

innodisk

APEX-P100

User Manual



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Preface

Thank you for your purchase of Innodisk's APEX-P100 system. This accompanying manual provides a detailed guide for engineers and technicians, and aims to assist in the setup and deployment of the board into industrial settings and solutions.

Introduction

This innovative custom size motherboard with support for an Intel LGA 1700 Gen 12/13th processor up to 125W, supports up to 64GB of DDR5 4800MHz memory, 5 independent displays, and comes with rich expansion, including 1 MXM Type B+.

Notices

Innodisk reserves the right to change the contents of this document without notice. Information contained inside is for reference only and does not represent any kind of commitment or guarantee from the manufacturer. In addition, Innodisk is not responsible for any damages caused from the use, or misuse of the information inside.

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Safety Warnings

- Always unplug mains power before installation of components
- Ensure the correct AC input voltage is used to power the device

RTC Battery Warnings

Incorrect Replacement: Avoid replacing the battery with an incorrect type, as this can bypass safety mechanisms. This is particularly crucial for certain types of lithium batteries.

Unsafe Disposal: Never dispose of a battery in fire or a hot oven, nor should you mechanically crush or cut a battery. These actions can lead to explosions.

Exposure to High Temperatures: Leaving a battery in an environment with extremely high temperatures can cause explosions or result in the leakage of flammable liquids or gases.

Low Air Pressure Conditions: Subjecting a battery to extremely low air pressure may lead to explosions or leakage of flammable substances.

Warranty

Innodisk Corporation guarantees that all Innodisk manufactured products undergo strenuous quality control testing before delivery. In the event that any product defect (nonconformity) occurred with respect to the product, Innodisk will provide product repair and replacement service within the warranty period of this product (2 years).

CE & FCC Conformity

This product conforms to FCC (class B for digital devices), and CE requirements.

Box Contents

Item	Quantity
APEX-P100-A00 System	1
(HF) 88~264V 600W DC 20.4~25.2V 25A -40~70°C (Adapter)	1
3P SL4 TO 3P RING TERMINAL 4.3 SVT 18AWG/3C, 300mm (AC Power Cable)	1
RVL2-4 ID:4.3mm TO 2ESDFM 04P UL1007#16, 1000mm (DC Power Cable)	1

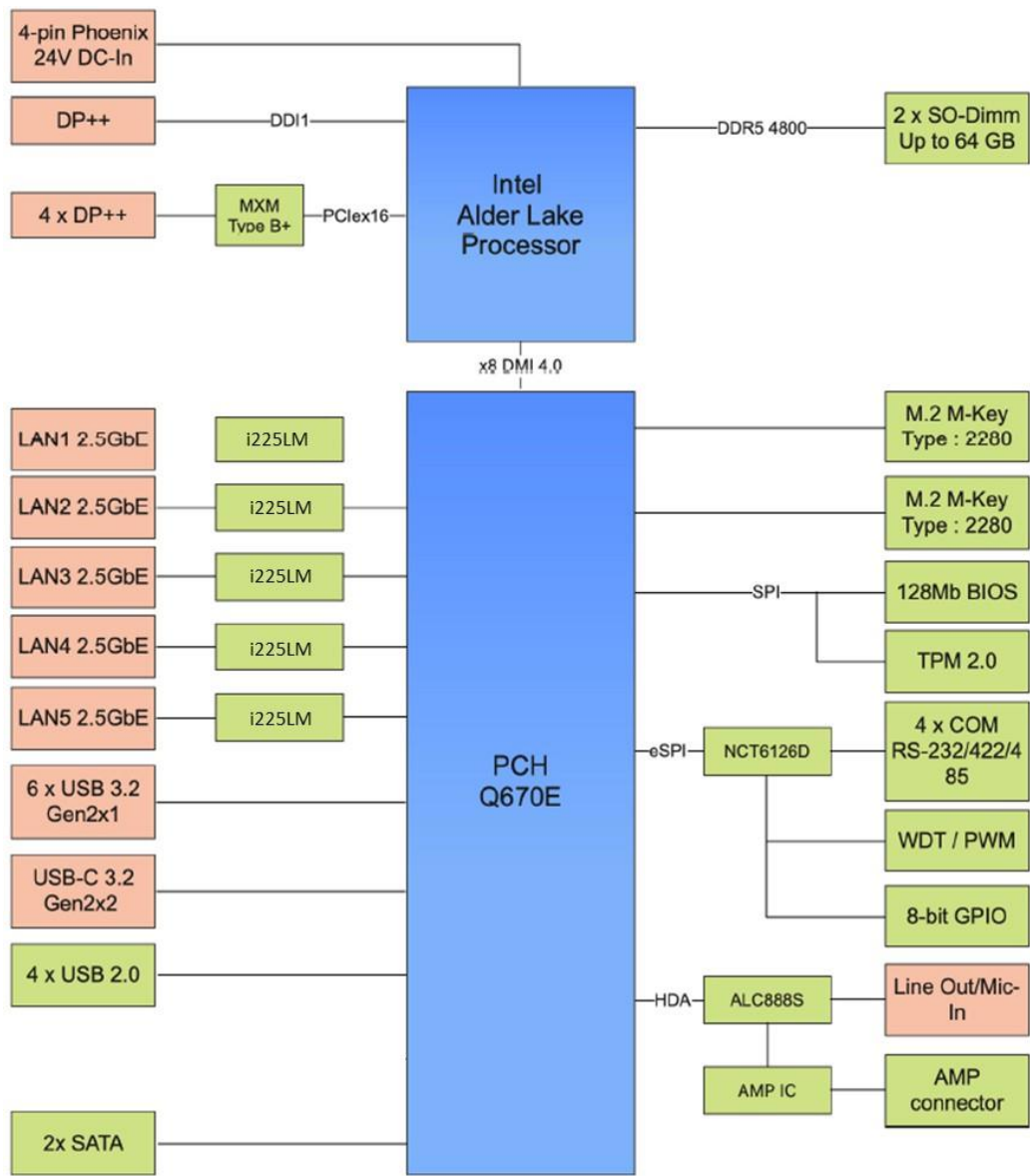
Optional Accessories

Item
Power Cord, Standards (UK), 1.8m
Power Cord, Standards (EU), 1.8m
Power Cord, Standards (US), 1.8m

