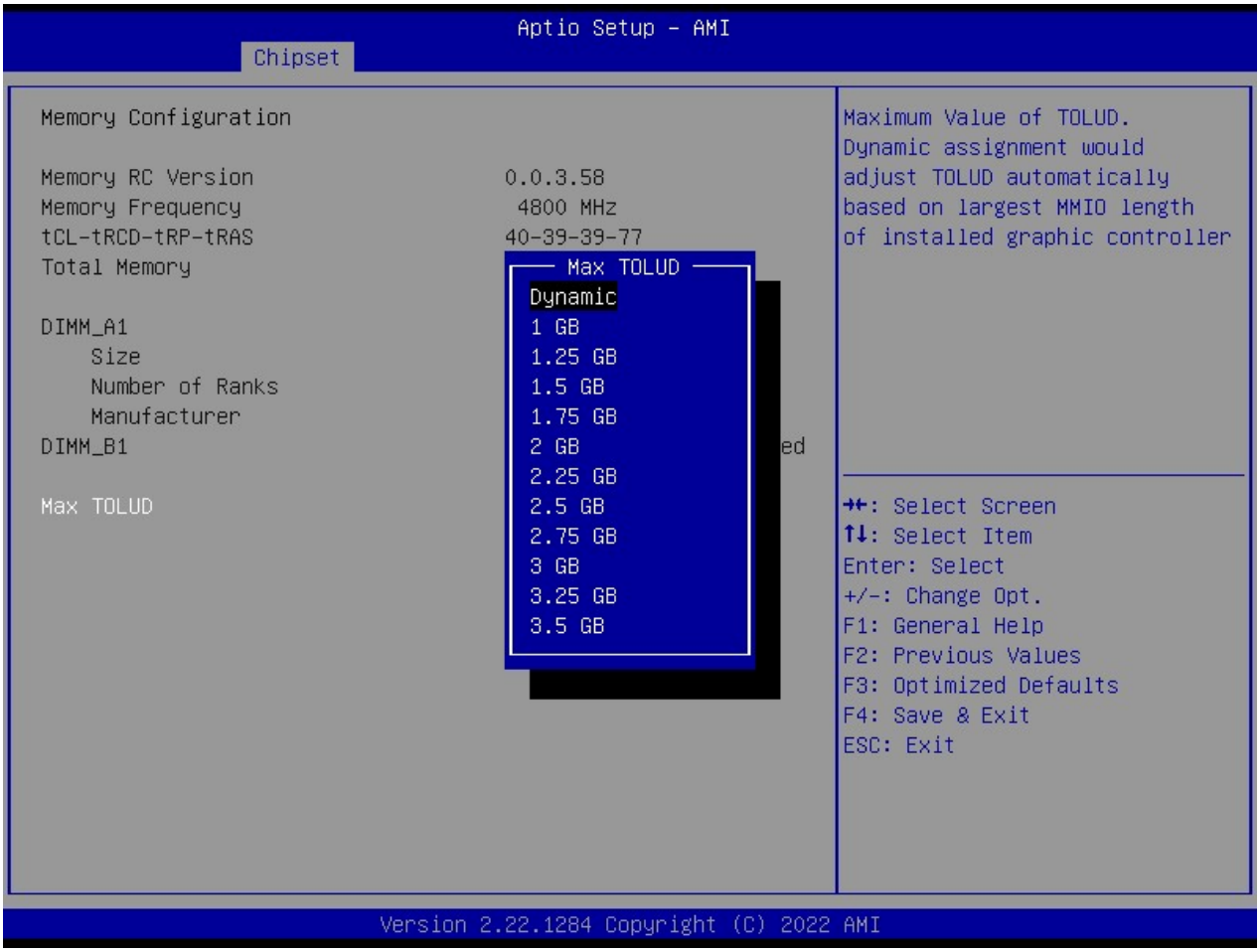
Configuration options: [Disabled], [Enabled]

2.5.1.2 Memory Configuration

Memory Configuration parameters

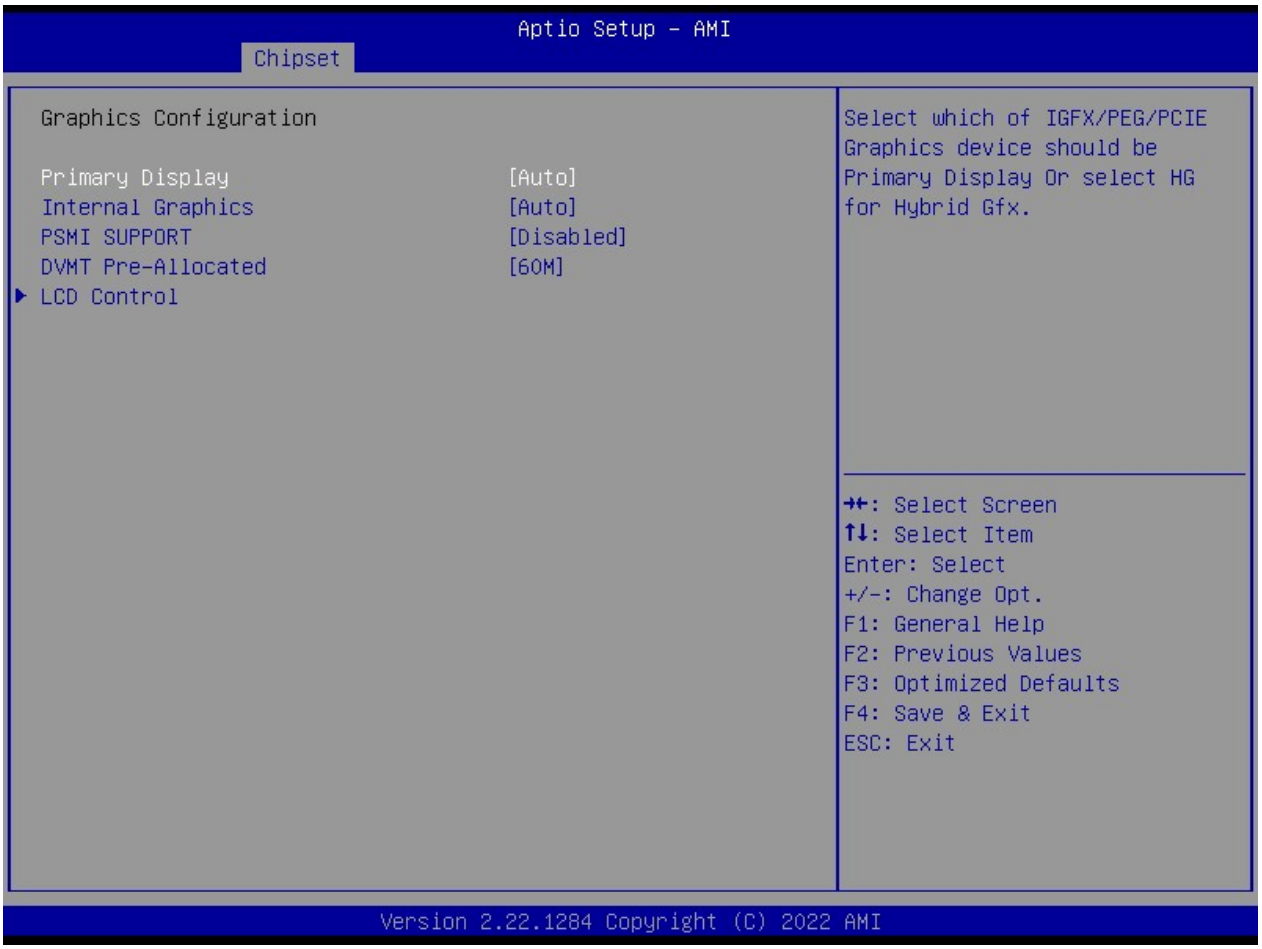
2.5.1.2.1 Max TOLUD

Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.



2.5.1.3 Graphic Configuration

Graphic configuration settings



2.5.1.3.1 Primary Display [Auto]

Select which of IGFX/PEG/PCIE graphic device should be primary display or select HG for Hybrid Gfx.

Configuration options: [Auto], [IGFX], [PEG slot], [PCIE]

2.5.1.3.2 Internal Graphics [Auto]

Keep IGFX enabled based on the setup options

Configuration options: [Auto], [disabled], [enabled]

