

MBB1001

**AMD Ryzen™ Embedded 7000
ATX Motherboard**

User's Manual

Version 1.0
(February 2025)

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This product has passed CE tests for environmental specifications and limits and complies with EU directives. In a domestic environment, it may cause radio interference, requiring users to take adequate measures."



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Green IBASE



This product complies with RoHS 2 restrictions, which prohibit the use of certain hazardous substances in electrical and electronic equipment. The following substances must not exceed the specified concentrations:

- Hexavalent chromium: 1,000 ppm
- Poly-brominated biphenyls (PBBs): 1,000 ppm
- Poly-brominated diphenyl ethers (PBDEs): 1,000 ppm
- Cadmium: 100 ppm
- Mercury: 1,000 ppm
- Lead: 1,000 ppm
- Bis(2-ethylhexyl) phthalate (DEHP): 1,000 ppm
- Butyl benzyl phthalate (BBP): 1,000 ppm
- Dibutyl phthalate (DBP): 1,000 ppm
- Diisobutyl phthalate (DIBP): 1,000 ppm

Important Safety Information

Carefully read the precautions before using the board.

Care for your iBASE products:

- Before cleaning the PCB, ensure the device is unplugged and powered off
- Use circuit board cleaner or alcohol cautiously to avoid damage to sensitive components.
- Vacuum the dust with a computer vacuum cleaner to prevent the fan from being clogged.



WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do Placing heavy objects on the product may damage internal components or affect performance.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static mat.
- Hold the edges of the PCB when handling.
- When handling, avoid touching the surface of the PCB and hold it by its edges or non-metallic components.
- Ground yourself by touching a grounded metal object, such as a metal pipe or grounded equipment, to discharge static.



CAUTION

Danger of explosion if the internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions or recycle them at a local recycling facility or battery collection point.

Warranty Policy

- **IBASE standard products:**

24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

- * Products, however, that fail due to misuse, accident, improper installation or unauthorized repair shall be treated as out of warranty and customers shall be billed for repair and shipping charges.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.
 - Product model name
 - Product serial number
 - Detailed description of the problem
 - The error messages in text or in screenshots if there is any
 - The arrangement of the peripherals
 - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, please visit the IBASE website to apply for an RMA number.

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Chapter 1

General Information

The information provided in this chapter includes:

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

1.1 Introduction

MBB1001 is an ATX motherboard based on AMD Ryzen Embedded 7000 Processors with the B650 chipset. With support for four DDR5 memory slots that accommodate up to 128GB and ECC, it features up to three independent displays with DisplayPort (DP), HDMI, and DVI-D interfaces. This high-performance platform is embedded with high-speed connectivity to meet the stringent demands of next-generation applications in imaging, AI, and edge computing, including dual Gigabit Ethernet LAN, multiple PCI-E slots supporting Gen5, Gen4, and Gen3, as well as two M.2 2280 slots supporting PCI-E x2 Gen4 NVMe and RAID 0, 1 configurations.



1.2 Features

- AMD Ryzen™ Embedded 7000 Processors with B650 chipset
- Dual Channel DDR5 5200, UDIMM 4 slots
Max. up to 128GB Supports ECC
- Triple display DP/HDMI/DVI-D and Dual GbE LAN
- 1x PCI-E x16 support (Gen5) / 1x PCI-E x4 support (Gen5)
- 1x PCI-E x4 support (Gen4) / 1x PCI-E x1 support (Gen3), 1x PCI
- 2x M.2 2280 (PCI-E x2 gen 4, supports NVMe) support RAID 0, 1

1.3 Packing List

Your MBB1001 package should include the items listed below. If any of the items below is missing, contact the distributor or dealer from whom you purchased the product.

- MBB1001 x 1
- IO Shield x 1
- SATA cable x 1
- COM cable x 1

1.4 Specifications

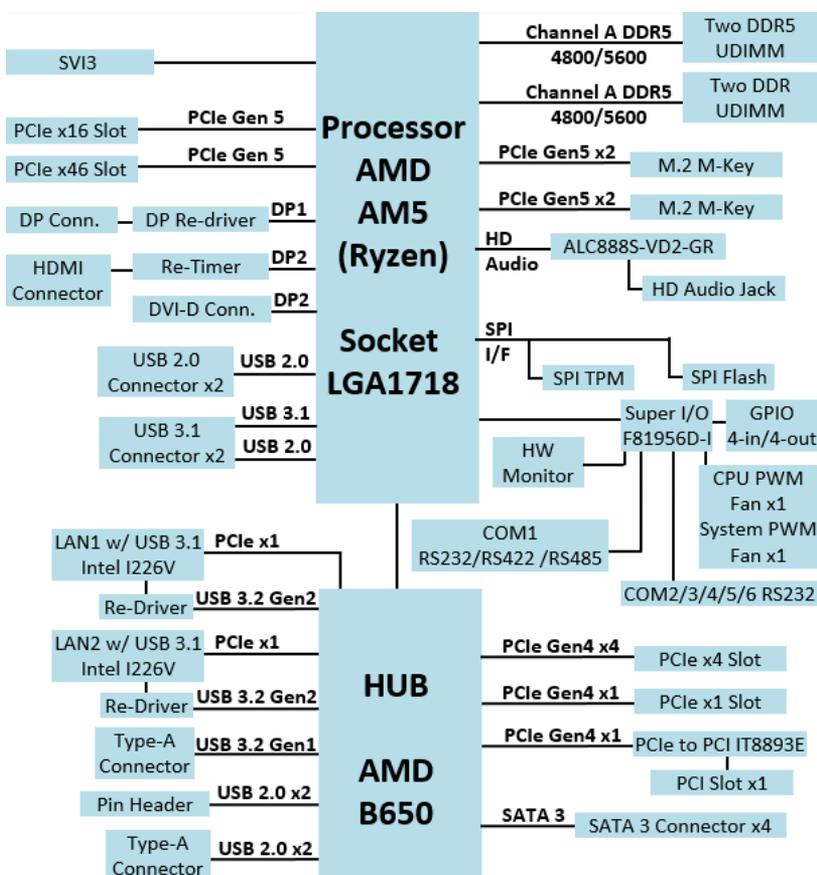
Model	MBB1001
Description	AMD Ryzen™ Embedded 7000 series ATX Motherboard
CPU Type	LGA1718
CPU Socket	AMD Ryzen™ Embedded 7000 series
PCH	B650
Memory	Memory Dual Channel DDR5 5200, UDIMM 4 slots, Max. up to 128GB; Supports ECC
Watchdog Timer	256 levels
HW Monitor	Yes
Storage Interface	NVMe
Expansion Slots	1x PCI-E x16 supports (Gen5) 1x PCI-E x4 supports (Gen5) 1x PCI-E x4 supports (Gen4) 1x PCI-E x1 supports (Gen3) 1x PCI Display Interface
Ethernet	Intel® I226LM and Intel® I226V
Display Interface	1x HDMI 2.1, 1x DP 2.0, 1x DVI-D
LAN Controller	2x Gigabit LAN / Intel I226-V

Serial Port	1x Dual DB9 stack connector for - COM #1 (RS232/422/485) (jumper-less selection) - COM #2 (RS232) 4x COM Port Header (RS232)
USB 2.0	2x USB 2.0 via pin header 2x USB 2.0 type A vertical connector
USB 3.0	4x USB 3.2 Gen 2, 2 x USB 3.2 Gen1 with PDPC support
Serial ATA	4x SATA 6Gb/s supports RAID 0, 1, 10 / UEFI Windows 10 x64 only (9.2 based driver)
Audio	1x Triplet type jack 3 x 1 for HD audio port [Line-in / Line out / Mic-in] Realtek ALC888S for 5.1 channel
Others	Digital I/O (4-in/4-out)
Dimensions (L x W)	305mm x 244mm (12" x 9.6")

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

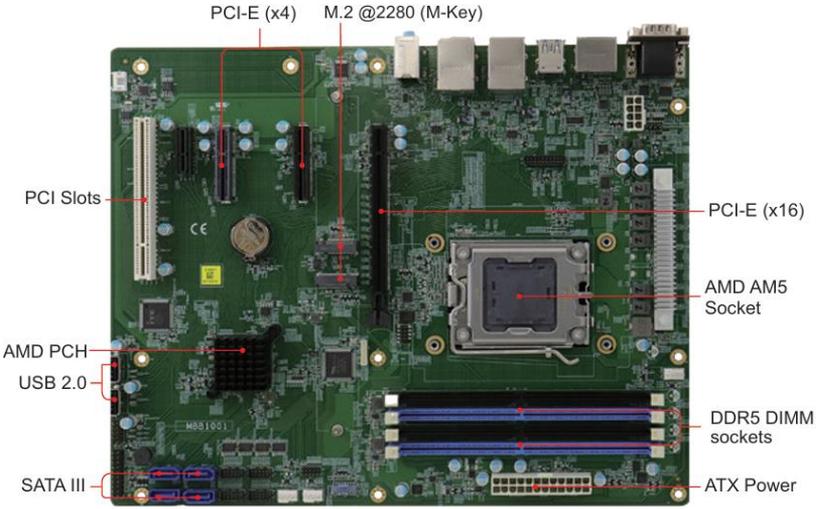
All specifications are subject to change without prior notice.