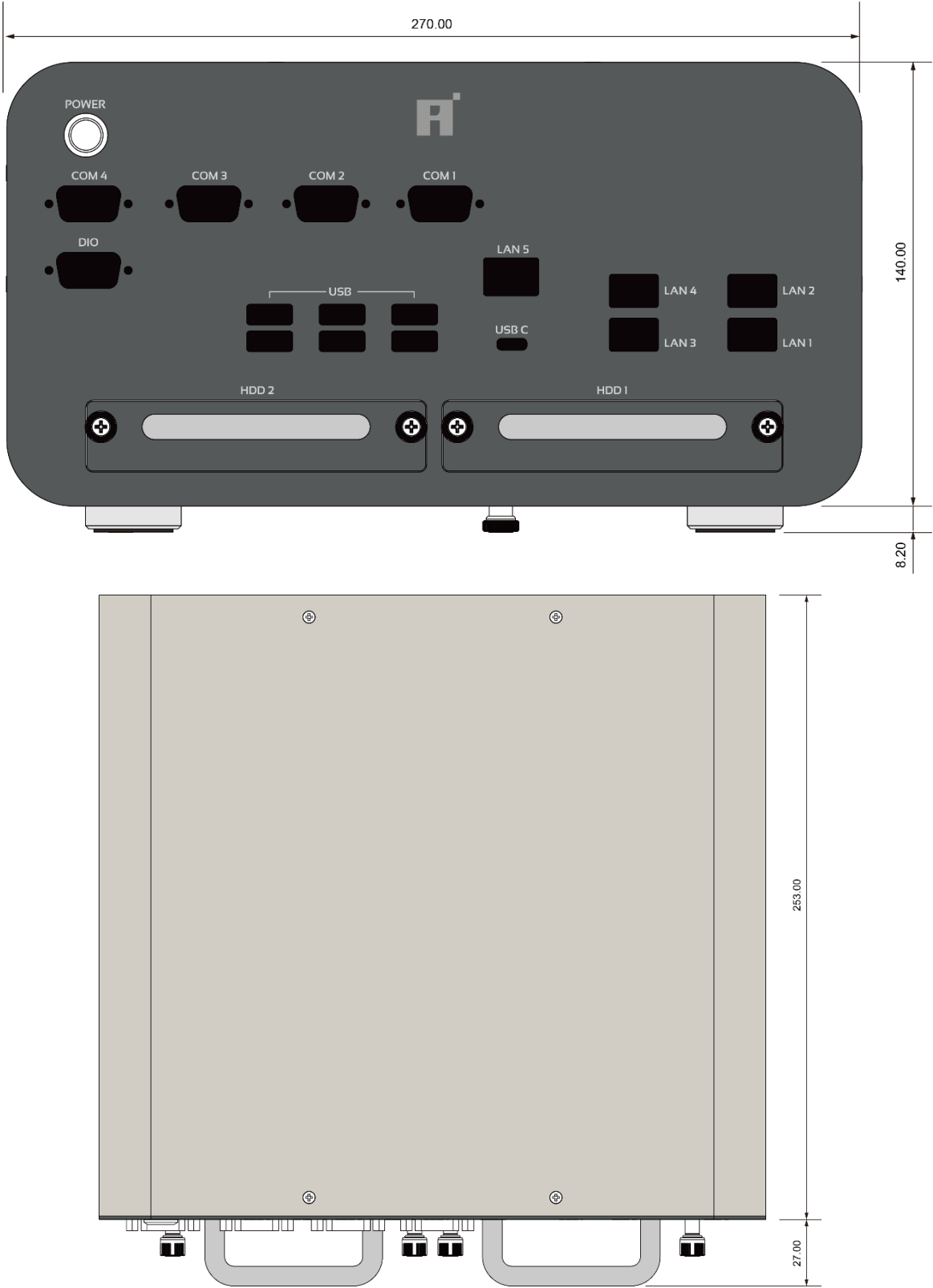
Specifications

Processor System	CPU	Intel® Core™ i7-13700E Processor
	Frequency	Up to 5.10GHz
	TDP	65W
	Chipset	Q670E
	BIOS	AMI EFI 256Mbit
GPU	MXM Type-B/B+	RTX 5000 Ada
	Cores	9728 CUDA cores
	FP32 Performance	41.15 TFLOPS peak
	Graphics Memory	16GB GDDR6
Memory	Technology	DDR5 32G (2 x 262pin 16GB SO-DIMM is pre-installed) up to 4400MHz*1
Graphics	Integrated Graphic	Intel® UHD Graphics 770
	3D/HW Acceleration	DX12, Open GL 4.6, Vulkan 1.2, Mesa 3D, Open GL 4.6, Vulkan 1.2
	HW Encode	H.265/HEVC, H.264/MPEG-4 AVC, MPEG-2, JPEG/MJPEG and VP8
	HW Decode	H.265/HEVC, H.264/MPEG-4 AVC, MPEG-2, VC-1/WMV9, JPEG/MJPEG, VP8 and VP9
Audio	Controller	Realtek ALC888S-VD2-GR
Ethernet	RJ45	LAN 1~5: Intel® i226-LM, up to 2500Mbps
Storage	SATA	2 x 2.5" SATA III SSD/HDD
	M.2	2x M.2 M Key Slot, Support PCIe x4 for NVME, Size 2280/SATA (1 x M.2 2280 512GB NVMe SSD is pre-installed)
Expansions	MXM	1
	M.2	2 x M.2 M Key Slot, Support PCIe Gen4x4 + SATA Interface for NVME, Size 2280 (w/ Type B/B+ GPU Card needs to use wide temp. M.2 SSD)
Front I/O	USB	6 x USB 3.2 Gen2 x 1 (10Gbps, Type-A)
		1 x USB 3.2 Gen2 x 2 (20Gbps, Type-C)
	Ethernet	5 x RJ45 LAN Connector (1+4), 2.5G bps
	Serial port	4 x RS-232/RS-422/RS-485 (COM1~4)
	DIO	1