2.5.1.3.3 PSMI Support [Disabled]

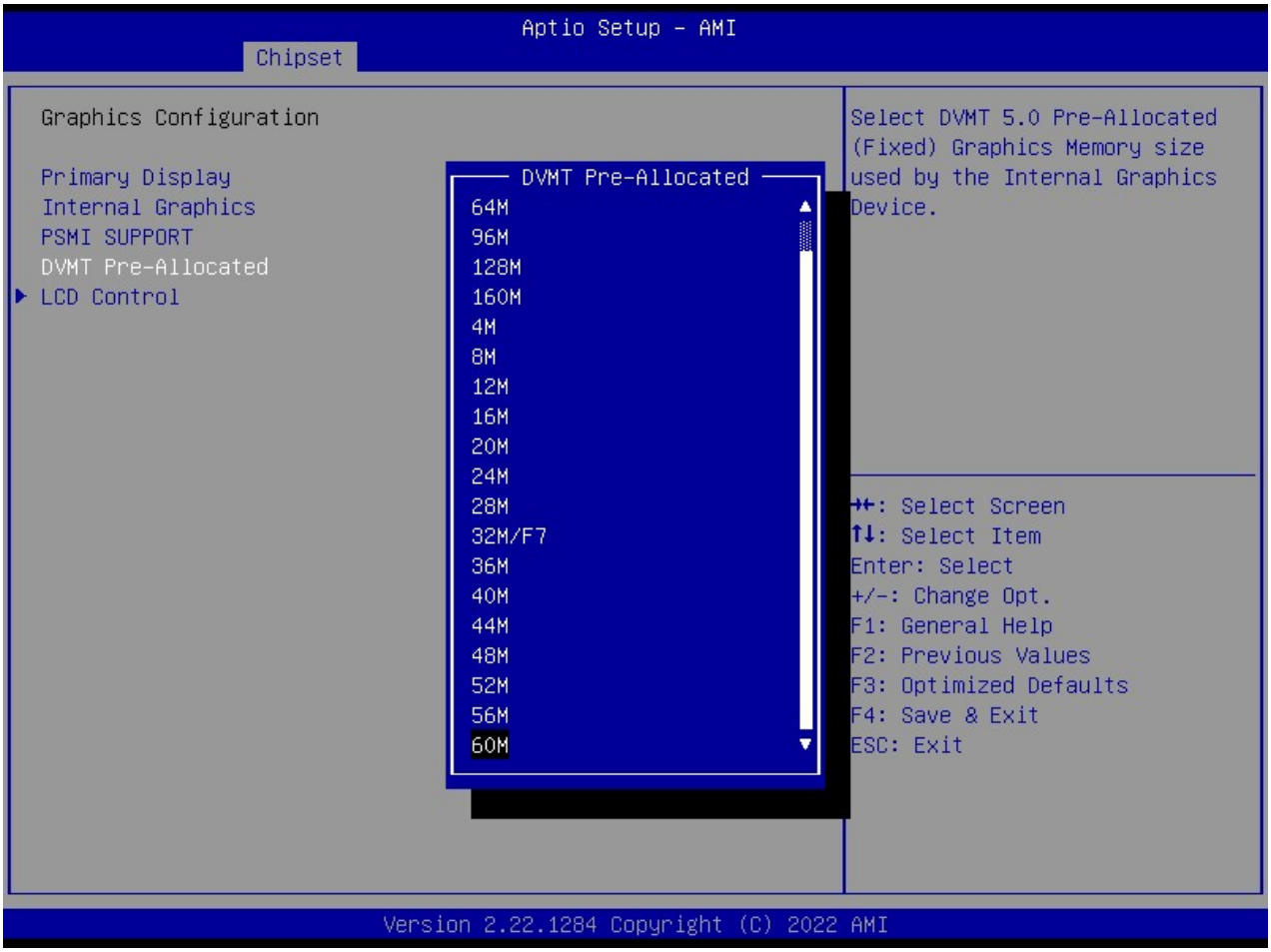
PSMI enabled/Disabled

Configuration options: [Disabled], [Enabled]

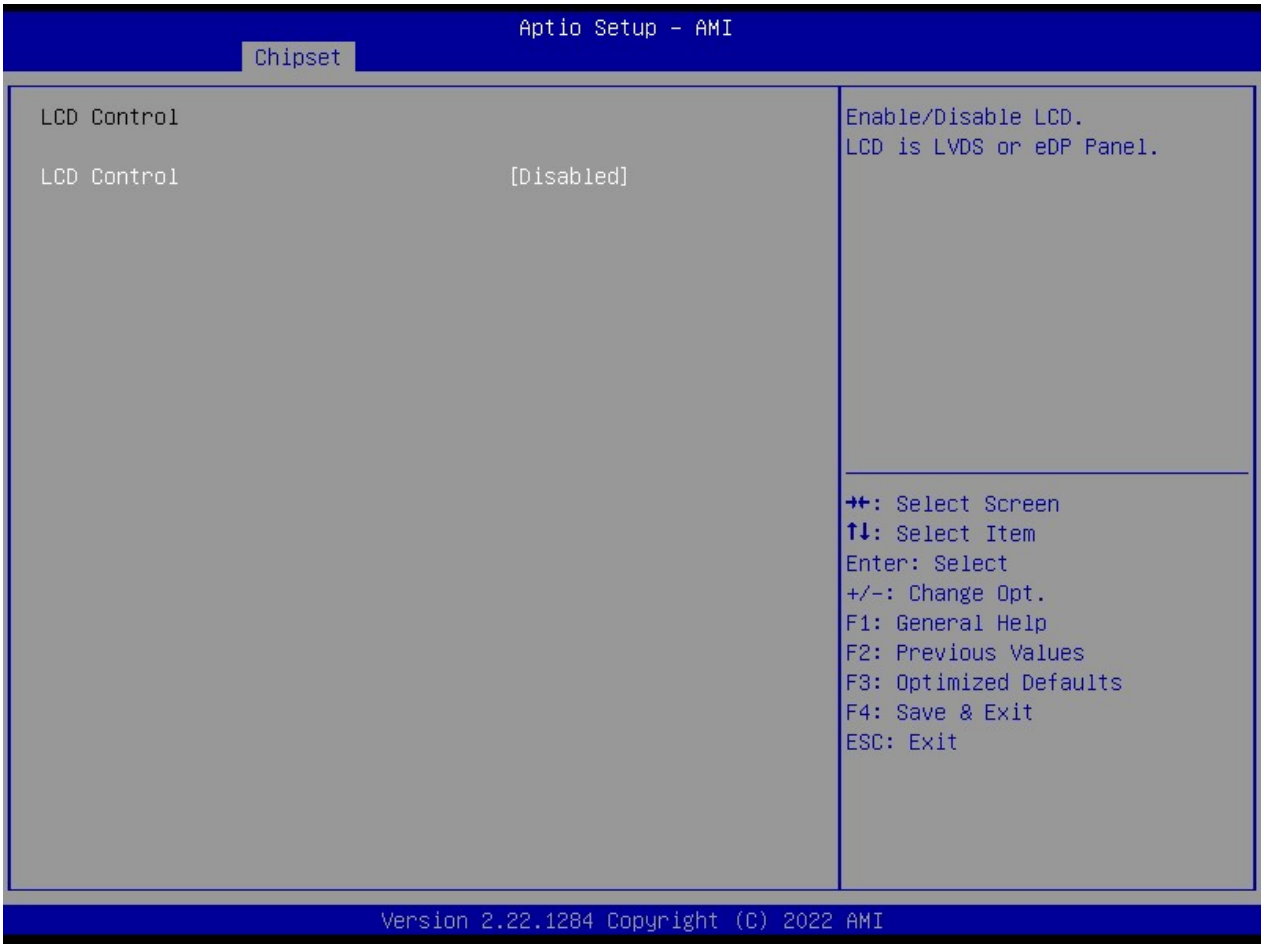
2.5.1.3.4 DVMT Pre-Allocated [60M]

Select DVMT 5.0 Pre-allocated (Fixed) Graphics memory size used by the internal graphics device.

Configuration options: As picture below shown



2.5.1.3.5 LCD Control

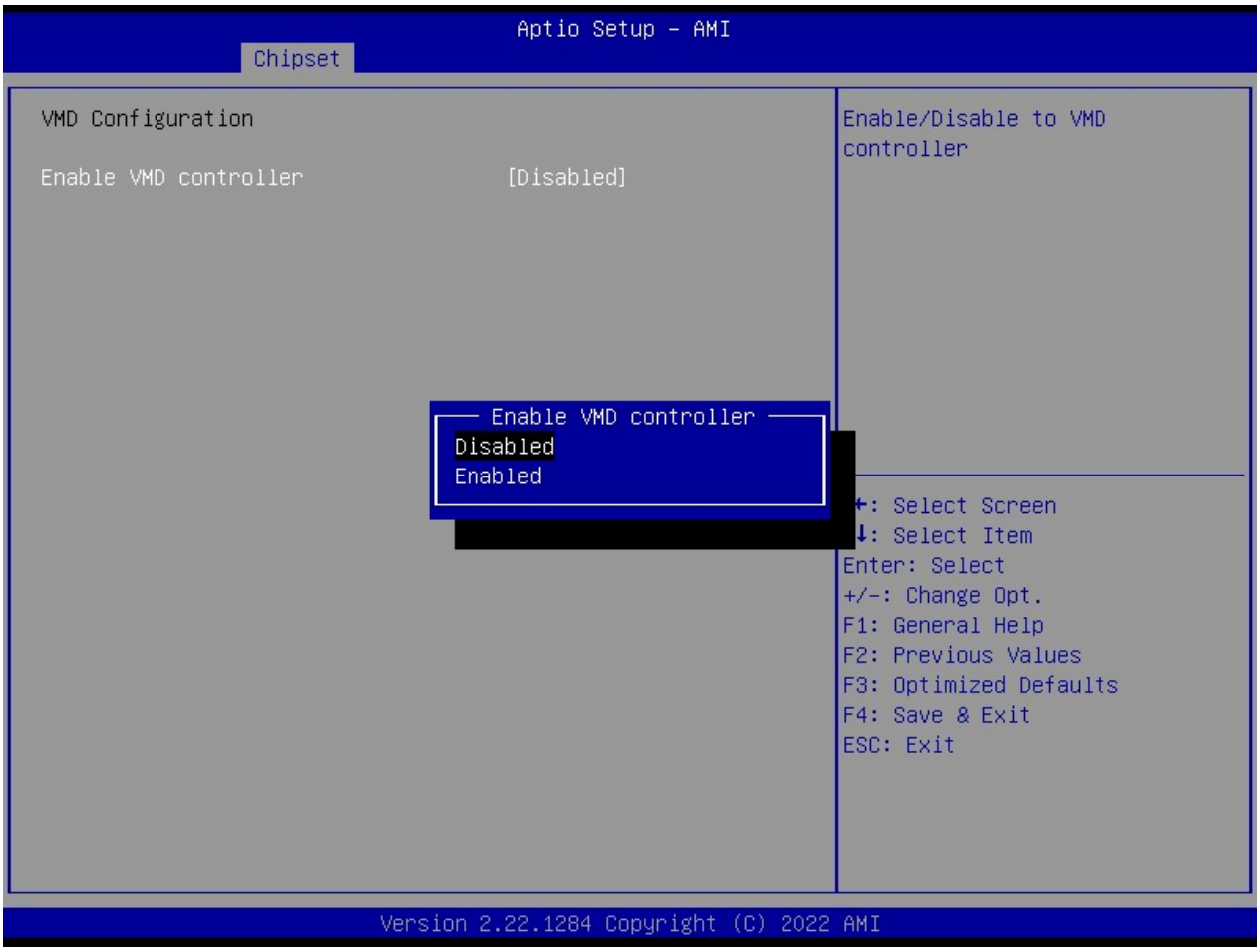


2.5.1.3.5.1 LCD Control [Disabled]

Enable/Disable LCD. LCD is LVDS or eDP panel

Configuration options: [Disabled], [Enabled]