1.5 Block Diagram



1.6 Product View

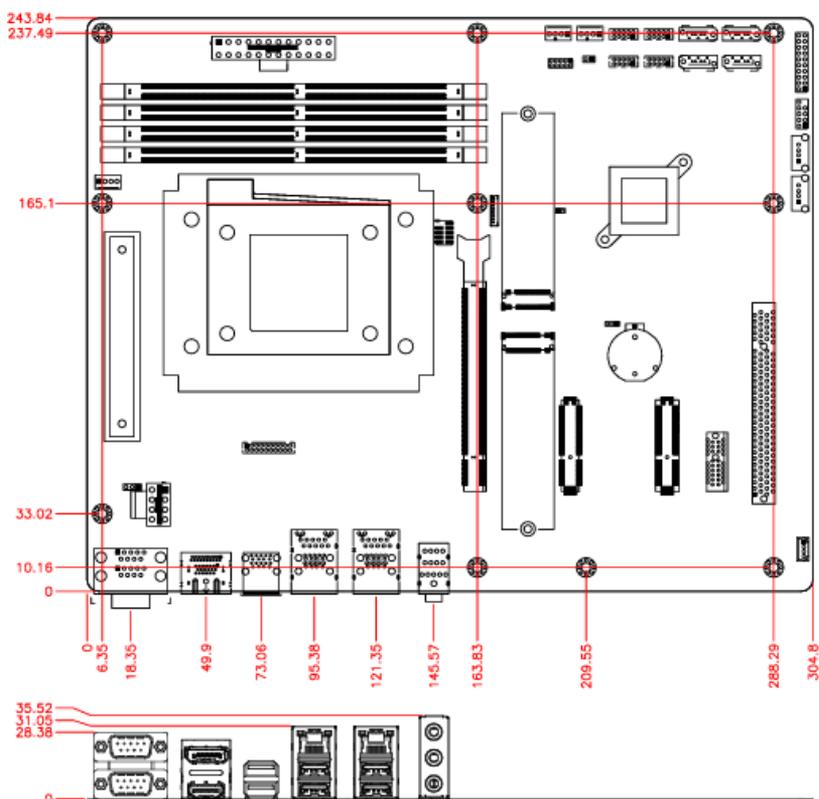
Top View



I/O View



1.7 Dimensions



Chapter 2

Hardware Configuration

This section provides information on jumper settings and connectors on the MBB1001 and other installation information in order to set up a workable system. The topics covered are:

- Essential installations
- Jumper and connector locations
- Jumper settings and information of connectors

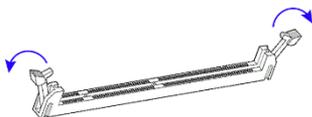
2.1 Essential Installations

Follow the instructions below to install the memory modules.

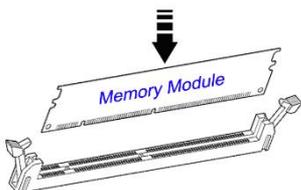
2.1.1 Installing the Memory

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

1. Align the key of the memory module with that on the memory slot and insert the module slantwise.



2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.



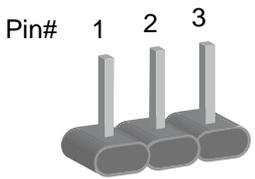
To remove the module, press the ejector tabs at both ends outwards.

2.2 Setting the Jumpers

Set up and configure your MBB1001 by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

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



A 3-pin jumper



A jumper cap

Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Illustration
Open		
1-2		
2-3		

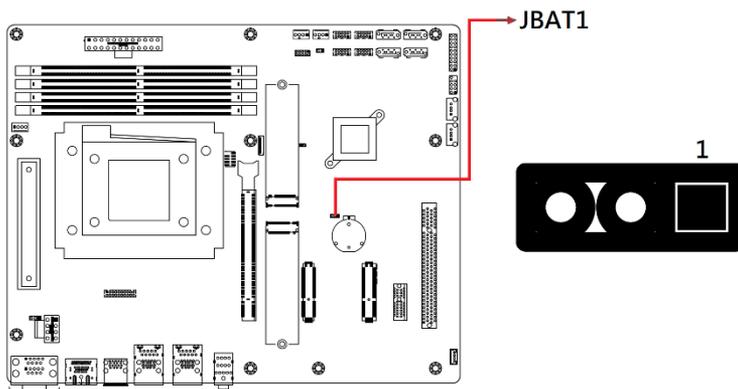
When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e., turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e., turned **Off**.

2.4 Jumpers Quick Reference

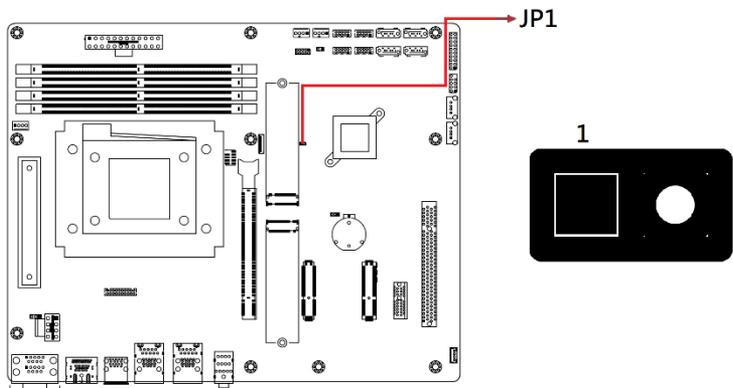
Jumper	Function
JBAT1	Clear CMOS Contents
JP1	ATX/AT Mode Setting

2.4.1 JBAT1: Clear CMOS Contents



Function	Pin closed	Illustration
Normal (default)	1-2	 1
Clear CMOS	2-3	 1

2.4.2 JP1: ATX/AT Mode Setting

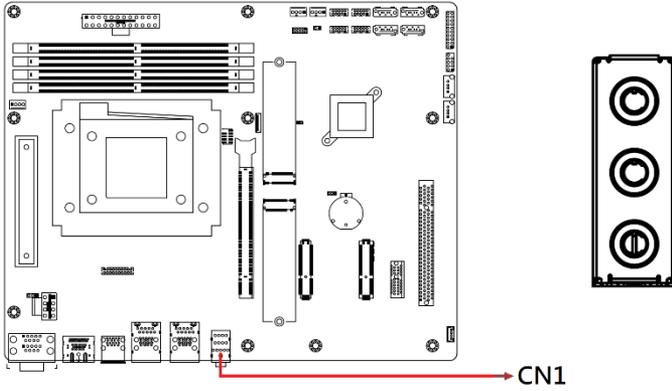


Function	Pin closed	Illustration
ATX (Default)	Open	 1
AT	Close	 1

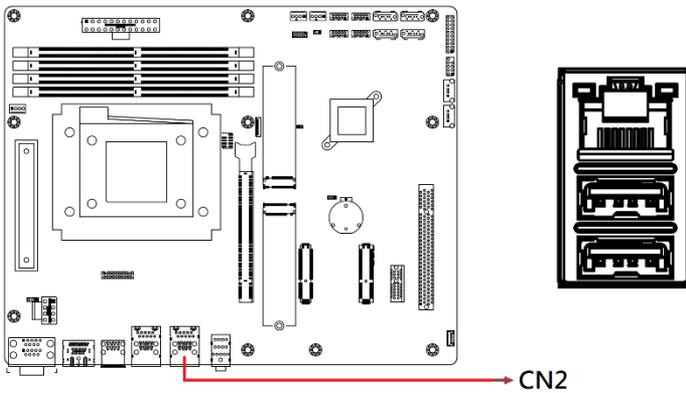
2.5 Connectors Quick Reference

Connector	Function
CN1	HD Audio Connector
CN2	Gigabit LAN (Intel I226V) + USB3.2 2/3
CN3	Gigabit LAN (Intel I226V) + USB3.2 0/1
CN4	USB 3.2 4/5 Connector
CN5	DP and HDMI Connector
CN6	COM1(upper) and COM2(bottom) Serial Ports
CN7, CN8	USB 2.0 Connector
CN9, CN10, CN11, CN12	SATA Connectors
J1	iSmart Flash Connector (Factory use only)
J3	DVI-D Connector
J4, J5	M.2 M-Key Connector
J6	SPI Flash Connector (Factory use only)
J7	eSPI Debug Connector (Factory use only)
J8	DDR5 UDIMM CHA0
J9	DDR5 UDIMM CHA1
J10	USB 2.0 Connectors
J11	DDR5 UDIMM CHB 0
J12	DDR5 UDIMM CHB 1
J13	Digital I/O
J14	Front Panel Function Connector
J15, J20, J16, J21	COM3~COM6 RS232 Serial Ports
J18	ATX Power Supply Connector
ATX_12V_2X1	ATX 12V Power Connector
CPU_FAN1	CPU Fan Power Connector
SYS_FAN1	System Fan1 Power Connector
SYS_FAN2	System Fan2 Power Connector
PCIE1	PCI-E X1 Slot
PCIE2, PCIE3	PCI-E X4 Slot
PCIE4	PCI-E X16 Slot
PCI1	PCI 32-bit Slot

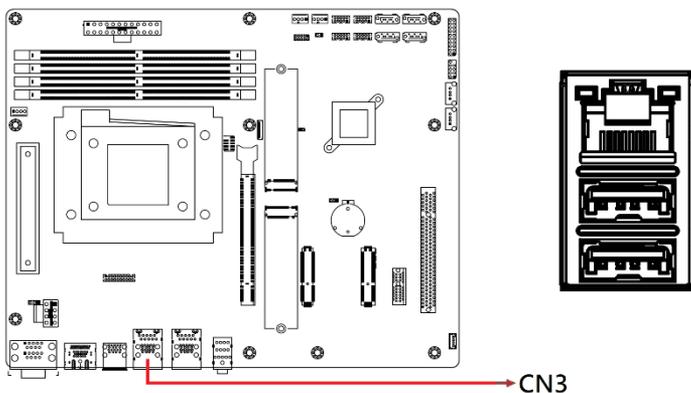
2.5.1 CN1: HD Audio Connector



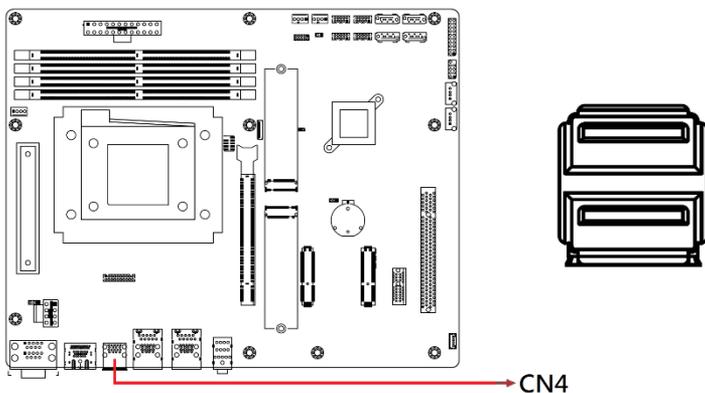
2.5.2 CN2: Gigabit LAN (Intel I226V) + USB 3.2 2/3



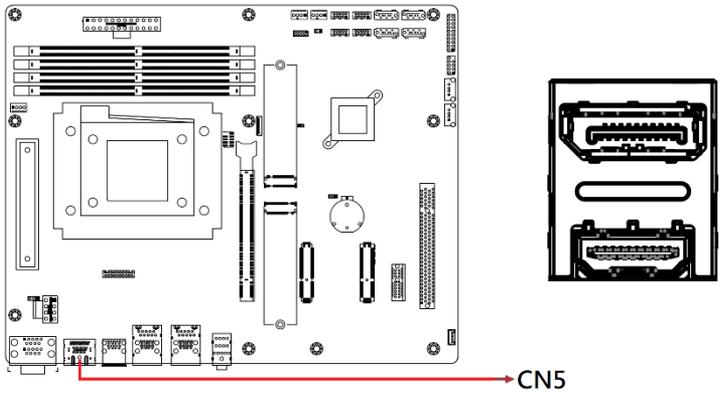
2.5.3 CN3: Gigabit LAN (Intel I226V) + USB 3.2 0/1