Rear I/O	Display Port	4 x DP++, From MXM Port A/B/C/D
		1 x DP++, From CPU
	Audio	1 x Line Out, 1 x Mic In
	CAN Bus	2 x CAN Bus-Isolation 2.0B (optional)
	USB	2 x USB 2.0 (480Mbps, Type-A)
	OOB	1
Power	Input Voltage / Type	DC-in 24V / 4-pin Terminal Block
	Consumption Max.	476 Watts (w MXM GPU, Intel® Core™ i7-13970E, 512G SSD, 32G memory)
Mechanical	Mounting	Desk mount / Wall mount
	Dimension (W x H x D)	270.0 x 280.0 x 148.2 mm
	Net Weight	5.7 KG
Environment	Operating Temperature	0°C ~ +50°C
	Storage Temperature	-40°C ~ +85°C
	Relative Humidity	95% @ 40°C Related Humidity, Non-condensing
	Vibration	3 Grms, IEC60068-2-64, Random, 5 ~ 500 Hz, 1Hr / Axis (operation, w/o PCIe Card)
	Shock	(OP)10 G, IEC 60068-2-27, Half Sine, 11 ms Duration (operation, w/o PCIe Card)
Others	Watchdog Timer	255-level timer interval
Software Support	OS	Ubuntu 22.04 · Windows 10
Certification		CE/FCC Class B

Board Block Diagram



System Dimensions (mm)



Component Installation

Accessing the System

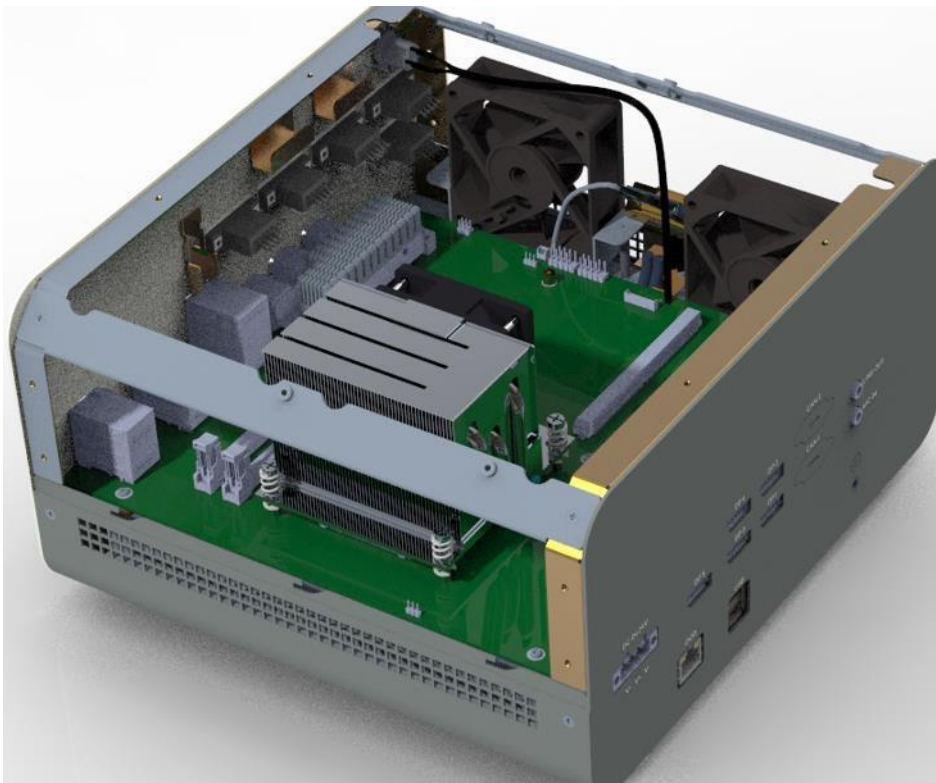
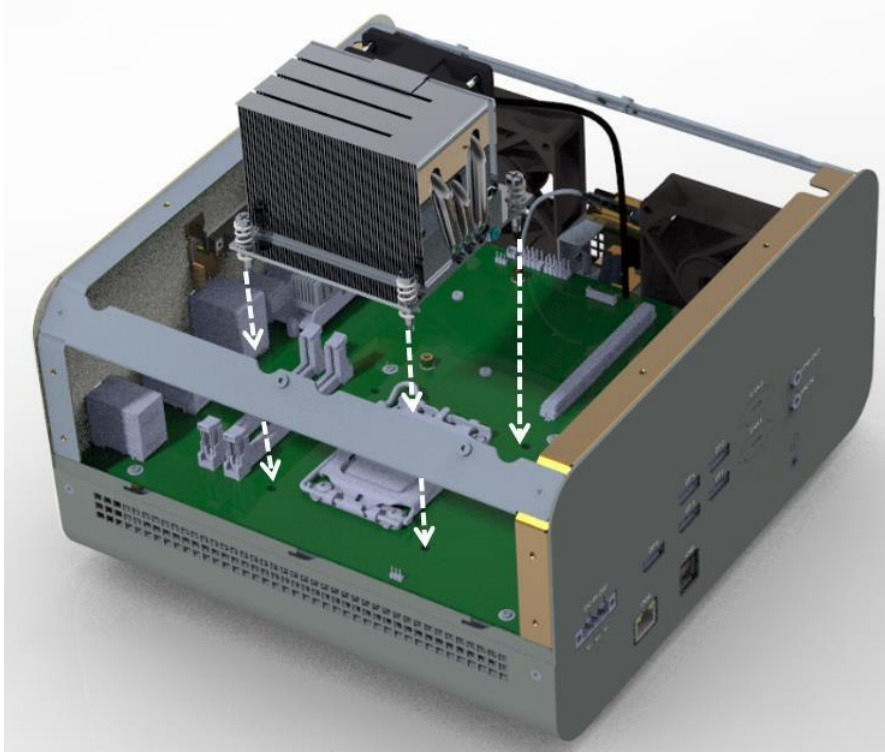
The system features a lockable top cover. Open the cover to access the motherboard. Remove the system cover to access other system components. The system can be accessed without powering down the system.