2.5.1.4 VMD Setup Menu



2.5.1.4.1 Enable VMD Controller [Disabled]

Enable/Disable to VMD controller

Configuration options: [Disabled], [Enabled]

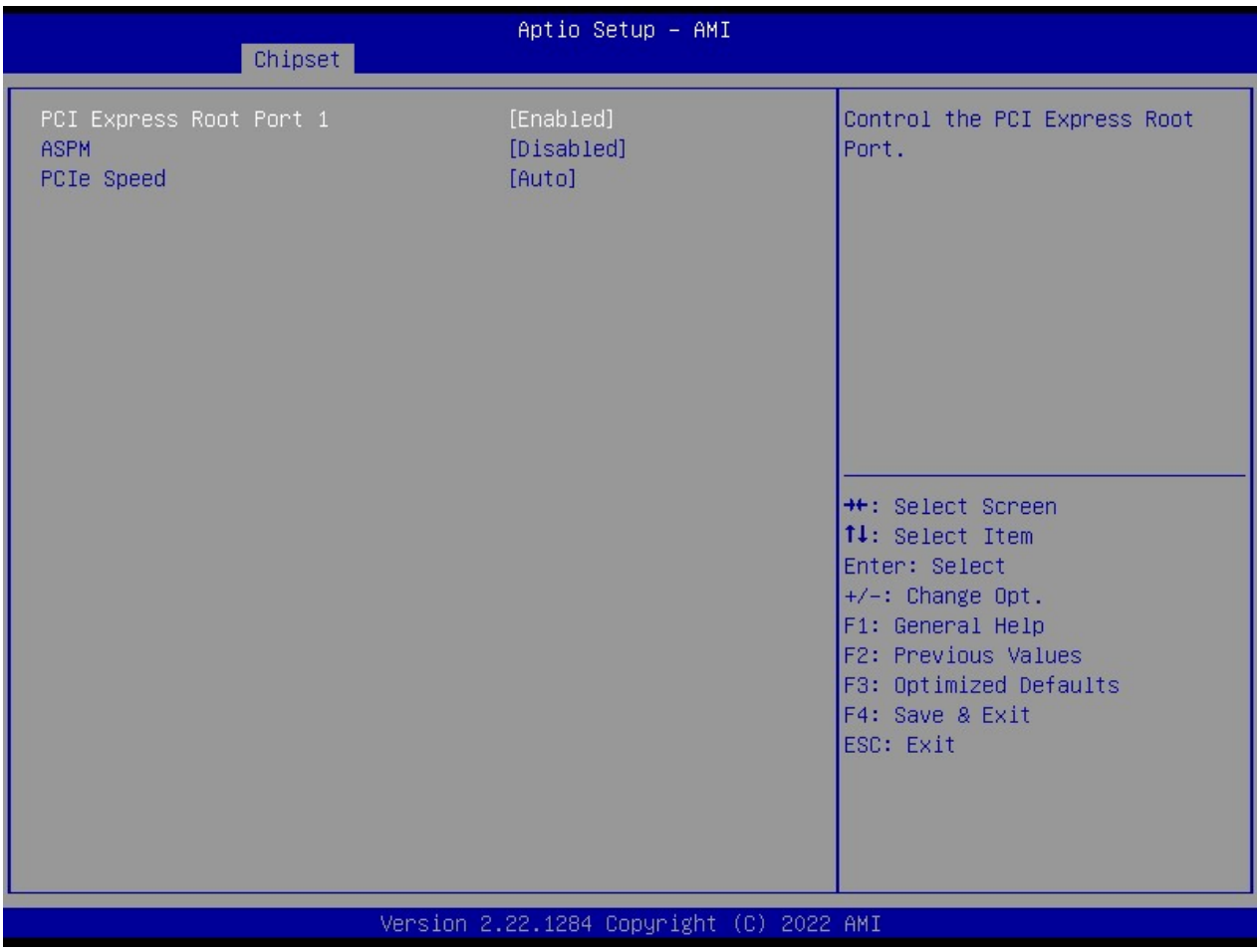
2.5.1.5 PCI Express Configuration

2.5.1.5.1 Detect Non-Compliance Device [Disabled]

Detect Non-compliance Device in PEG

Configuration options: [Disabled], [Enabled]

2.5.1.5.2 PCI Express Root Port 1 (x4 Key M)



2.5.1.5.2.1 PCI Express Root Port 1 [Enabled]

Control the PCI express Root Port

Configuration options: [Enabled], [Disabled]

2.5.1.5.2.2 ASPM [Disabled]

Set the ASPM level

Configuration options: [Disabled], [L0S], [L1], [L0sL1]

2.5.1.5.2.3 PCIe Speed [Auto]

Configure PCIe Speed

Configuration options: [Auto], [Gen1], [Gen2], [Gen3], [Gen4]

2.5.1.5.3 PCI Express Root Port 2 (x16 PEG slot)

2.5.1.5.3.1 PCI Express Root Port 2 [Enabled]

Control the PCI express Root Port

Configuration options: [Enabled], [Disabled]

2.5.1.5.3.2 ASPM [Disabled]

Set the ASPM level

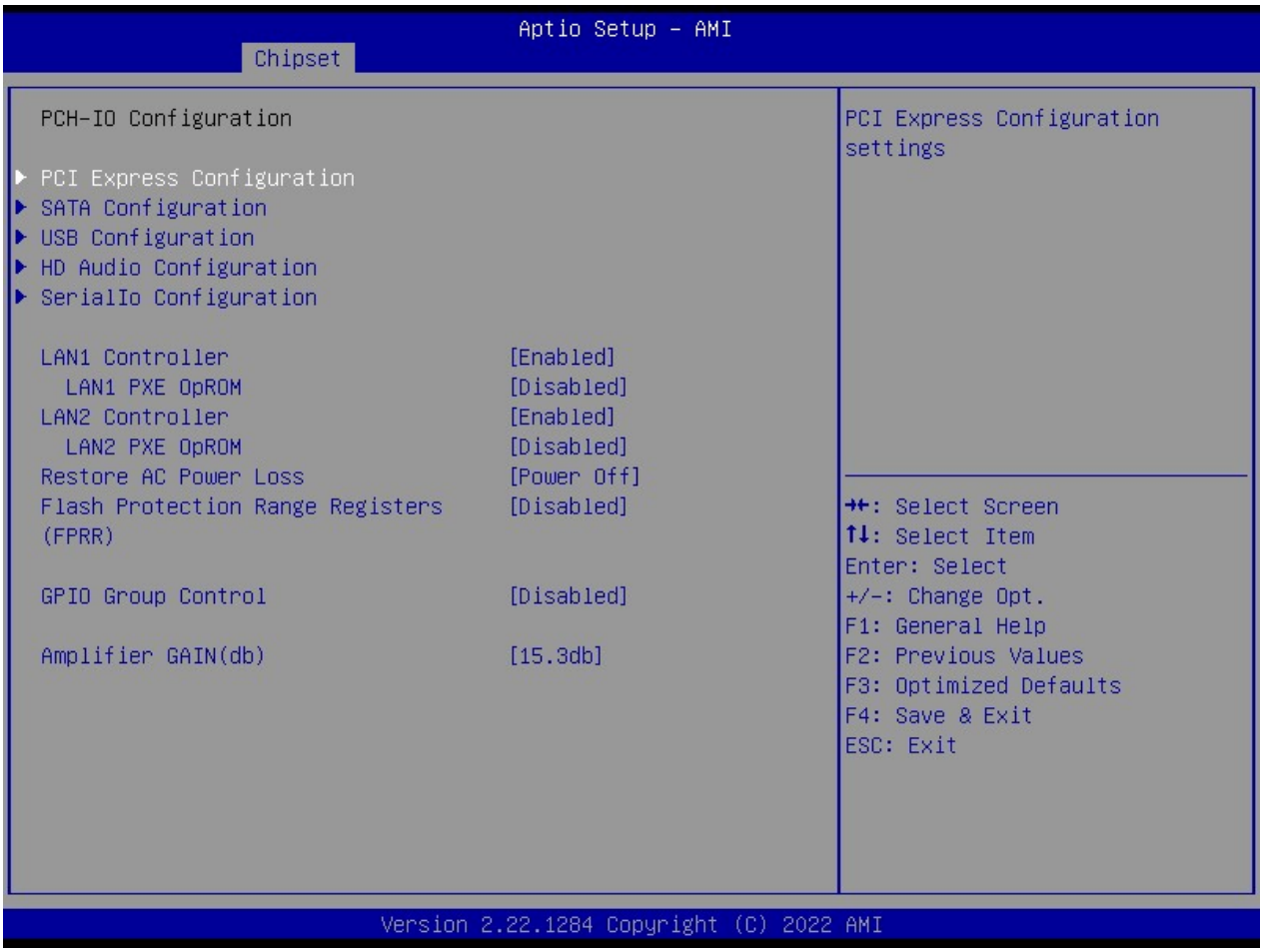
Configuration options: [Disaled], [L0S], [L1], [L0sL1]