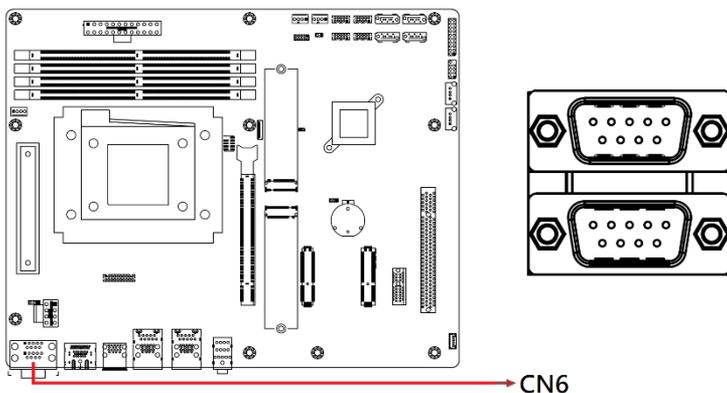
2.5.4 CN4: USB 3.2 4/5 Connector



2.5.5 CN5: DP and HDMI Connector



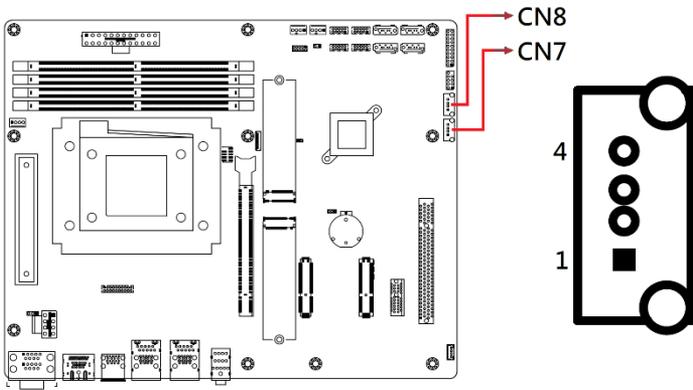
2.5.6 CN6: COM1 (upper) / COM2 (bottom) Ports



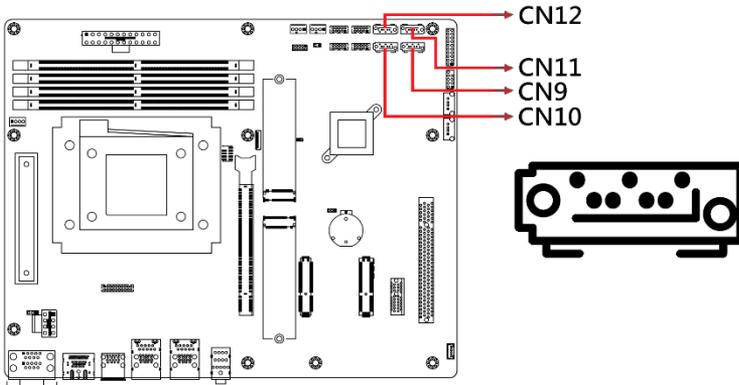
Pin	Signal Name		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

Note: COM1 supports RS-232/RS-422/RS-485
COM2 supports RS-232 only

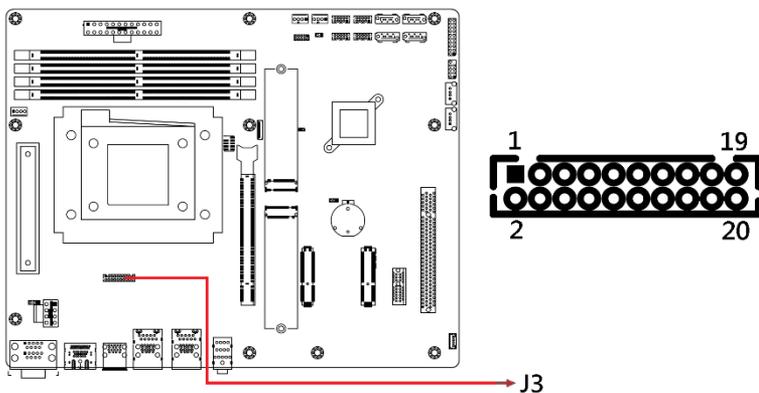
2.5.7 CN7, CN8: USB 2.0 Connectors



2.5.8 CN9, CN10, CN11, CN12: SATA Connectors

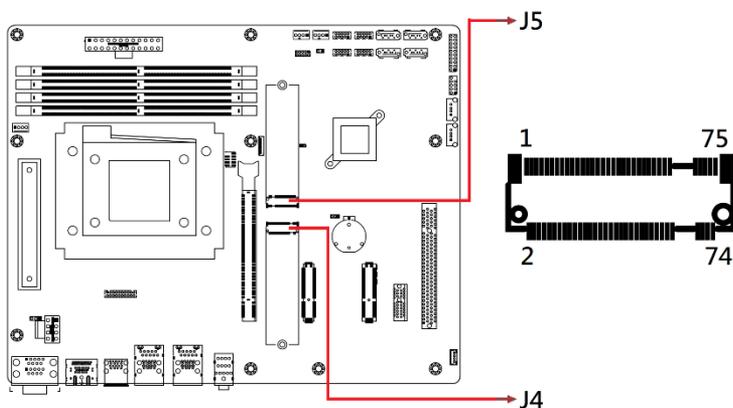


2.5.9 J3: DVI-D Connector

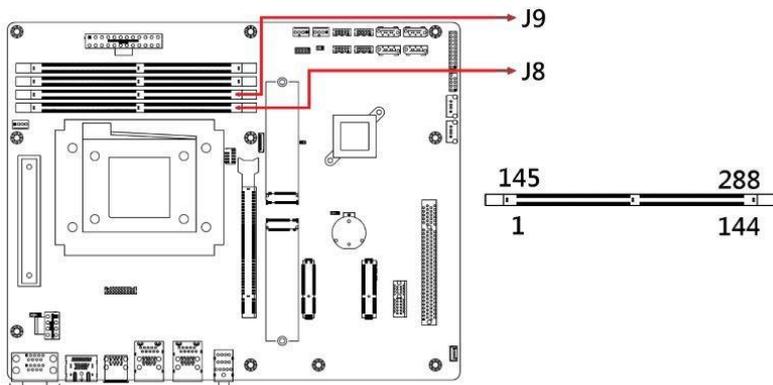


Signal Name	Pin	Pin	Signal Name
DATA1_P	1	2	DATA1_N
Ground	3	4	Ground
CLK_P	5	6	CLK_N
Ground	7	8	VCC
HPD	9	10	NC
DATA2_P	11	12	DATA2_N
Ground	13	14	Ground
DATA0_P	15	16	DATA0_N
NC	17	18	NC
SDA	19	20	SCL

2.5.10 J4, J5: M.2 M-Key Connector

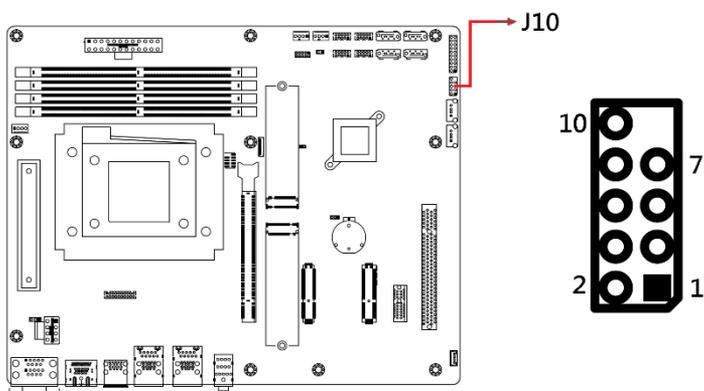


2.5.11 J8, J9: DDR5 UDIMM CHA0 / CHA1

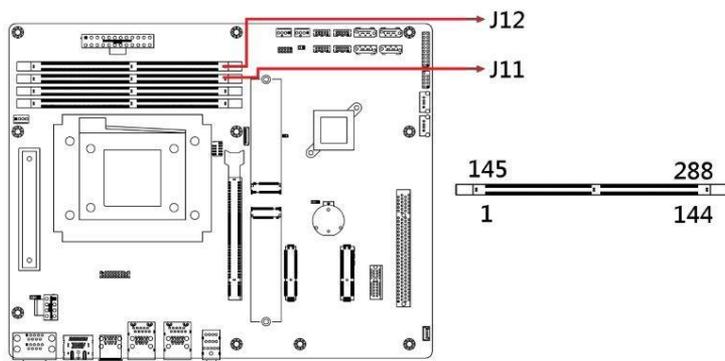


Note: DIMMs must be populated from farthest slot to closest to the processor on a per channel basis when a data bus daisy chain topology used.

2.5.12 J10: USB 2.0 Connectors

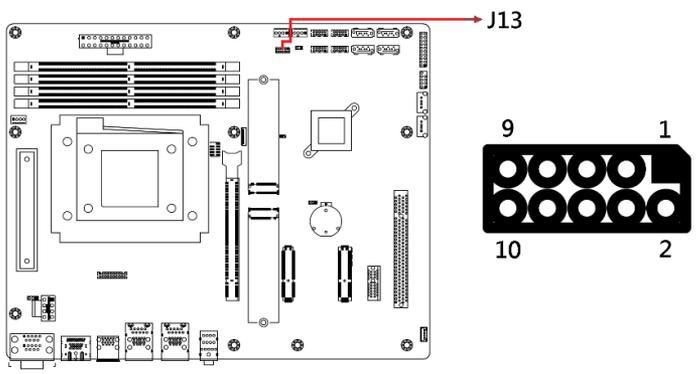


Signal Name	Pin	Pin	Signal Name
VCC	1	2	VCC
D0-	3	4	D1-
D0+	5	6	D1+
GND	7	8	GND
KEY	9	10	NC

2.5.13 J11,12 : DDR5 UDIMM CHB0 / CHB1

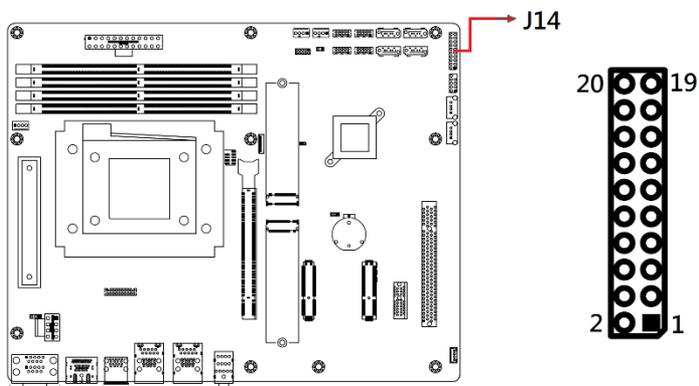
Note: DIMMs must be populated from farthest slot to closest to the processor on a per channel basis when a data bus daisy chain topology used.