1. Remove 12 screws on the system cover.
2. Flip open the cover to access the system component.
3. Slightly slide the system cover.
4. Lift the top cover off the chassis.



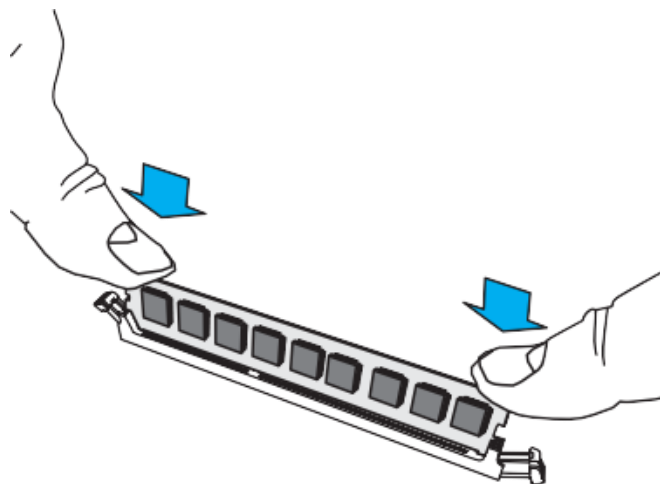
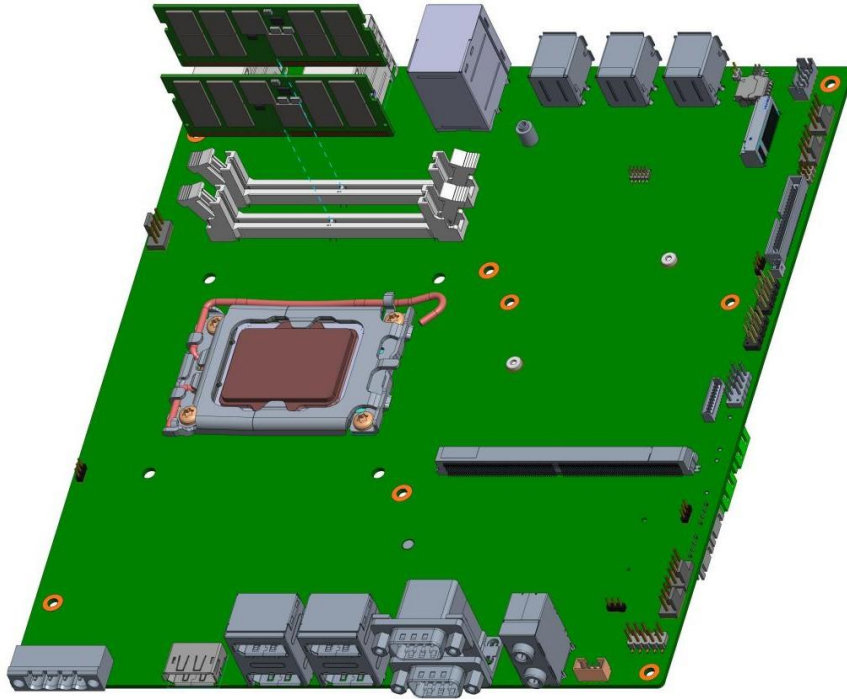
CPU Cooler Installation

1. Remove the top cover as above.
2. Assemble 4 screws (on the CPU Cooler) to fix the cooler on the APEX-P100 system.



DRAM Installation

Slowly insert the DRAM modules into the slots, ensuring that the clips on both sides of the slot securely click into place. When removing the modules, the clips on either side of the module must first be un-clipped.



Storage Installation (2.5" HDD/SSD)

1. Loosen 2 thumb screws on hard drive bay, then pull out.
2. Install HDD/SSD with 4 screws on the HDD/SSD tray.
3. Push back the hard drive bay into the system and secure with thumb screws.



Setup

1. Before you start

Thank you for choosing our product. Before you start using the system, please make sure you follow the instructions below.

- Use DP1/2/3/4 connector setting when you already installed MXM card.
- Use DP5 connector setting without MXM card in the system.

2. Boot-up

- Press the power button to power on the device and boot up when plugging in the power cable.



3. Removing Power

Use the following procedure to ensure that power has been removed from the system.

1. Use the operating system to power down the system.
2. After the system has completely shut down, disconnect the power cord from the power source.
3. Disconnect the power cord from the chassis.