2.5.1.5.3.3 PCIe Speed [Auto]

Configure PCIe Speed

Configuration options: [Auto], [Gen1], [Gen2], [Gen3], [Gen4], [Gen5]

2.5.2 PCH-IO Configuration



2.5.2.1 LAN1 Controller [Enabled]

Enable or Disable onboard LAN1

Configuration options: [Disabled], [Enabled]

2.5.2.2 LAN1 PXE OpROM [Disabled]

Enabled or Disabled boot option for LAN1 controller

Configuration options: [Disabled], [Enabled]

2.5.2.3 LAN2 Controller [Enabled]

Enable or Disable onboard LAN2

Configuration options: [Disabled], [Enabled]

2.5.2.4 LAN2 PXE OpROM [Disabled]

Enabled or Disabled boot option for LAN2 controller

Configuration options: [Disabled], [Enabled]

2.5.2.5 Restore AC Power Loss [Power off]

Specify what state to go to when power is re-applied after a power failure (G3 state)

Configuration options: [Power on], [Power off], [Last State]

2.5.2.6 Flash Protection Range Registers (FPRR) [Disabled]

Enable Flash Protection Range Registers

Configuration options: [Disabled], [Enabled]

2.5.2.7 GPIO Group Control [Disabled]

Configure the digital GPIO pins

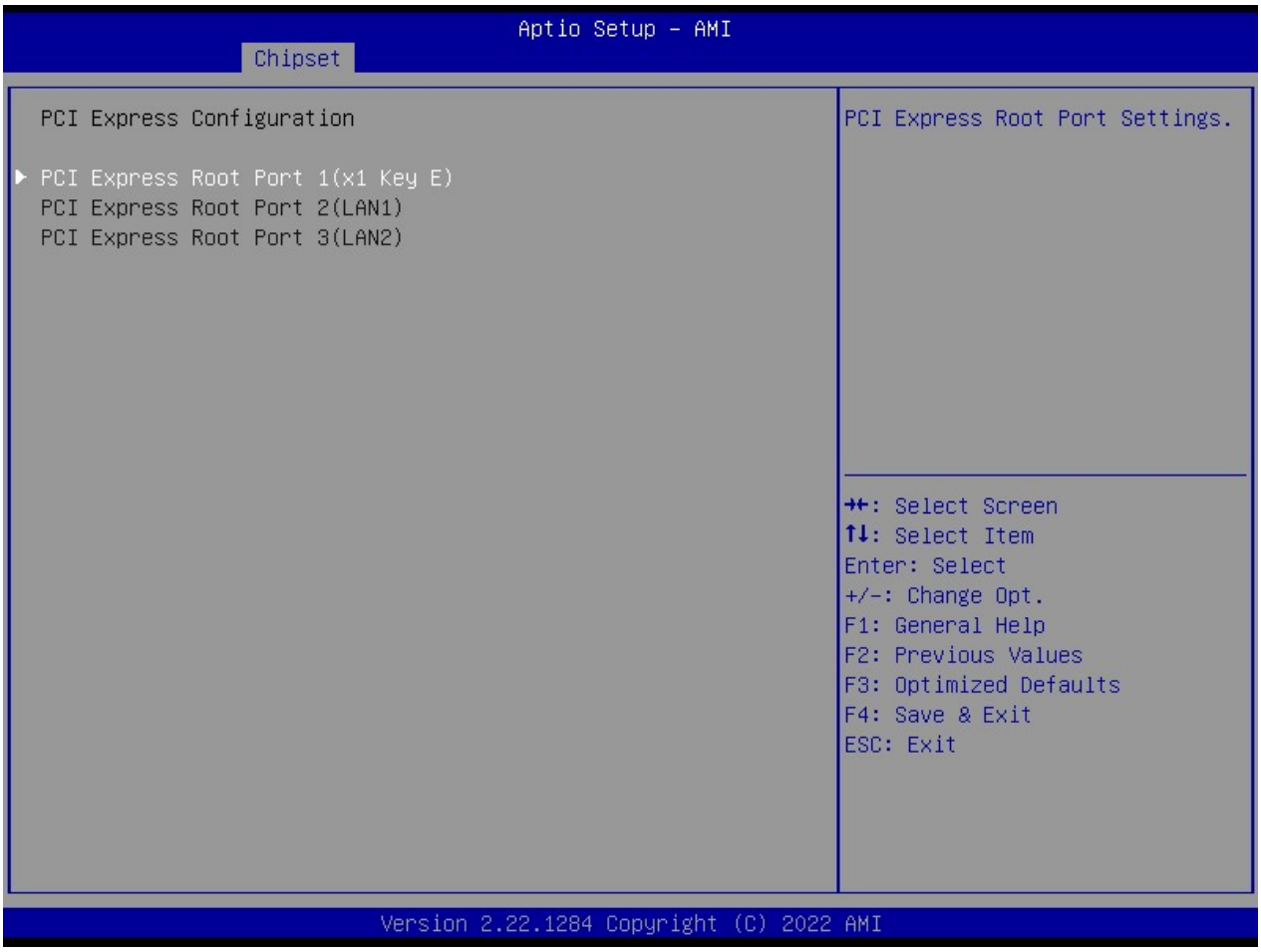
Configuration options: [Disabled], [Enabled]

2.5.2.8 Amplifier GAIN (db) [15.3db]

Select Amplifier GAIN value

Configuration options: [15.3db], [21.2db], [27.2db], [31.8db]

2.5.2.9 PCI Express Configuration



2.5.2.9.1 PCI Express Root Port 1 (x1 Key E)

2.5.2.9.1.1 PCI Express Root Port 1 [Enabled]

Control the PCI Express Port

Configuration options: [Disabled], [Enabled]

2.5.2.9.1.2 ASPM 1 [Disabled]

Set the ASPM level: Force L0s- Force all links to L0s State; Auto- BIOS auto configure; Disabled- Disables ASPM

Configuration options: [Disabled], [L1], [Auto]

2.5.2.9.1.3 PCIe Speed [Auto]

Select PCI Express Port speed

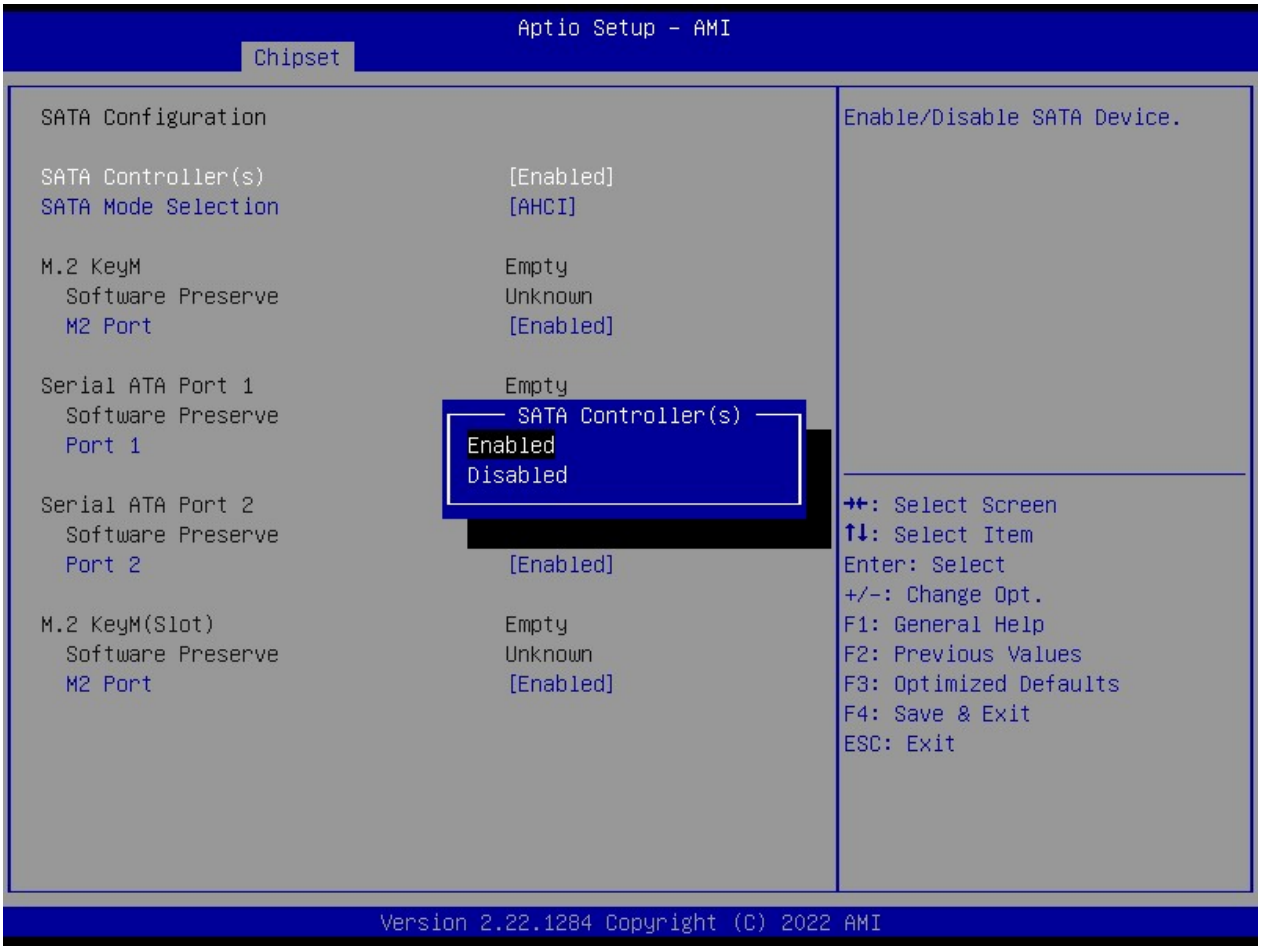
Configuration options: [Auto], [Gen1], [Gen2], [Gen3], [Gen4]

2.5.2.9.1.4 Detect Non-Compliance Device [Disabled]

Detect non-compliance PCI express Device, If enabled, it will take more time at Post time.