2.5.14 J13: Digital I/O



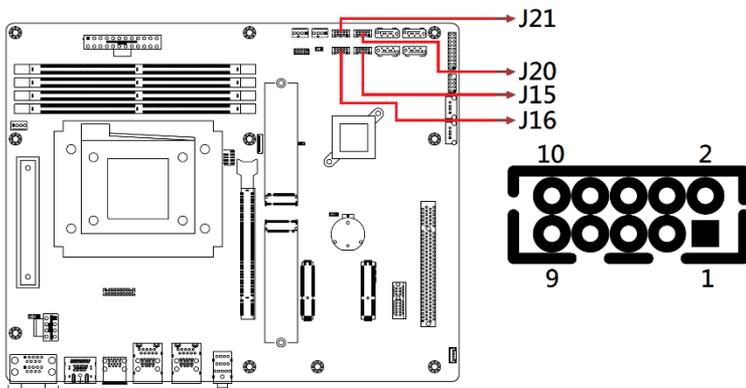
Signal Name	Pin	Pin	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

2.5.15 J14: Front Panel Function Connector



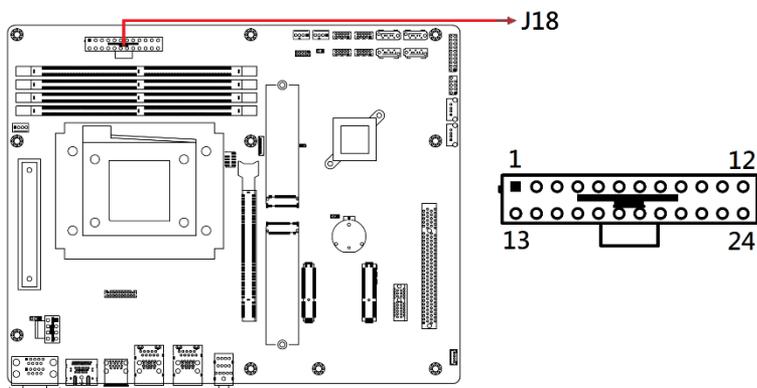
Signal Name	Pin	Pin	Signal Name
PWR LED +	1	2	SPK
GND	3	4	NC
PWR LED- (GND)	5	6	GND
NC	7	8	SPK (VCC)
GND	9	10	NC
GND	11	12	NC
PWR_BTN	13	14	PWR_BTN
NC	15	16	NC
RST_BTN	17	18	RST_BTN
HDD LED +	19	20	HDD LED -

2.5.16 J15, J20, J16, J21: COM3~COM6 RS232 Ports



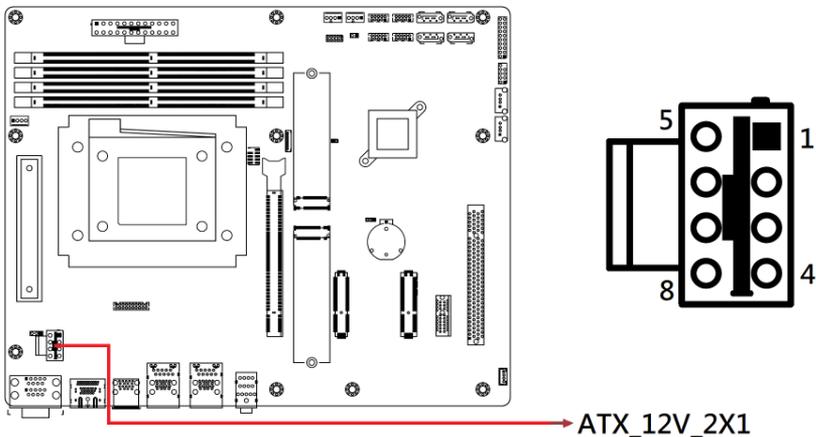
Signal Name	Pin	Pin	Signal Name
DCD#	1	2	SIN#
SOUT	3	4	DTR#
GND	5	6	DSR#
RTS#	7	8	CTS#
RI#	9	10	KEY

2.5.17 J18: ATX Power Supply Connector



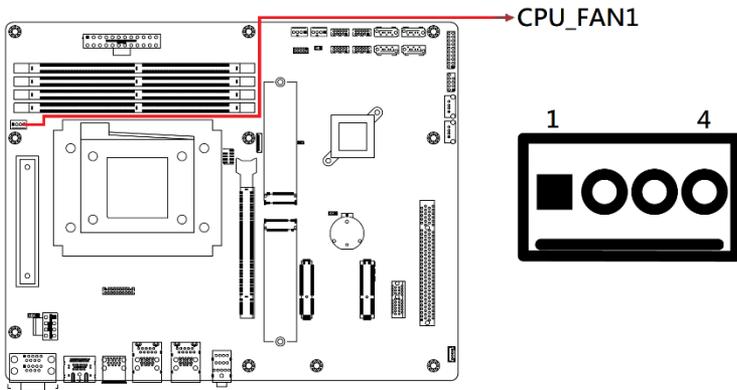
Signal Name	Pin	Pin	Signal Name
3.3V	13	1	3.3V
-12V	14	2	3.3V
Ground	15	3	Ground
PS-ON	16	4	+5V
Ground	17	5	Ground
Ground	18	6	+5V
Ground	19	7	Ground
-5V	20	8	Power good
+5V	21	9	5VSB
+5V	22	10	+12V
+5V	23	11	+12V
Ground	24	12	+3.3V

2.5.18 ATX_12V_2X1: ATX 12V Power Connector



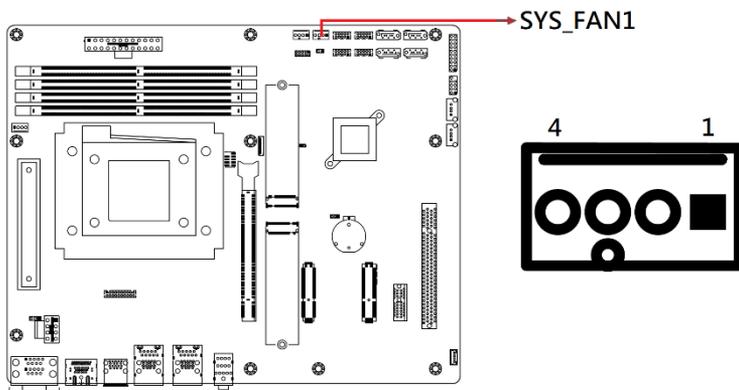
Signal Name	Pin	Pin	Signal Name
Ground	1	5	+12V
Ground	2	6	+12V
Ground	3	7	+12V
Ground	4	8	+12V

2.5.19 CPU_FAN1: CPU Fan Power Connector



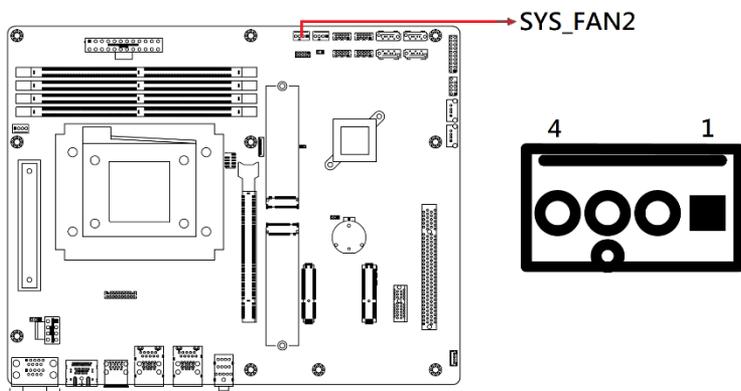
Pin	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

2.5.20 SYS_FAN1: System Fan1 Power Connector



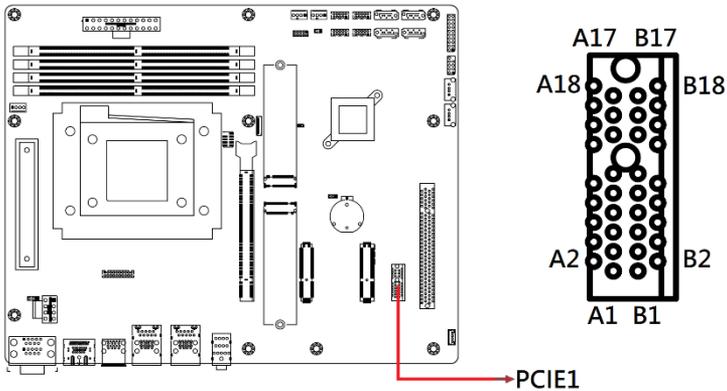
Pin	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