BIOS Setup

1. Beep Codes

PEI Beep Codes	Description
1	Memory not Installed
1	Install Per Memory routine in PEI Core was called twice
2	Recovery started
3	DXE IPL was not found
3	DXE Core firmware volume was not found
4	Recovery failed
4	S3 resume failed
7	Reset PPI is not available

DXE Beep Codes	Description
1	Invalid password
3	Some of the architectural protocols are not available
4	No console input devices found
5	No console output devices found
6	Flash update failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

2. Entering BIOS Setup

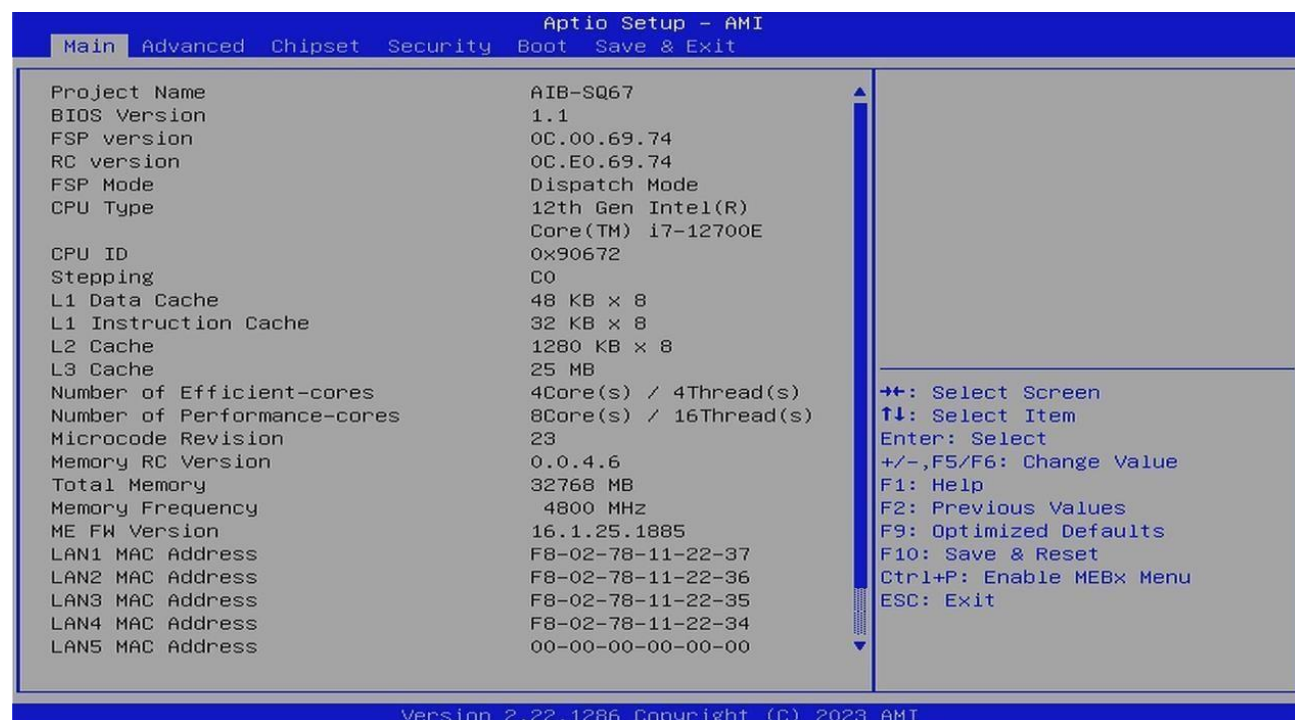
To enter the BIOS setup, press the **DELETE** key during system boot.

3. BIOS Controls

The BIOS is entirely controlled by the keyboard, using the following keys:

Hot Key	Description
Left/right	Switch selected menu
Up/down	Select item
Enter	Confirm selection or open sub menu
Plus/minus or F5/F6	Change the value of a setting
F1	Display help screen
F2	Restore previous value
F9	Load optimized default
F10	Save the selected setting
ESC	Discard changes and exit BIOS

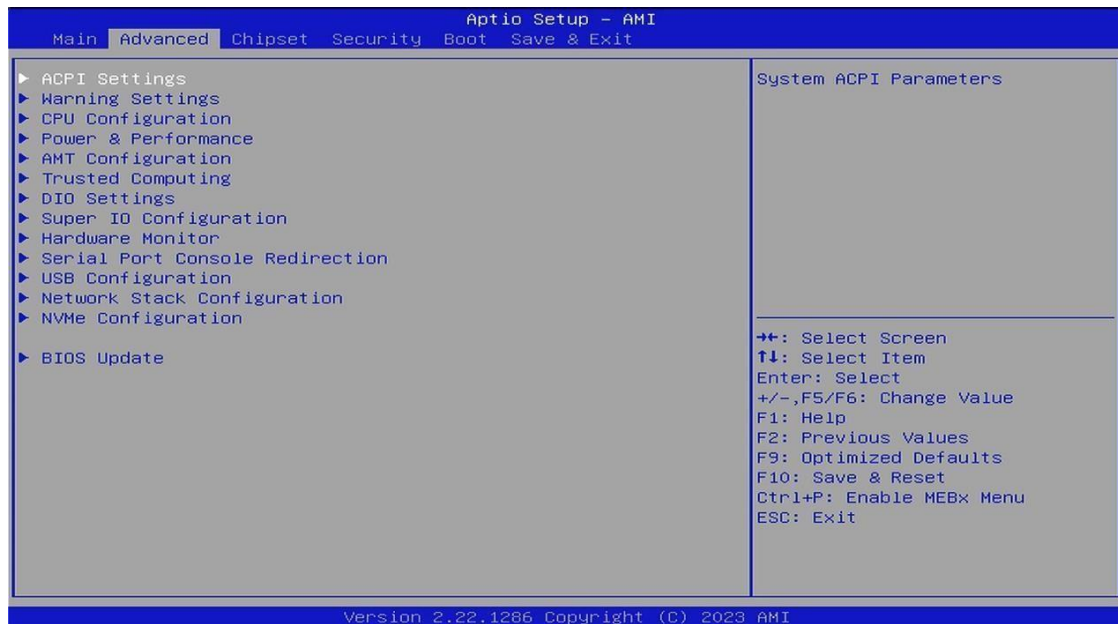
4. BIOS Main Tab



■ Location: Main

Setting Name	Available Options
System Date	01/01/1998 – 31/12/9999 (DD/MM/YYYY)
System Time	00:00:00 – 23:59:59 (HH/MM/SS)