Configuration options: [Disabled], [Enabled]

2.5.2.10 SATA Configuration



2.5.2.10.1 SATA Controller(s) [Enabled]

Enable or Disable SATA device

Configuration options: [Enabled], [Disabled]

2.5.2.10.2 SATA Mode Selection [AHCI]

Determines how SATA controller operate

Configuration options: [AHCI]

2.5.2.10.3 M.2 Port [Enabled]

Enable or Disable M.2 port

Configuration options: [Enabled], [Disabled]

2.5.2.10.4 Serial ATA Port 1 [Enabled]

Enable or Disable SATA port 1

Configuration options: [Enabled], [Disabled]

2.5.2.10.5 Serial ATA Port 2 [Enabled]

Enable or Disable SATA port 2

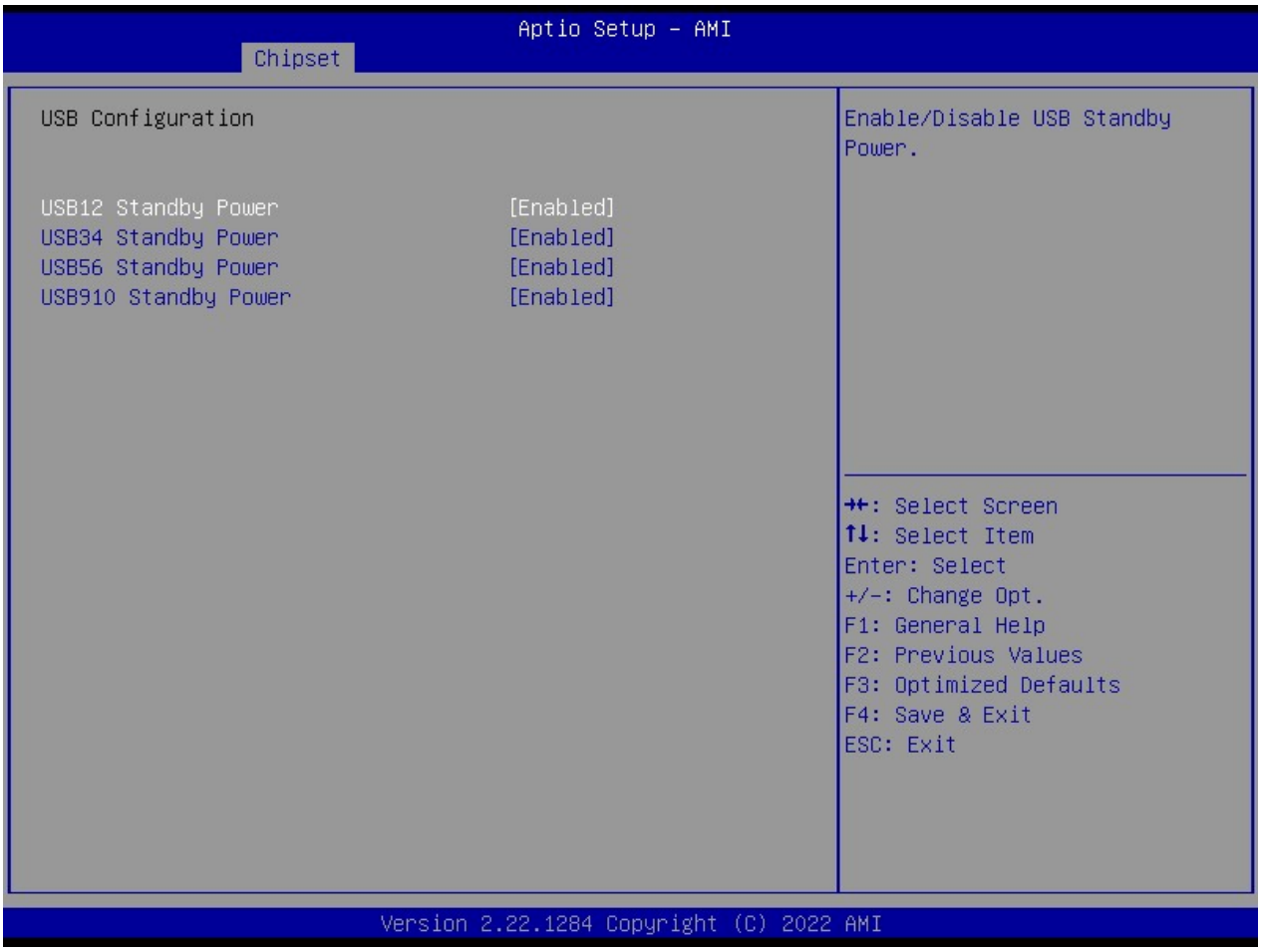
Configuration options: [Enable], [Disabled]

2.5.2.10.6 M.2 Port [Enabled]

Enable or Disable M.2 port

Configuration options: [Enabled], [Disabled]

2.5.2.11 USB Configuration



2.5.2.11.1 USB12 Standby Power [Enabled]

Enable or Disable USB standby power

Configuration options: [Disabled], [Enabled]

2.5.2.11.2 USB34 Standby Power [Enabled]

Enable or Disable USB standby power

Configuration options: [Disabled], [Enabled]

2.5.2.11.3 USB56 Standby Power [Enabled]

Enable or Disable USB standby power

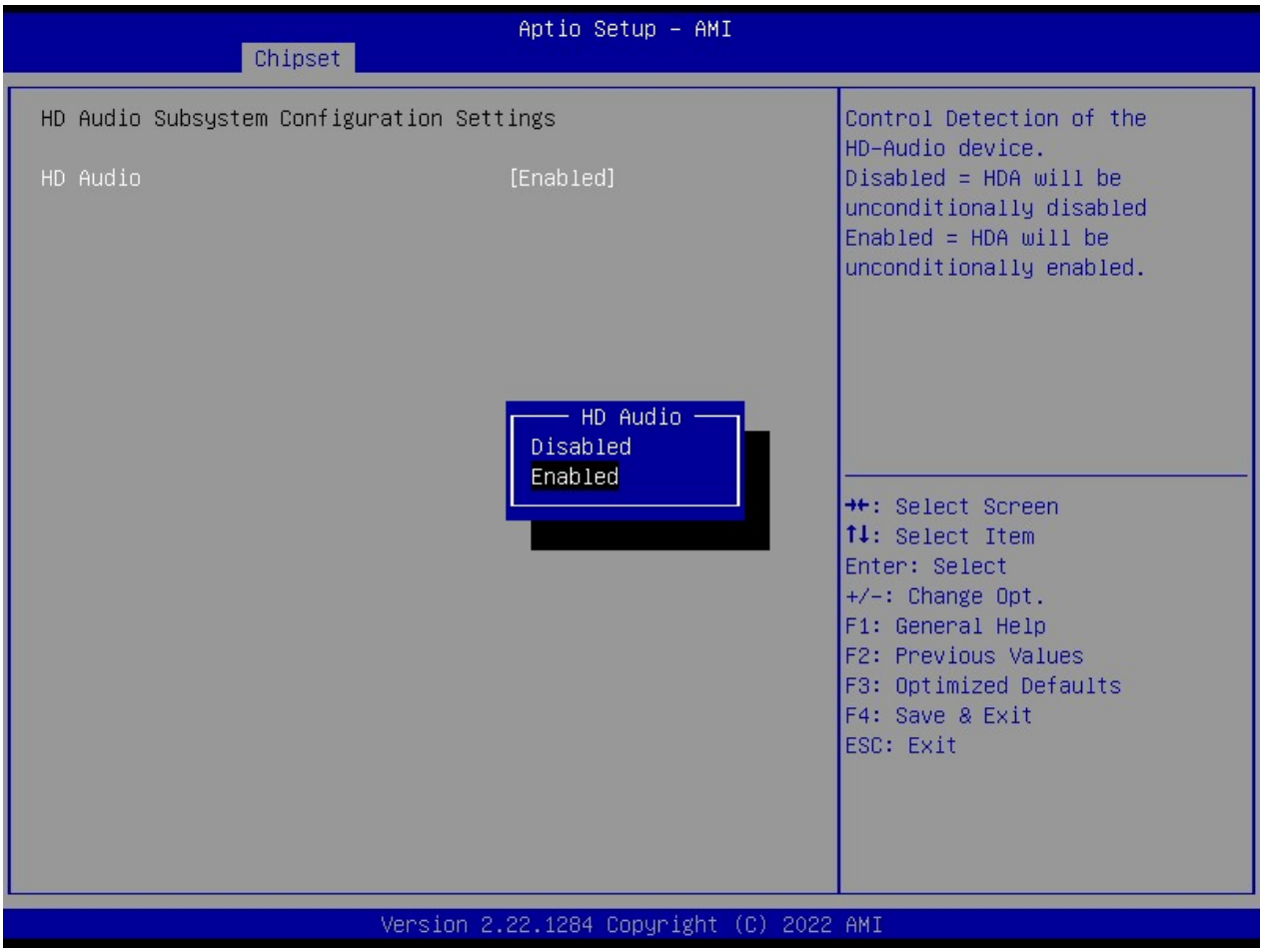
Configuration options: [Disabled], [Enabled]