2.5.21 SYS_FAN2: System Fan2 Power Connector

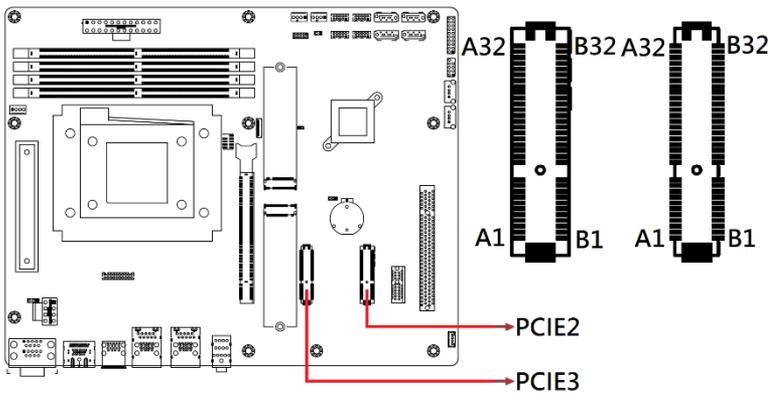


Pin	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

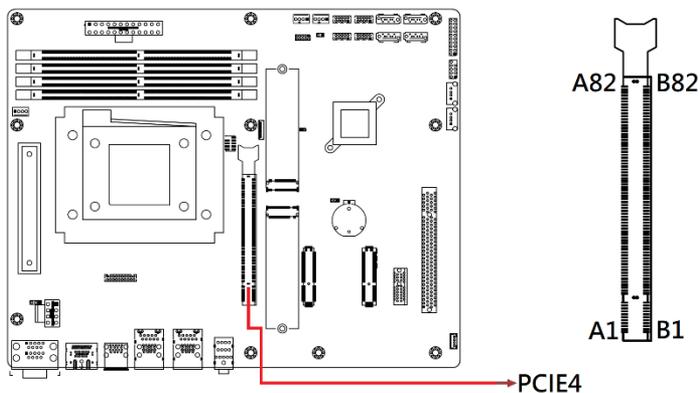
2.5.22 PCIE1: PCI-E X1 Slot



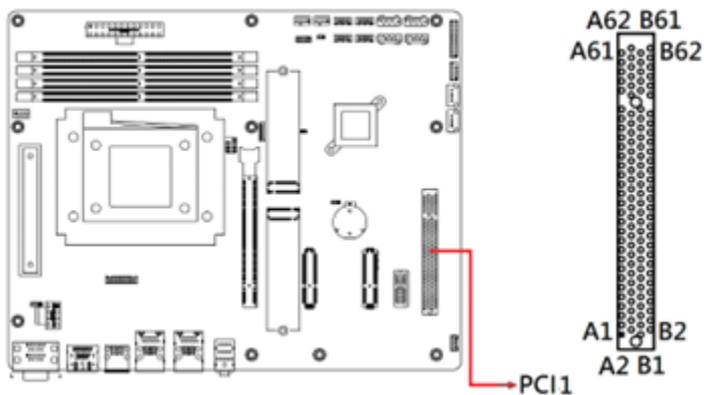
2.5.23 PCIE2, PCIE3: PCI-E X4 Slot



2.5.24 PCIE4: PCI-E X16 Slot



2.5.25 PCI1: PCI 32-bit Slot



Chapter 3

Drivers Installation

This chapter introduces installation of the following drivers:

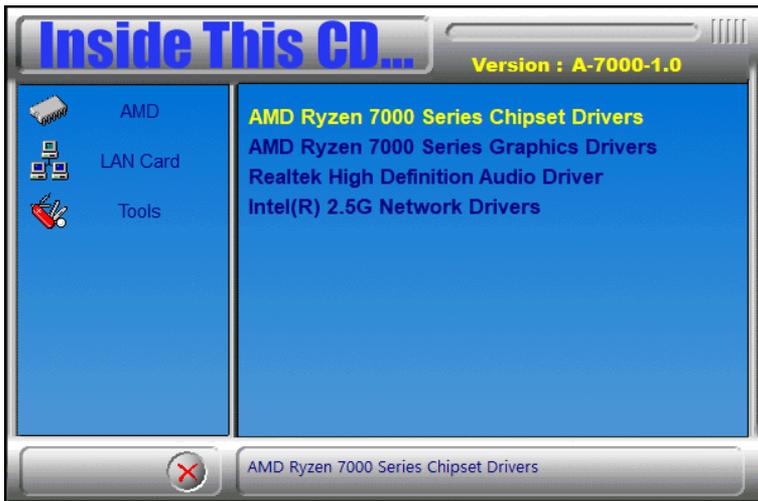
- AMD Ryzen 7000 Series Chipset Drivers
- AMD Ryzen 7000 Series Graphics Drivers
- Realtek High Definition Audio Driver
- Intel(R) 2.5G Network Drivers

3.1 Introduction

This section describes the installation procedures for software drivers. The software drivers are available on the IBASE website. Go to the product's download page. Copy the compressed drivers file to your computer. Double-click the file to extract it. Run "CDGuide" to access the main drivers page.

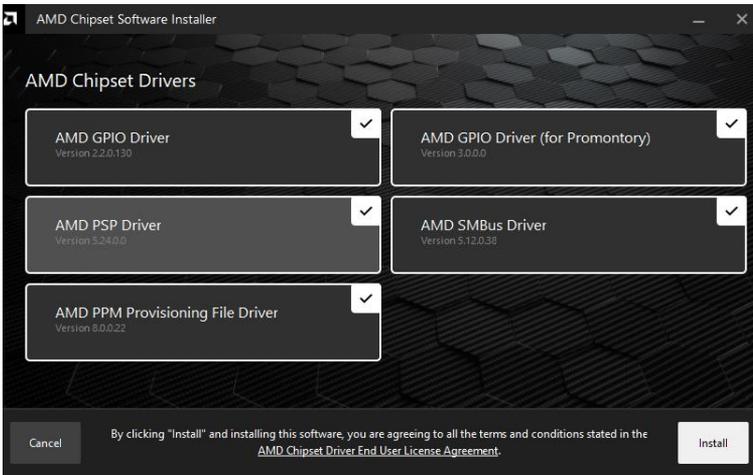
3.2 AMD Ryzen 7000 Series Chipset Drivers

1. Click **AMD** on the left pane, then select **AMD Ryzen 7000 Series Chipset Drivers** on the right pane.



3 Driver Installation

2. On the **AMD Chipset Software Installer** screen, click **Install** as shown in the image.

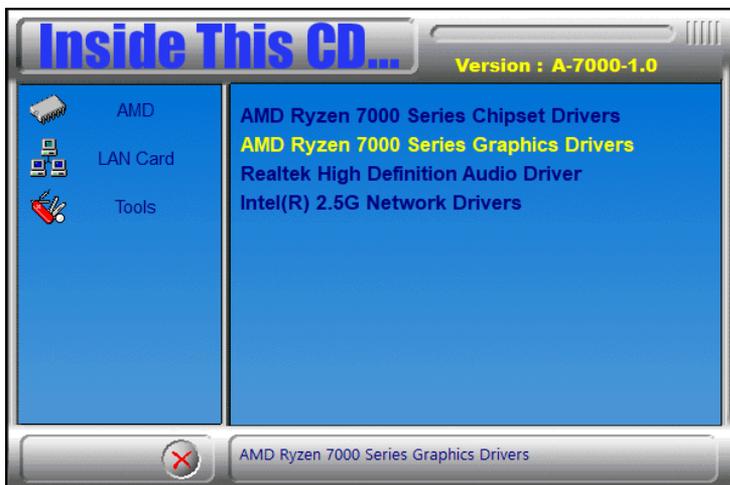


3. Click **Restart** when it says "AMD Chipset Software installed successfully."

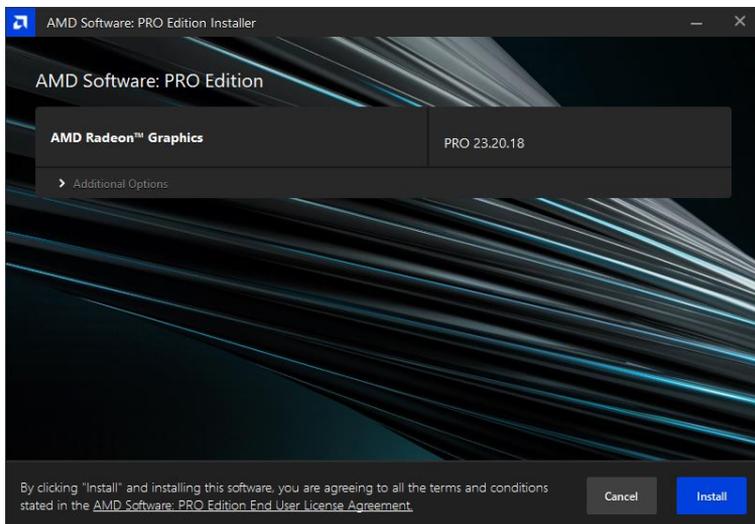


3.3 AMD Ryzen 7000 Series Graphics Drivers

1. Click **AMD** on the left pane, then select **AMD Ryzen 7000 Series Graphics Drivers** on the right pane.



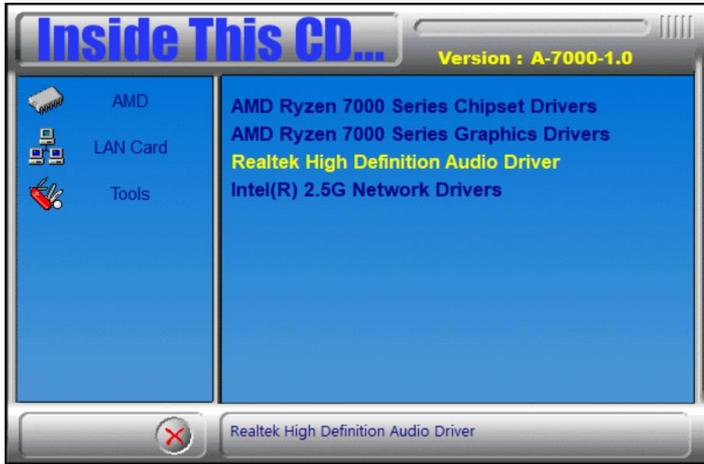
2. In the **AMD Software PRO Edition Installer** screen, click **Install** as shown in the image.



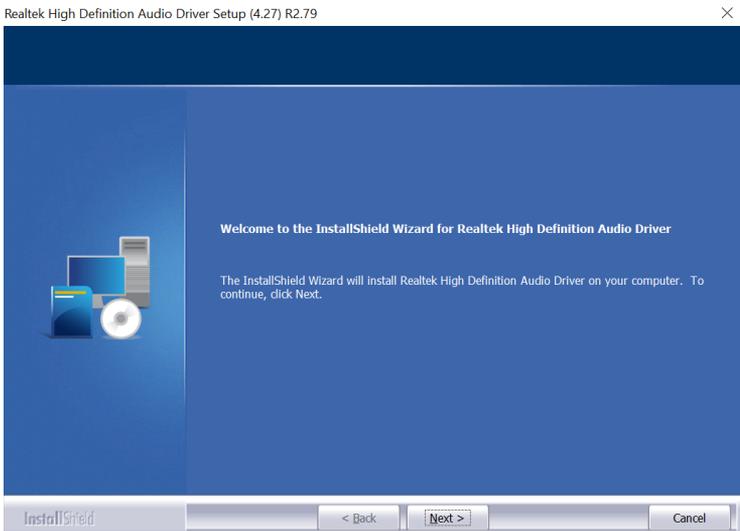
3. Click **Finish** when the **AMD Software PRO Edition** has been installed successfully.