5. BIOS Advanced Tab



■ Location: Advanced > ACPI Settings

Setting Name	Available Options
Wake System from S5 via RTC	Enabled, Disabled
Wake up hour	0 – 23
Wake up minute	0 – 59
Wake up second	0 – 59
State After G3	S0 State, S5 State, Last State
Wake on PME	Enabled, Disabled
ErP Supported	Enabled, Disabled
USB Wake from S3/S4	S3, S4

■ Location: Advanced > Warning Settings

Setting Name	Available Options
Case Open	Enabled, Disabled

■ Location: Advanced > CPU Configuration

Setting Name	Available Options
Intel (VMX) Virtualization Technology	Enabled, Disabled

Active Performance-cores	All, 1, 2, 3, 4, 5, 6, 7
Active Efficient-cores	All, 0, 1, 2, 3
Hyper-Threading	Enabled, Disabled

■ **Location: Advanced > Power & Performance > CPU – Power Management Control**

Setting Name	Available Options
Intel® SpeedStep™	Enabled, Disabled
Turbo Mode	Enabled, Disabled
C states	Enabled, Disabled
Package C State Limit	C0/C1, C2, C3, C6, C7, C7S, C8, C9, C10, CPU Default, Auto

■ **Location: Advanced > AMT Configuration**

Setting Name	Available Options
USB Provisioning of AMT	Enabled, Disabled
MAC Pass Through	Enabled, Disabled
Active Remote Assistance Process	Enabled, Disabled
Unconfigure ME	Enabled, Disabled

■ **Location: Advanced > AMT Configuration > ASF Configuration**

Setting Name	Available Options
PET Progress	Enabled, Disabled
WatchDog	Enabled, Disabled
ASF Sensor Table	Enabled, Disabled

■ **Location: Advanced > AMT Configuration > Secure Erase Configuration**

Setting Name	Available Options
Secure Erase Mode	Simulated, Real
Force Secure Erase	Enabled, Disabled

■ **Location: Advanced > AMT Configuration > One Click Recovery Config**

Setting Name	Available Options
OCR Https Boot	Enabled, Disabled
OCR PBA Boot	Enabled, Disabled
OCR Windows Recovery Boot	Enabled, Disabled
OCR Disable Secure Boot	Enabled, Disabled

■ **Location: Advanced > Trusted Computing**

Setting Name	Available Options
Security Device Support	Enabled, Disabled
Pending Operation	None, TPM Clear

■ **Location: Advanced > DIO Settings**

Setting Name	Available Options
DIO PIN Type 1	Output Low, Output High, Input
DIO PIN Type 2	Output Low, Output High, Input
DIO PIN Type 3	Output Low, Output High, Input
DIO PIN Type 4	Output Low, Output High, Input
DIO PIN Type 5	Output Low, Output High, Input
DIO PIN Type 6	Output Low, Output High, Input
DIO PIN Type 7	Output Low, Output High, Input
DIO PIN Type 8	Output Low, Output High, Input

■ **Location: Advanced > Super IO Configuration**

Setting Name	Available Options
WatchDog Timer Unit	Second, Minute
Super IO WatchDog Timer	0 – 255
COM1	Enabled, Disabled
Electrical Interface Mode	RS232, RS485, RS422
COM2	Enabled, Disabled
Electrical Interface Mode	RS232, RS485, RS422
COM3	Enabled, Disabled
COM4	Enabled, Disabled
Electrical Interface Mode	RS232, RS485, RS422

■ Location: Advanced > Hardware Monitor

Setting Name	Available Options
CPUFAN1 Mode	Manual mode, SMART FAN
Temperature 1	1 – 255
Temperature 2	1 – 255
Temperature 3	1 – 255
Temperature 4	1 – 255
FD/RPM 1	0 – 100
FD/RPM 2	0 – 100
FD/RPM 3	0 – 100
FD/RPM 4	0 – 100
SYSFAN 1 Mode	Manual mode, SMART FAN
Temperature 1	0 – 100
Temperature 2	0 – 100
Temperature 3	0 – 100
Temperature 4	0 – 100
FD/RPM 1	0 – 100
FD/RPM 2	0 – 100
FD/RPM 3	0 – 100
FD/RPM 4	0 – 100
SYSFAN 2 Mode	Manual mode, SMART FAN
Temperature 1	0 – 100
Temperature 2	0 – 100
Temperature 3	0 – 100
Temperature 4	0 – 100
FD/RPM 1	0 – 100
FD/RPM 2	0 – 100
FD/RPM 3	0 – 100
FD/RPM 4	0 – 100
SYSFAN 3 Mode	Manual mode, SMART FAN
Temperature 1	0 – 100
Temperature 2	0 – 100
Temperature 3	0 – 100
Temperature 4	0 – 100
FD/RPM 1	0 – 100
FD/RPM 2	0 – 100

FD/RPM 3	0 – 100
FD/RPM 4	0 – 100
MXMFAN 1 Mode	Manual mode, SMART FAN
Temperature 1	0 – 100
Temperature 2	0 – 100
Temperature 3	0 – 100
Temperature 4	0 – 100
FD/RPM 1	0 – 100
FD/RPM 2	0 – 100
FD/RPM 3	0 – 100
FD/RPM 4	0 – 100

■ **Location: Advanced > Serial Port Console Redirection**

Setting Name	Available Options
COM1 Console Redirection	Enabled, Disabled
COM2 Console Redirection	Enabled, Disabled
COM3 Console Redirection	Enabled, Disabled
COM4 Console Redirection	Enabled, Disabled