2.5.2.11.4 USB910 Standby Power [Enabled]

Enable or Disable USB standby power

Configuration options: [Disabled] [Enabled]

2.5.2.12 HD Audio Configuration

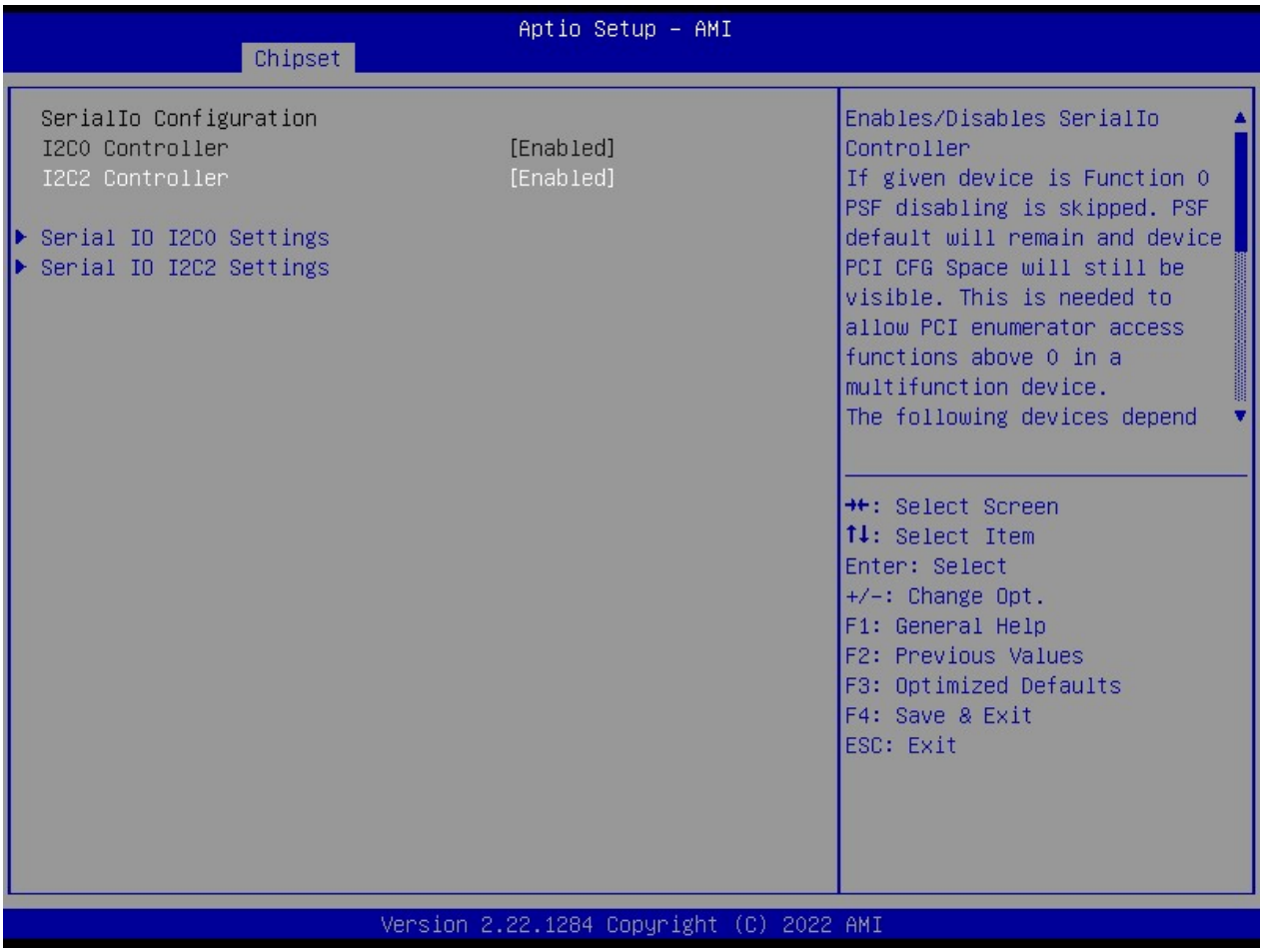


2.5.2.12.1 HD Audio [Enabled]

Control Detection of the HD-Audio device.

Configuration options: [Disabled], [Enabled]

2.5.2.13 Serial IO Configuration



2.5.2.13.1 Serial IO I2C0 Controller [Enabled]

Enabled/Disabled Serial IO Controller

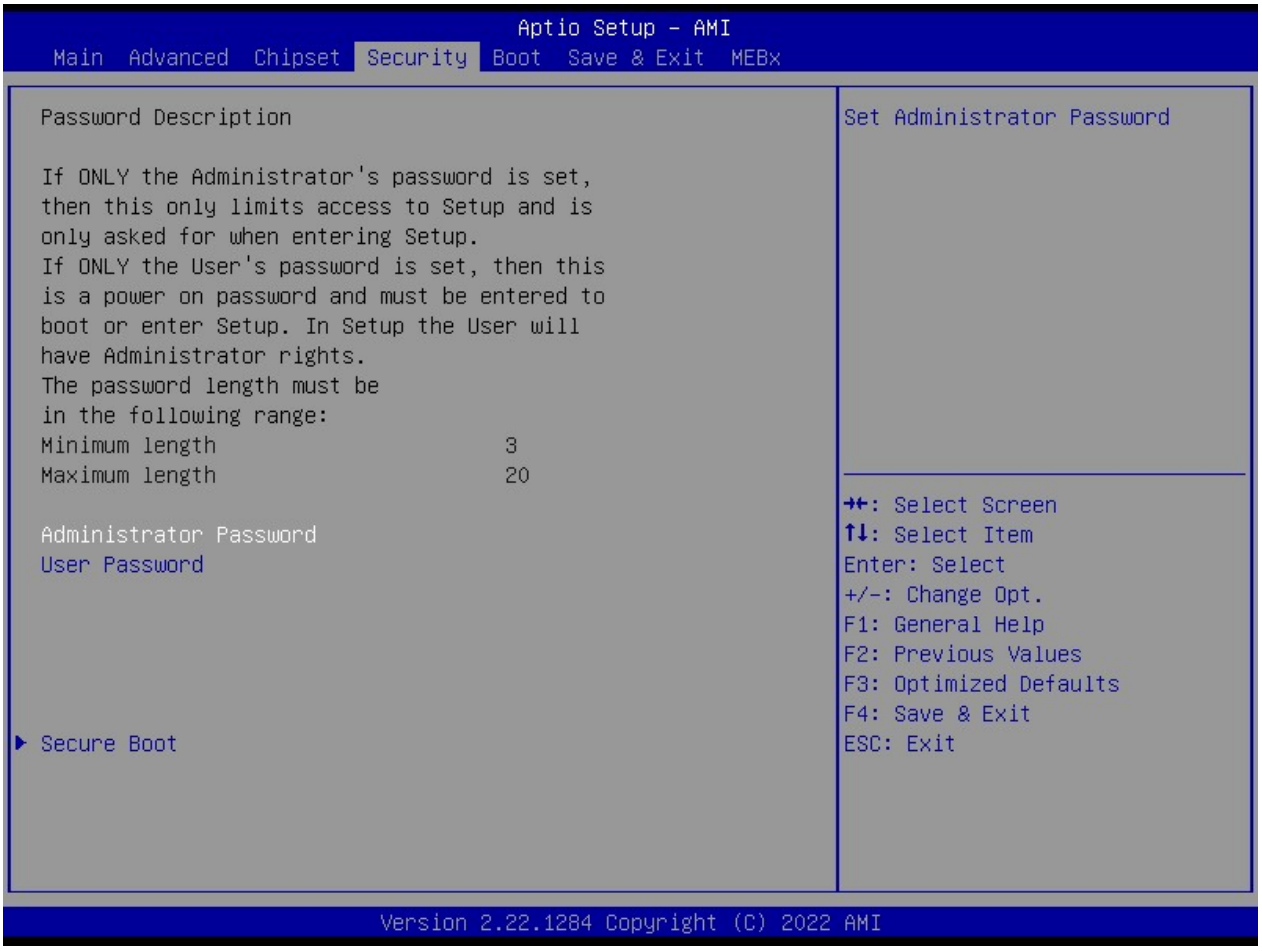
Configuration options: [Disabled], [Enabled]

2.5.2.13.2 Serial IO I2C2 Controller [Enabled]

Enabled/Disabled Serial IO Controller

Configuration options: [Disabled], [Enabled]

2.6 Security



2.6.1 Administrator Password

Set Administrator Password

2.6.2 User Password

Set User Password

2.6.3 Secure Boot

Secure Boot configuration. It usually requires user to provide the Secure Boot key to be implemented with a customized BIOS and the OS image.