3.4 Realtek High Definition Audio Driver

1. Click **AMD** on the left pane, then select **Realtek High Definition Audio Driver** on the right pane.



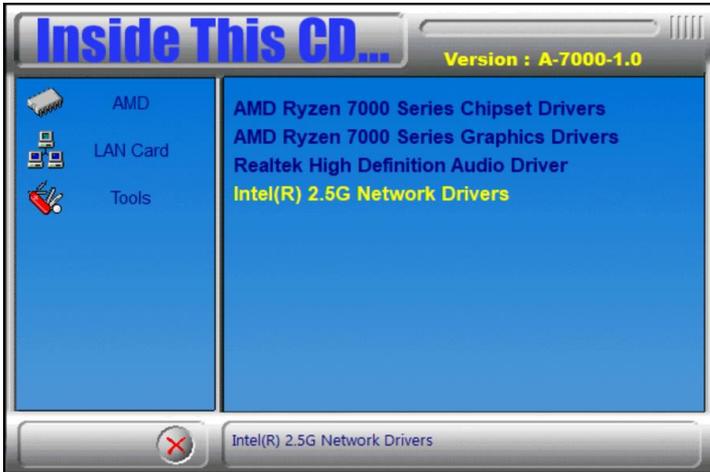
2. When the *Welcome* screen appears, click **Next**.



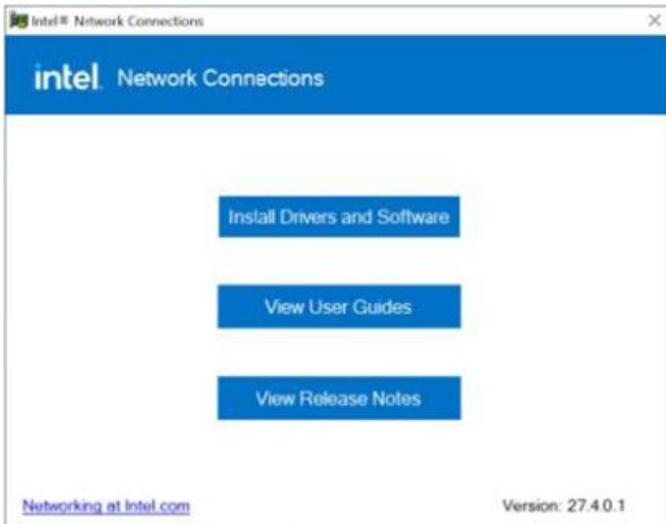
3. Restart the system when the InstallShield Wizard has completed the installation.

3.5 Intel(R) 2.5G Network Drivers

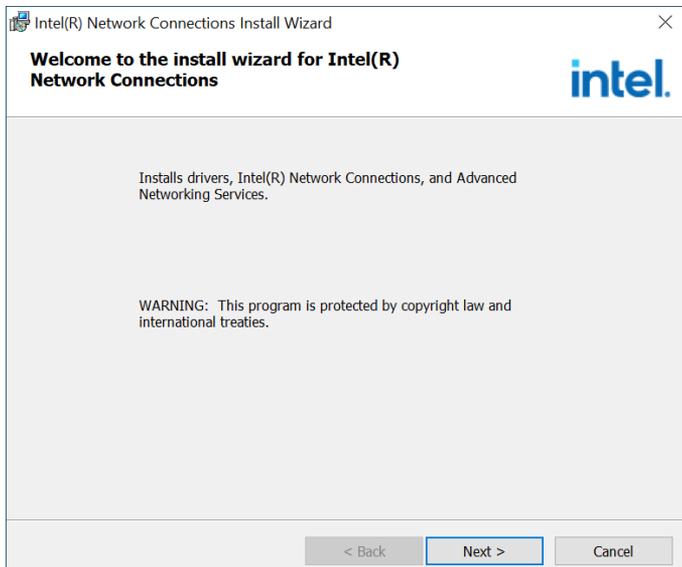
1. Click **AMD** on the left panel, then select **Intel(R) 2.5G Network Drivers** on the right pane.



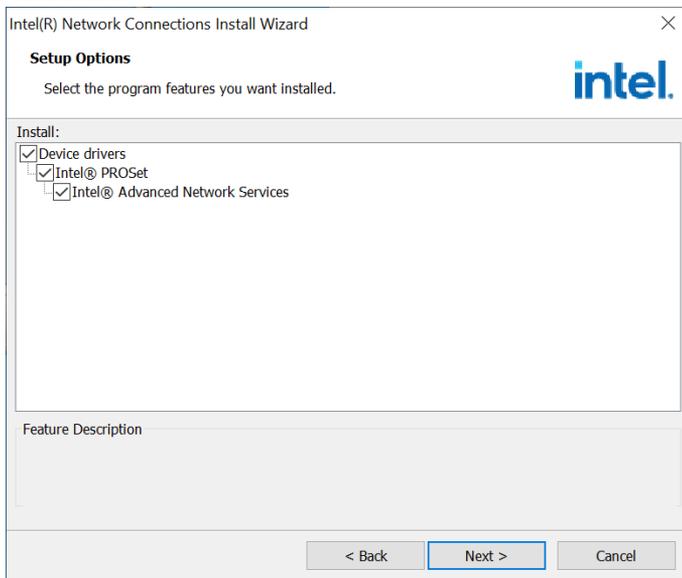
2. Click Intel Drivers and Software.



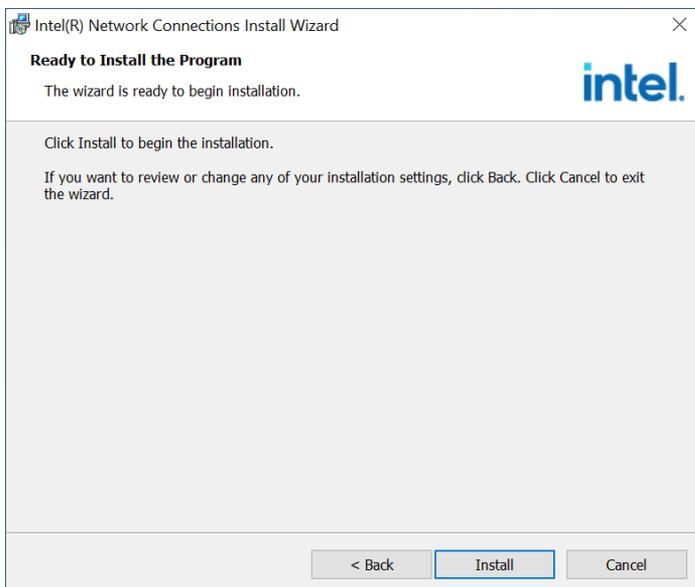
- When the **Welcome to the install wizard for Intel(R) Network Connections** screen appears, click **Next**. On the next screen, accept the terms in the License Agreement and click **Next**.



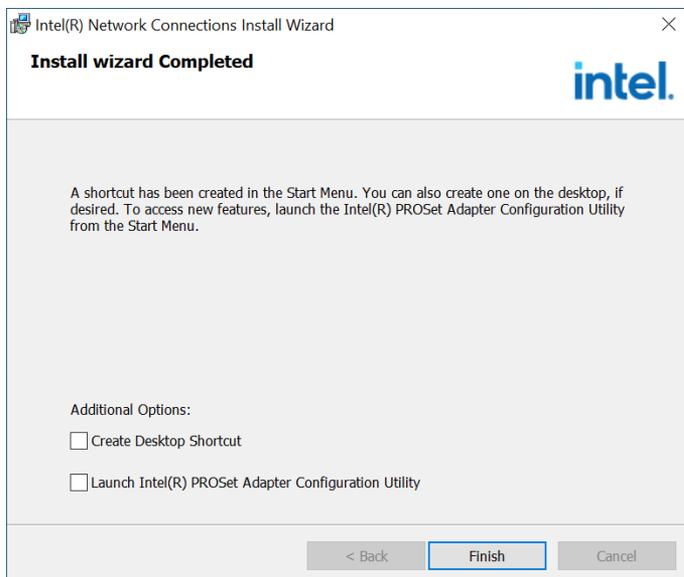
- On the **Setup Options** screen, select the program features you want to install, then click **Next** to continue.



5. On the *Ready to Install the Program* screen, click **Install** to begin the installation.



6. When the *Install wizard Completed* screen appears, click **Finish**.



Chapter 4

BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the key immediately allows you to enter the Setup utility. If you are a little bit late pressing the key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

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

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: It is strongly recommended that you avoid making any changes to the chipset defaults.

These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

4.3 Main Settings



BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

4.4 Advanced Settings

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



4.4.1 Trusted Computing



BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INTIA interface will not be available.
SHA256 PCR Bank	Enables / Disables SHA256 PCR Bank.
Pending operation	Schedule an operation for the security device. Note: Your computer will reboot during restart in order to change state of security device.
Platform / Storage/ Endorsement Hierarchy	Enables / Disables the hierarchy.
Physical Presence Spec Version	Selects to show the PPI Spec Version (1.2 or 1.3) that the OS supports. Note: Some HCK tests might not support 1.3.
Device Select	<ul style="list-style-type: none"> • TPM 1.2 will restrict support to TPM 1.2 devices only. • TPM 2.0 will restrict support to TPM 2.0 devices only. • Auto will support both with the default being set to TPM 2.0 devices if not found, and TPM 1.2 device will be enumerated.