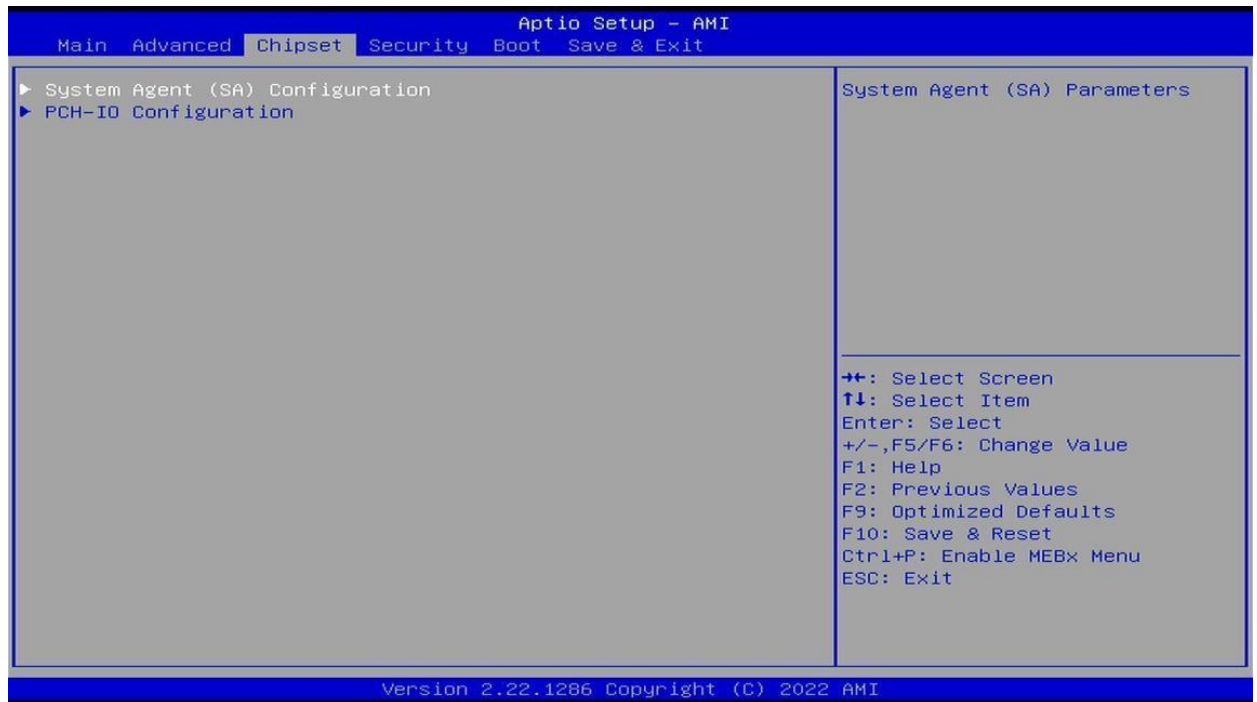
■ **Location: Advanced > USB Configuration**

Setting Name	Available Options
USB Mass Storage Driver Support	Enabled, Disabled

■ **Location: Advanced > Network Stack Configuration**

Setting Name	Available Options
Network Stack	Enabled, Disabled

6. BIOS Chipset Tab



■ Location: Chipset > System Agent (SA) Configuration

Setting Name	Available Options
VT-d	Enabled, Disabled

■ Location: Chipset > System Agent (SA) Configuration > Graphics Configuration

Setting Name	Available Options
Primary Display	Auto, IGFX, PEG Slot, PCH PCI
Internal Graphics	Auto, Disabled, Enabled

■ Location: Chipset > System Agent (SA) Configuration > VMD Setup Menu

Setting Name	Available Options
Enable VMD Controller	Enabled, Disabled

- **Location: Chipset > System Agent (SA) Configuration > PCIe Configuration > PCI Express Root Port 1**

Setting Name	Available Options
PCI Express Root Port 1	Enabled, Disabled
PCIe Speed	Auto, Gen1, Gen2, Gen3, Gen4

- **Location: Chipset > System Agent (SA) Configuration > PCIe Configuration > PCI Express Root Port 2**

Setting Name	Available Options
PCI Express Root Port 2	Enabled, Disabled
PCIe Speed	Auto, Gen1, Gen2, Gen3, Gen4, Gen5

- **Location: Chipset > System Agent (SA) Configuration > PCIe Configuration > PCI Express Root Port 3**

Setting Name	Available Options
PCI Express Root Port 3	Enabled, Disabled
PCIe Speed	Auto, Gen1, Gen2, Gen3, Gen4, Gen5

- **Location: Chipset > PCH-IO Configuration > PCI Express Configuration > LAN1**

Setting Name	Available Options
LAN1	Enabled, Disabled

- **Location: Chipset > PCH-IO Configuration > PCI Express Configuration > LAN2**

Setting Name	Available Options
LAN2	Enabled, Disabled

- **Location: Chipset > PCH-IO Configuration > PCI Express Configuration > LAN3**

Setting Name	Available Options
LAN3	Enabled, Disabled

- **Location: Chipset > PCH-IO Configuration > PCI Express Configuration > LAN4**

Setting Name	Available Options
LAN4	Enabled, Disabled

- **Location: Chipset > PCH-IO Configuration > PCI Express Configuration > LAN5**

Setting Name	Available Options
LAN5	Enabled, Disabled

- **Location: Chipset > PCH-IO Configuration > PCI Express Configuration > M2M1**

Setting Name	Available Options
M2M1	Enabled, Disabled
PCIe Speed	Auto, Gen1, Gen2, Gen3, Gen4

- **Location: Chipset > PCH-IO Configuration > PCI Express Configuration > M2M2**

Setting Name	Available Options
M2M2	Enabled, Disabled
PCIe Speed	Auto, Gen1, Gen2, Gen3, Gen4