2.6.3.1 Secure Boot [Disabled]

Secure Boot feature is active if Secure Boot is enabled. Platform key (PK) is enrolled and the system is in user mode

2.6.3.2 Secure Boot Mode [Custom]

Secure Boot Mode option: [Standard], [Custom]

2.6.3.3 Restore Factory Keys

Force system to User Mode. Install factory default Secure Boot key databases

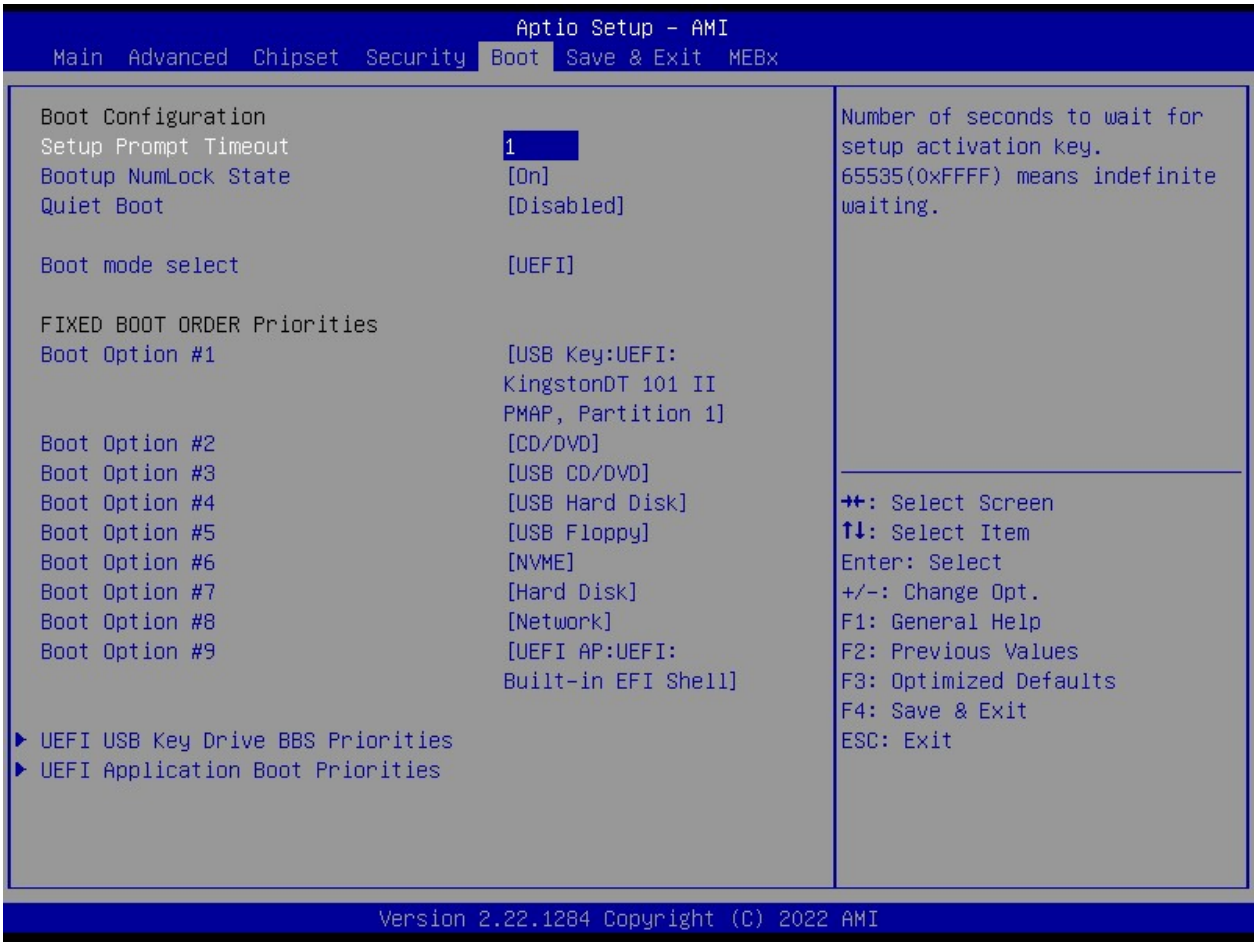
2.6.3.4 Reset To Setup Mode

Delete all Secure Boot Key databases from NVRAM

2.6.3.5 Key Management

Enable expert users to modify Secure Boot policy variables without variable authentication

2.7 Boot



2.7.1 Setup Prompt Timeout [1]

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

2.7.2 Bootup NumLock State [On]

Select the keyboard NumLock state

Configuration options: [On], [Off]

2.7.3 Quiet Boot [Disable]

Enable or disable Quick Boot option

Configuration options: [Disabled] [Enabled]

2.7.4 Boot Mode Select [UEFI]

UEFI is the only boot mode available with Alder Lake platform mainboard

Configuration options: [UEFI]

2.7.5 Fixed BOOT ORDER Priorities

The system will boot by the detected boot device with pre-set boot priorities accordingly.

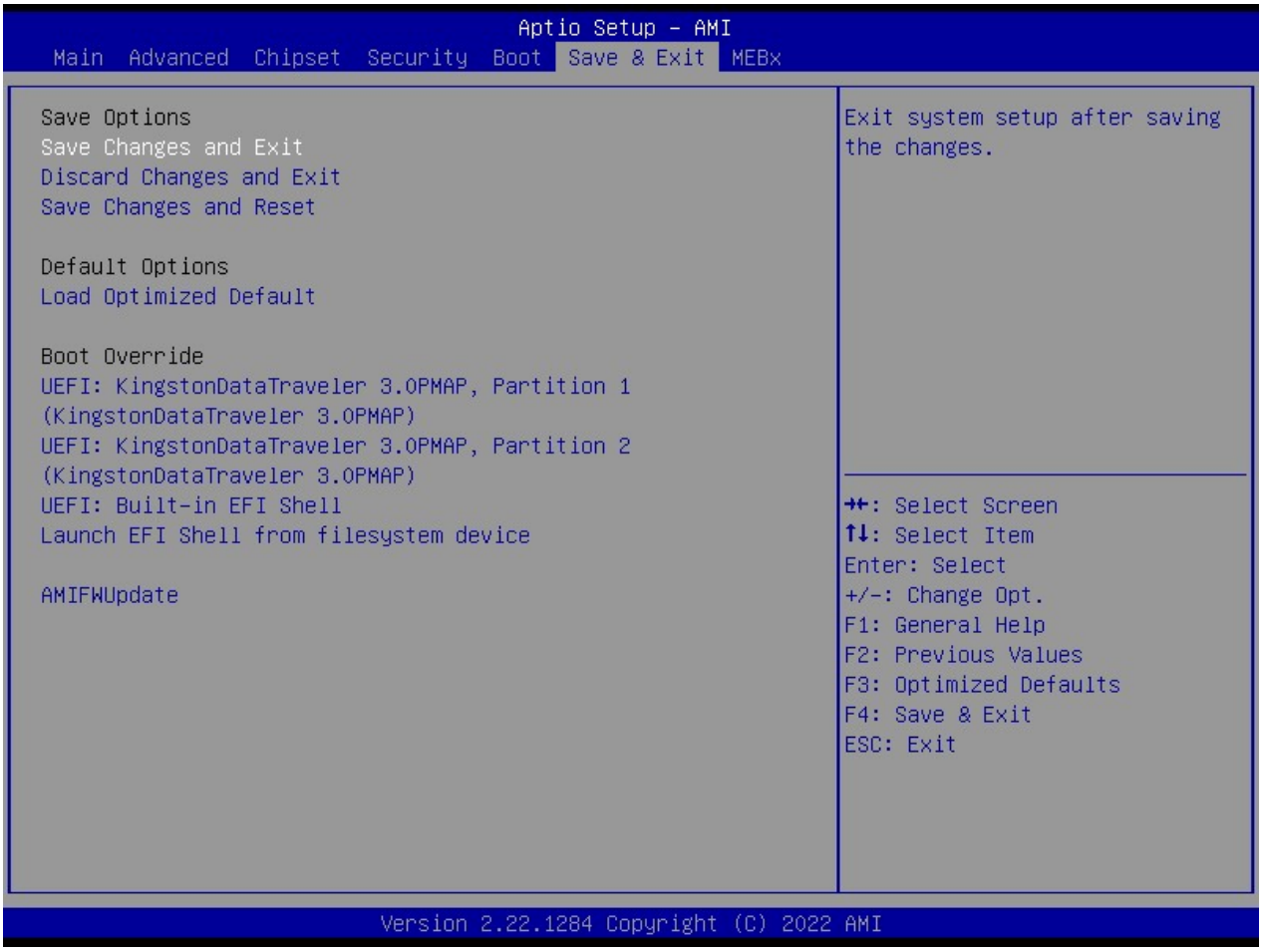
2.7.6 UEFI USB Key Drive BBS Priorities

Specifies the boot device priority sequence from available UEFI USB key Drives.

2.7.7 UEFI Application Boot Priorities

Specifies the boot device priority sequence from available UEFI Application.

2.8 Save & Exit



2.8.1 Save Changes and Exit

Exit system setup after saving the changes.

2.8.2 Discard Changes and Exit

Exit system setup without saving any changes.

2.8.3 Save Changes and Reset

Reset the system after saving the changes.

2.8.4 Restore Defaults

Restore/Load default values for all the setup options.

NOTE:

Loading this option is recommended after BIOS update. Then load "Save changes and Exit" BIOS option.

2.8.5 Boot Override

User can override the pre-set boot priority manually through this menu for detected boot devices.

NOTE:

This function will only function once after rebooted. If user prefers to set the boot device boot order permanently, then the change will need to be made under "Fixed BOOT ORDER Priorities" menu.

2.8.5.1 Launch Built-in EFI Shell

Force the system to boot into the UEFI Shell once.

2.8.5.2 Launch EFI Shell from filesystem device

Attempts to launch EFI shell application from one of the available filesystem devices.