4.4.2 ACPI Settings



BIOS Setting	Description
Enable ACPI Auto Configuration	Enables or Disables BIOS ACPI Auto Configuration
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

4.4.3 iSmart Controller



BIOS Setting	Description
Power-On after Power failure	Options: Enable or Disable
Temperature Guardian	Options: Enable or Disable
Schedule Slot 1	Setup the hour/minute for system power on

4.4.4 F81966 Super IO Configuration

a

Advanced Aptio Setup - AMI		
F81966 Super IO Configuration		Set Parameters of Serial Port 1 (COMA)
Super IO Chip	F81966	
Serial Port 1 Configuration		
Serial Port 2 Configuration		
Serial Port 3 Configuration		
Serial Port 4 Configuration		
Serial Port 5 Configuration		
Serial Port 6 Configuration		

Advanced Aptio Setup - AMI		
Serial Port 1 Configuration		SERIAL PORT Loop Back/RS232/RS422/RS485 mode select
Serial Port	[Enabled]	
Device Settings	IO=3F8h; IRQ=4;	
Change Settings	[Auto]	
SERIAL PORT MODE SELECT	[RS232 Mode]	

Advanced Aptio Setup - AMI		
Serial Port 2 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2F8h; IRQ=3;	
Change Settings	[Auto]	

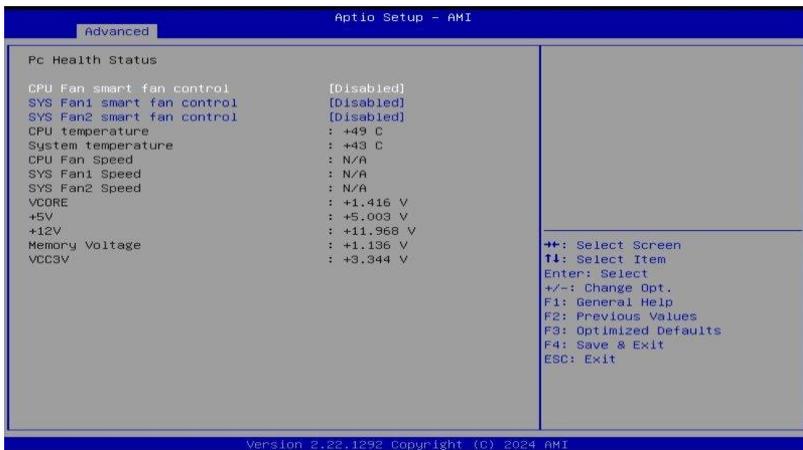
Advanced Aptio Setup - AMI		
Serial Port 3 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=3E8h; IRQ=5;	
Change Settings	[Auto]	

Advanced Aptio Setup - AMI		
Serial Port 4 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2E8h; IRQ=6;	
Change Settings	[Auto]	

Advanced Aptio Setup - AMI		
Serial Port 5 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2F0h; IRQ=10;	
Change Settings	[Auto]	

Advanced Aptio Setup - AMI		
Serial Port 6 Configuration		Enable or Disable Serial Port (COM)
Serial Port	[Enabled]	
Device Settings	IO=2E0h; IRQ=11;	
Change Settings	[Auto]	

4.4.5 Hardware Monitor

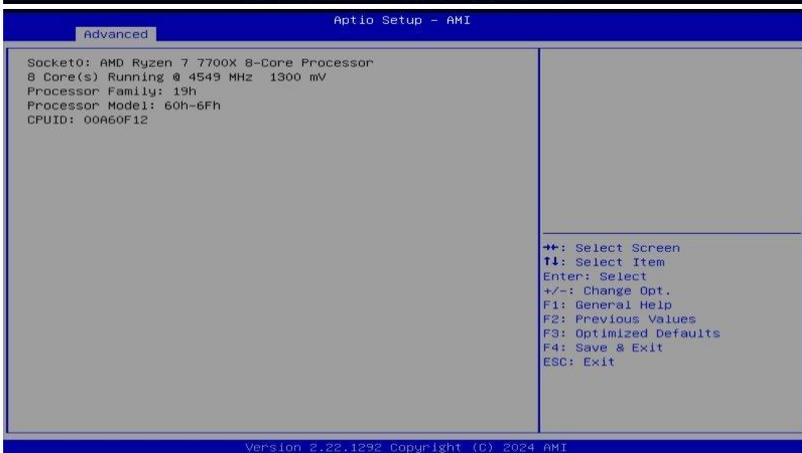


BIOS Setting	Description
CPU Smart Fan Control	Enables / Disables the CPU smart fan feature. Options: Disabled / 50 °C / 60 °C / 70 °C / 80 °C
System Smart Fan Control	Enables / Disables the system smart fan feature. Options: Disabled / 50 °C / 60 °C / 70 °C / 80 °C
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.6 UEFI Variable Protection



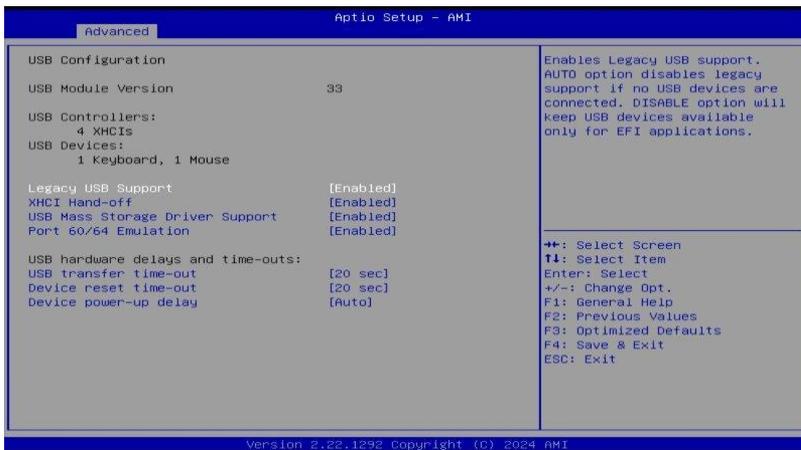
4.4.7 CPU Configuration



4.4.8 IDE Configuration



4.4.9 USB Configuration



BIOS Setting	Description
Legacy USB Support	<ul style="list-style-type: none"> • Enabled enables Legacy USB support. • Auto disables legacy support if there is no USB device connected. • Disabled keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSES without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
Port 60/64 EmulationDriver Support	Enables I/O port 60h/64h emulation for the complete USB keyboard legacy support for non-USB aware OSES.
USB Transfer time-out	The time-out value (1 / 5 / 10 / 20 secs) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Gives seconds (10 / 20 / 30 / 40 secs) to delay execution of Start Unit command to USB mass storage device.
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. Auto uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor.

4.4.10 Network Stack Configuration



BIOS Setting	Description
Network Stack	Enables / Disables UEFI Network Stack.
IPv4 PXE Support	Enables / Disables IPv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.
IPv4 HTTP Support	Enables / Disables IPv4 HTTP Boot Support. If disabled, Ipv4 HTTP boot option will not be created.
IPv6 PXE Support	Enables / Disables IPv6 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.
IPv6 HTTP Support	Enables / Disables IPv6 HTTP Boot Support. If disabled, Ipv4 HTTP boot option will not be created.
PXE boot wait time	Assigns a period of time to press ESC key to abort the PXE boot.
Media detect count	Assigns a number of times to check the presence of media.

4.4.11 NVME Configuration



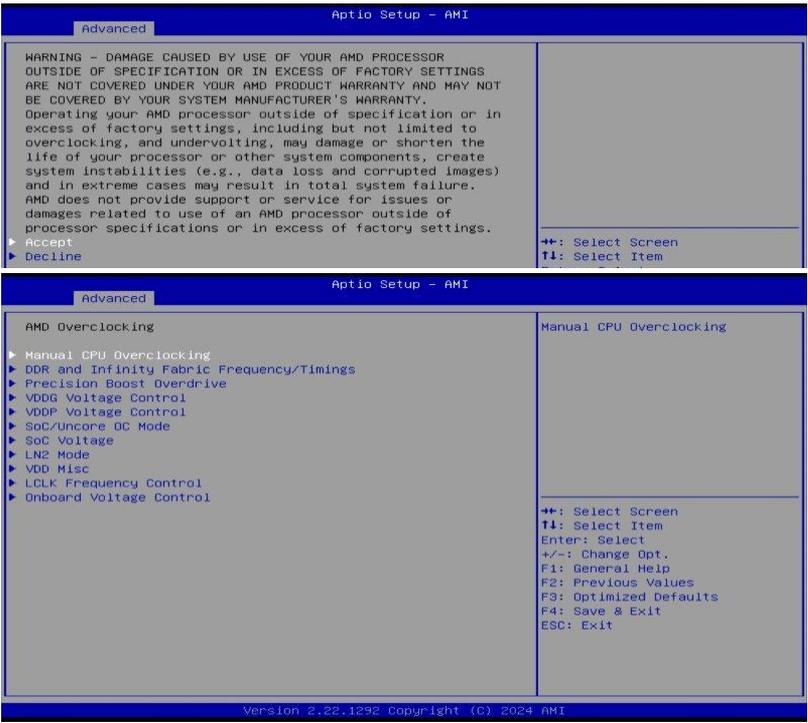
4.4.12 AMD CBS



4.4.13 AMD PBS

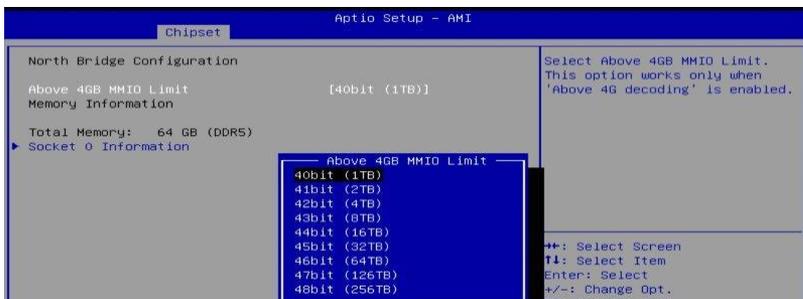


4.4.14 AMD Overclocking



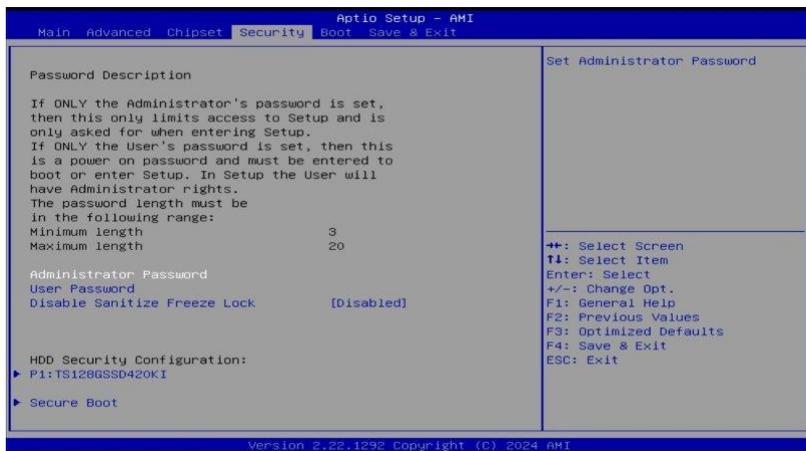
BIOS Setting	Description
Manual CPU Overclocking	Manual CPU Overclocking items include: CPU Frequency CPU Voltage CPU Core Count Control Prochot VRM Throttling Peak Current Control
DDR and Infinity Fabric Frequency/ Timings	DDR Options include: DDR Timing Configuration DDR Bus Configuration DDR Controller Configuration DDR5 Nitro Mode
Precision Boost Overdrive	Precision Boost Overdrive: Enabled: Allows Processor to run beyond defined values for PPT, VDD_CPU EDC, VDD_CPU TDC, VDD_SOC EDC, VDD_SOC TDC to the limits of the board, and allows it to boost at higher voltages for longer durations than default operation.
VDDG Voltage Control	VDDG represents voltage for the data portion of the Infinity Fabric. It is derived from the VDD_MISC.
VDPP Voltage Control	Allows the user to adjust the VDQP voltage. 'Manual' means set voltage for the DDR bus signaling (PHY). 'Auto' means VDQP is system default.
SoC/Uncore OC Mode	Forces CPU SoC/uncore components (e.g., Infinity Fabric, memory, and integrated graphics) to run at their maximum specified frequency at all times. May improve performance at the expense of idle power savings.
SoC Voltage	Specifies the SoC/uncore voltage (VDD_SOC) in mV to support memory and Infinity Fabric overclocking. VDD_SOC also determines the GPU voltage on processors with integrated graphics. Stepping is 5mV. Voltage ranges allowed to be set will be limited outside of LN2 mode. If in LN2 mode (and CPU temp is below -40°C) the allowable range of settable voltages will be extended.
LN2 Mode	Enables settings that provide additional stability at extreme cold operating temperatures
VDD Misc	Allows the user to adjust the VDD Misc voltage. 'Manual' means set voltage for the GMI PHY. 'Auto' means VDD MISC is system default.
LCLK Frequency Control	AUTO: Default Settings. Manual: manually configure LCLK frequency
Onboard Voltage Control	Settings for VDDIO Voltage Control VPP Voltage Control

4.5 Chipset Settings



BIOS Setting	Description
Above 4GB MMIO Limit	Select Above 4GB MMIO Limit. This option works only when 'Above 4G decoding' is enable.
Socket 0 Information	View Information related to Socket 0

4.6 Security Settings



BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Disable Sanitize Freeze Lock	When enabled, then sending Sanitize Freeze Lock command to MDDs will be skipped in next boot.
Secure Boot	Configures Secure Boot.

4.6.1 Secure Boot



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



4.7 Boot Settings



BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Fast Boot	Enables / Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
Boot mode select	Selects a Boot mode, Legacy / UEFI.
Boot Option Priorities	Sets the system boot order.
UEFI Hard Disk Drive BBS priorities	Specifies the boot device priority sequence from available UEFI Hard Disk Drives.

4.8 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.
Save as User Defaults	Saves the changes done so far as User Defaults.
Restore User Defaults	Restores the user defaults to all the setup options.

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Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000070-0x00000071	System CMOS/real time clock
0x0000FF00-0x0000FFFF	AMD Radeon(TM) Graphics
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x000002F0-0x000002F7	Communications Port (COM5)
0x000002E0-0x000002E7	Communications Port (COM6)
0x00000020-0x00000021	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x00000000-0x0000003AF	PCI Express Root Complex
0x00000000-0x0000003AF	Direct memory access controller
0x000003E0-0x00000CF7	PCI Express Root Complex
0x000003B0-0x000003DF	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F000-0x0000FFFF	PCI Express Root Port
0x00000040-0x00000043	System timer
0x00000010-0x0000001F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x0000006F	Motherboard resources

Address	Device Description
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources
0x000000B1-0x000000B1	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x0000040B-0x0000040B	Motherboard resources
0x000004D6-0x000004D6	Motherboard resources
0x00000C00-0x00000C01	Motherboard resources
0x00000C14-0x00000C14	Motherboard resources
0x00000C50-0x00000C51	Motherboard resources
0x00000C52-0x00000C52	Motherboard resources
0x00000C6C-0x00000C6C	Motherboard resources
0x00000C6F-0x00000C6F	Motherboard resources
0x00000CD8-0x00000CDF	Motherboard resources
0x00000800-0x0000089F	Motherboard resources
0x00000B00-0x00000B0F	Motherboard resources
0x00000B20-0x00000B3F	Motherboard resources
0x00000900-0x0000090F	Motherboard resources
0x00000910-0x0000091F	Motherboard resources
0x00000061-0x00000061	System speaker
0x00000081-0x00000083	Direct memory access controller
0x00000087-0x00000087	Direct memory access controller
0x00000089-0x0000008B	Direct memory access controller
0x0000008F-0x0000008F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 4294967259~66	AMD USB 2.0 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 0	High precision event timer
IRQ 0	System timer
IRQ 8	High precision event timer
IRQ 4294967235~38	AMD Radeon(TM) Graphics
IRQ 43	AMD Audio CoProcessor
IRQ 43	High Definition Audio Controller
IRQ 7	AMD GPIO Controller
IRQ 4294967291	Standard SATA AHCI Controller
IRQ 4294967275~82	AMD USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 6	Communications Port (COM4)
IRQ 10	Communications Port (COM5)
IRQ 11	Communications Port (COM6)
IRQ 4294967294	PCI Express Root Port
IRQ 4294967293	PCI Express Root Port
IRQ 4294967292	PCI Express Root Port
IRQ 55~204	Microsoft ACPI-Compliant System
IRQ 256~511	Microsoft ACPI-Compliant System
IRQ 4294967239~40	AMD PSP 11.0 Device
IRQ 4294967250~58	Intel(R) Ethernet Controller I226-V #7
IRQ 4294967241~49	Intel(R) Ethernet Controller I226-V #8
IRQ 40	High Definition Audio Controller
IRQ 4294967267~74	AMD USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967283~90	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)

C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81956.H"
//-----
int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//-----
int main (int argc, char *argv[])
{
    unsigned char bBuf;
    unsigned char bTime;
    char **endptr;

    char SIO;

    printf("Fintek 81966 watch dog program\n");
    SIO = Init_F81956();
    if (SIO == 0)
    {
        printf("Can not detect Fintek 81966, program abort.\n");
        return(1);
    }
    //if (SIO == 0)

    if (argc != 2)
    {
        printf(" Parameter incorrect!!\n");
        return (1);
    }
}
```

```

bTime = strtol(argv[1], endptr, 10);
printf("System will reset after %d seconds\n", bTime);

if (bTime)
{
    EnableWDT(bTime);
}
else
{
    DisableWDT();
    return 0;
}
}
//-----
void EnableWDT(int interval)
{
    unsigned char bBuf;

    bBuf = Get_F81956_Reg(0x2B);
    bBuf &= (~0x20);
    Set_F81956_Reg(0x2B, bBuf);           //Enable WDTO

    Set_F81956_LD(0x07);                 //switch to logic device 7
    Set_F81956_Reg(0x30, 0x01);         //enable timer

    bBuf = Get_F81956_Reg(0xF5);
    bBuf &= (~0x0F);
    bBuf |= 0x52;
    Set_F81956_Reg(0xF5, bBuf);         //count mode is second

    Set_F81956_Reg(0xF6, interval);     //set timer

    bBuf = Get_F81956_Reg(0xFA);
    bBuf |= 0x01;
    Set_F81956_Reg(0xFA, bBuf);         //enable WDTO output

    bBuf = Get_F81956_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81956_Reg(0xF5, bBuf);         //start counting
}
//-----
void DisableWDT(void)
{
    unsigned char bBuf;

    Set_F81956_LD(0x07);                 //switch to logic device 7

    bBuf = Get_F81956_Reg(0xFA);
    bBuf &= ~0x01;
    Set_F81956_Reg(0xFA, bBuf);         //disable WDTO output

    bBuf = Get_F81956_Reg(0xF5);
    bBuf &= ~0x20;
    bBuf |= 0x40;
    Set_F81956_Reg(0xF5, bBuf);         //disable WDT
}
//-----

```

```

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81956.H"
#include <dos.h>
//-----
unsigned int F81956_BASE;
void Unlock_F81956 (void);
void Lock_F81956 (void);
//-----
unsigned int Init_F81956(void)
{
    unsigned int result;
    unsigned char ucDid;

    F81956_BASE = 0x4E;
    result = F81956_BASE;

    ucDid = Get_F81956_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81966
    {
        goto Init_Finish;
    }

    F81956_BASE = 0x2E;
    result = F81956_BASE;

    ucDid = Get_F81956_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81966
    {
        goto Init_Finish;
    }

    F81956_BASE = 0x00;
    result = F81956_BASE;

Init_Finish:
    return (result);
}
//-----
void Unlock_F81956 (void)
{
    outputb(F81956_INDEX_PORT, F81956_UNLOCK);
    outputb(F81956_INDEX_PORT, F81956_UNLOCK);
}
//-----
void Lock_F81956 (void)
{
    outputb(F81956_INDEX_PORT, F81956_LOCK);
}
//-----
void Set_F81956_LD( unsigned char LD)
{
    Unlock_F81956();
    outputb(F81956_INDEX_PORT, F81956_REG_LD);
    outputb(F81956_DATA_PORT, LD);
}

```

```
        Lock_F81956());
}
//-----
void Set_F81956_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_F81956();
    outputb(F81956_INDEX_PORT, REG);
    outputb(F81956_DATA_PORT, DATA);
    Lock_F81956();
}
//-----
unsigned char Get_F81956_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_F81956();
    outputb(F81956_INDEX_PORT, REG);
    Result = inportb(F81956_DATA_PORT);
    Lock_F81956();
    return Result;
}
//-----

//-----
//
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// PURPOSE.
//
//-----
#ifndef F81956_H
#define F81956_H                1
//-----
#define F81956_INDEX_PORT      (F81956_BASE)
#define F81956_DATA_PORT      (F81956_BASE+1)
//-----
#define F81956_REG_LD          0x07
//-----
#define F81956_UNLOCK          0x87
#define F81956_LOCK            0xAA
//-----
unsigned int Init_F81956(void);
void Set_F81956_LD( unsigned char);
void Set_F81956_Reg( unsigned char,
unsigned char); unsigned char
Get_F81956_Reg( unsigned char);
//-----
#endif // F81956_H
```

D. Onboard Connector Types

Function	Connector	Type
DVI-D	J3	HAOGUO DF11-20S-PA66H
USB 2.0	J10	E-CALL P2100-9S10H
Digital I/O Connector	J13	E-CALL P2101-10S
Front Panel Settings	J14	E-CALL 0126-01-203-200
COM3, COM4, COM5, COM6 RS-232	J15(COM3), J20(COM4), J16(COM5), J21(COM6)	HAOGUO DF11-10S-PA66H
ATX Power	J18	HAOGUO 01-0018-03
ATX 12V Power	ATX_12V_2X1	HAOGUO 01-0018-02
CPU Fan Power	CPU_FAN1	Techbest W2-031104132S1WT(A)-L
System Fan Power	SYS_FAN1, SYS_FAN2	Techbest W2-031104132S1WT(A)-L

E. MBB1001 USB Power Control Bit Mapping.

Function	Connector	Software Mapping
USB 3.1	CN4(A,B)	bit_1
USB 3.1	CN3(A,B)	bit_2
USB 3.1	CN2(A,B)	bit_3