2.8.6 AMIFWUpdate

Launches built-in AMIFWUpdate utility to update BIOS.

2.9 MEBx

Enter Intel MEBx (iAMT) menu. When entering this menu for the first time, the user password is "admin", then user needs to setup a new password in order to access this menu next time.

NOTE:

1. **Intel® ME passwords must be between 8 and 32 characters long, have at least one upper case character, one lower case character, one number, and a special character (for example: !, @, #, $, %, ^, &, *).**
2. **The MEBx menu will be prompted. Please refer to the Intel document "619907_ADL_S_TMDG_Rev1p0.pdf" for option details.**

(https://www.intel.com/content/www/us/en/support/articles/000005897/boards-and-kits/desktop-boards.html).

Chapter 3: Application Note

Please read the following application notes before proceed with the system setup and/or OS installation:

3.1 PXE Boot:

1. Connect ethernet cable with desired LAN1 or LAN2 port at rear I/O of MX680RD board.

NOTE:

Where "LAN1" is located right next to the rear I/O audio port. "LAN2" is located next to the rear I/O USB-C port (USB-P7).

2. Enter BIOS menu.
3. Under "Advanced"->"Network Stack Configuration"; enable "Network Stack", and then enable the desired "IPv4 PXE Support" or "IPv6 PXE Support" (choose only one).
4. under "Chipset"->"PCH-IO Configuration"; enable the desired "LAN1 PXE OpROM" or "LAN2 PXE OpROM" (choose only one).
5. Under "Boot"; change "Boot Option #1" to "Network".
6. Under "Save & Exit", click on "Save Changes and Exit".
7. Under the system reboot, the screen shall prompted with message "Checking Meia Presence….", "Media Present…..", "Start PXE over IPv# (# is either 4 or 6, depending on what you had chosen at step C) on MAC (showing the MAC address of chosen LAN port).

3.2 TPM Support (Infineon TPM (IFX), or Intel PTT (INTC)):

1. Enter BIOS menu.
2. Under "Advanced"->"Trusted Computing";
   A. Under "TPM Device Selection"; choose the desired TPM device "dTPM" for Infineon TPM (IFX), or "PTT" for Intel PTT (INTC).
   B. Under "Security Device Support", change it to "Enable".
3. Under "Save & Exit" option, choose "Save Changes and Exit".
4. The system shall reboot once. Enter BIOS menu again.

5. Enter "Advanced"->"Trusted Computing".
   A. If you selected "TPM Device Selection" as "dTPM", make sure "Vendor" section is shown as "IFX".
   B. if you chose "TPM Device Selection" as "PTT", make sure "Vendor" section is shown as "INTC".
6. Let the system reboot into Windows environment, under "Search", type "Device Manager". And make sure the Device Manager displays the option "Security devices"->"Trusted Platform Module 2.0" and there is no any exclamation mark or question mark associated with it.
7. Under "Search", type "Manage Bitlocker"; the menu "BitLocker Drive Encryption" shall be prompted. Click on "TPM Administration" at lower left-hand corner of its screen.
8. The next screen shall prompt with the status of TPM;
   A. Make sure "Status" section is indicating "The TPM is ready to use".
   B. Under "TPM Manufacturer Information" section, the "Manufacturer Name" is shown as "IFX" if you chose "dTPM" under step"2A" above.

   Or

   "INTC" if you selected "PTT" under step "2A" above.
9. If the information at steps "6", "7", & "8" were verified to be corrected, you may click on "Turn on BitLocker" option under "BitLocker Drive Encryption" screen to start BitLocker execution process.

3.3 Clear CMOS when a different model of CPU is installed:

If a different model of CPU is being installed with the same MX680RD board, it is recommended to clear the CMOS once in order to be sure previous CPU information stored at NVRAM is cleared.

3.4 First Boot Time after a new CPU is installed, or power on at first time:

The first boot time (system post) when changed a new processor or system power on first time will be longer (about 30 seconds or more), which is normal. The subsequent boot times (system post) will be shorter.

3.5 Multiple Displays (through Intel Video Graphic):

1. Due to the limitations of Intel video driver, 4 display outputs are the maximum of multiple video outputs available with MX680RD board.
2. It is recommended that if user prefer to have multiple display outputs, the physical display devices (DP monitors, LVDS or eDP panels) can be connected to the desired video port before power on the system. (maximum 4 display output connections).

NOTE:

LVDS panel and eDP panel can't be used simultaneously. Only either one of them can be connected at once.

3. Once the system is loaded into Windows desktop, user may conduct further adjustments through Window's "Display Settings" (right click on the Windows desktop), and/or through "Intel Graphics Command Center" (through Windows Start Menu).

3.6 The optional Realtek Audio Console Installation:

The optional "Realtek Audio Console" will be installed after the Win10 is being updated to Version "22H2" (through "Windows Update").

3.7 Intel VMD (RAID):

1. For RAID 0/1: Install two PCIe (NVMe) SSDs on both M.2 slots. Or two SATA signal SSDs on two SATA ports of MX680RD.
2. For RAID 5: Install 3 SATA signal SSDs on both SATA ports and M.2 slots.
3. For RAID 10: Install 4 SATA signal SSDs on both SATA ports and M.2 slots.

NOTE: For the RAID configuration:

1. Use only all SATA signal SSDs, OR all M.2 PCIe (NVMe) SSDs.
2. Do not mix SATA signal SSDs with M.2 PCIe (NVMe) SSDs. Only either type of SSD can be used on the same board for RAID configuration.

4. Turn-on system, enter BIOS.
5. Enter "Chipset"->"System Agent (SA) Configuration"->"VMD Setup menu"->"Enable VMD Controller"; set it to "enabled">. Then save and exit BIOS.
6. Enter BIOS again. Enter "Advanced"->"Intel Rapid Storage Technology", where it displays the model name of installed two M.2 NVME SSDs (or model names of installed two SATA disks).
7. Click on "Create RAID Volume", and set the "RAID level" as "RAID 0 (Stripe)" or "RAID 1 (Mirror)".
8. Under "Select Disks", mark "x" on both identified disks.
9. Click on "Create Volume". The BIOS will prompt with screen that shows "Volume1, RAID mode, storage capacity, normal".
10. Save and exit BIOS.
11. Insert USB keys that contains the Win10 installation files and BCM provided driver "(OPTIONAL) RST_19.2.0.1003" to MX680RD board.
12. Turn-on system, the Win10 installation process begins.
13. Under the screen "Where do you want to install Windows" (the HDD partitions), there is no any partition displays on the list. Click on "Load driver" Option.
14. Click on "Browse", then point to the directory where the BCM provided driver "(OPTIONAL) RST_19.2.0.1003"->"F6 (browse during Win installation)" ->"VMD" -> "f6vmdflpy-x64", then click on "OK".
15. Click on the option "Intel RST VMD Controller 467F", then click on "Next" to proceed.
16. The partition will be displayed, click on "Next" to continue Win10 installation process.

17. After the Win10 installation is completed, install the Intel RST driver.

3.8 The "JAMP1" audio header:

When the rear I/O audio port is connected with speakers, there is no audio output on "JAMP1" header, unless the speaker connection on the rear I/O connection is disconnected.

3.9 The Intel "MEBx" (iAMT):

1. Enter BIOS menu. ..
2. Enter "MEBx" option (on far right of BIOS menu).
3. Click on "Intel ME Password. For the 1st time enter, type "admin" first, then Intel MEBx will ask for a new password setup.

NOTE:

Intel® ME passwords must be between 8 and 32 characters long, have at least one upper case character, one lower case character, one number, and a special character (for example: !, @, #, $, %, ^, &, *).

4. The MEBx menu will be prompted.

3.10 Driver Installation Recommendations:

A. Intel DTT driver installation (This driver will remove the exclamation mark for):

i. **"PCI Data Acquisition and Signal Processing Controller" (after DTT driver installed, it becomes "Intel(R) Innovation Platform Framework Processor Participant").**

ii. **"Unknown device" (after DTT driver installed, it becomes "Intel(R) Innovation Platform Framework Manager").**

Here is recommended installation procedure:

1. **After BCM MX680RD driver package 1~7 was installed, check under Windows "Device Manager", there are two items with exclamation marks; " PCI Data Acquisition and Signal Processing Controller" and one "Unknown Device".**
2. **Go to "Device Manager", then click on "PCI Data Acquisition and Signal Processing Controller"->"Driver"->"Update Driver"-> "Browse my computer for drivers"->click on "Browse".**
3. **Then point the link to BCM driver package "8. Intel DTT_1.0.11400.36477"->"IPF"->"ipf-core-1.0.11400.36477"->"drivers"->"x64". And then click on "Next" for driver installation. The "PCI Data Acquisition and Signal Processing Controller" shall be disappeared from Device Manager list, and becomes "Intel(R) Innovation Platform Framework Processor Participant".**
4. **Go to "Device Manager", then click on "Unknown Device"->"Driver"->"Update Driver"->"Browse my computer for drivers"->click on "Browse".**
5. **Then point the link to BCM driver package "8. Intel DTT_1.0.11400.36477"->"IPF"->"ipf-core-1.0.11400.36477"->"drivers"->"x64". And then click on "Next" for driver installation. The last "Unknown Device" shall be disappeared from Device Manager list, and becomes "Intel(R) Innovation Platform Framework Manager".**

B. Exclamation mark shown for USB after BCM MX680RD driver package 1~8 was installed: If your Win10 installation package is not 22H2. There is a great chance that you will see one "Universal Serial Bus (USB) Controller" shown with exclamation mark under Device Manager. In this case, just go to "Windows Update Settings". And update Win10 version to "22H2". This exclamation mark for USB shall be disappeared.