- **Location: Chipset > PCH-IO Configuration > SATA Configuration**

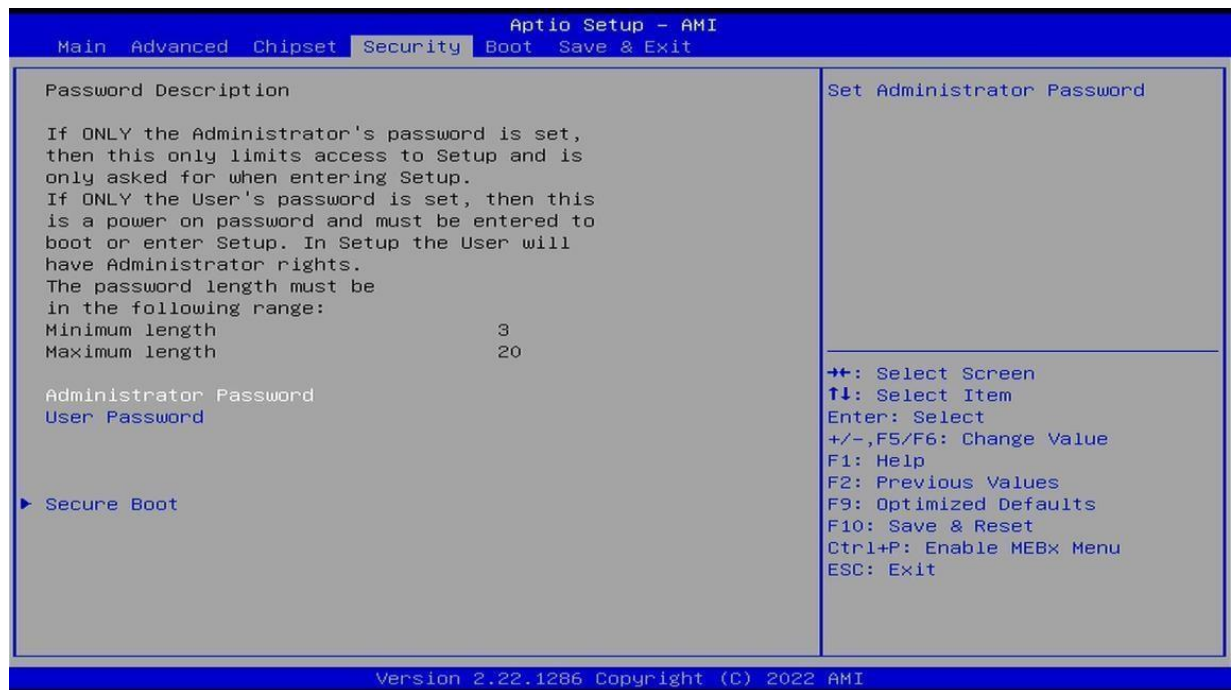
Setting Name	Available Options
SATA Controller(s)	Enabled, Disabled
SATA Mode Selection	AHCI

Port 0 (M2M1)	Enabled, Disabled
Port 0 (M2M2)	Enabled, Disabled
Port 5 (SATA1)	Enabled, Disabled
Port 6 (SATA2)	Enabled, Disabled

■ **Location: Chipset > PCH-IO Configuration > HD Audio Configuration**

Setting Name	Available Options
HD Audio	Enabled, Disabled

7. BIOS Security Tab



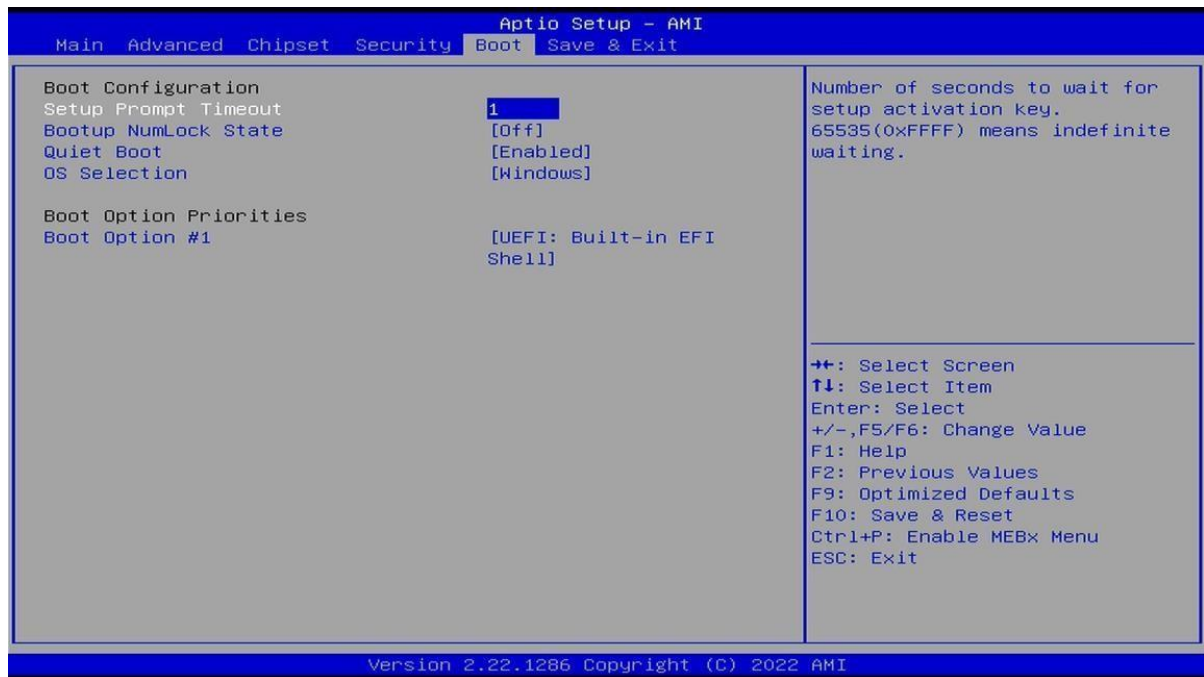
■ Location: Security

Setting Name	Available Options
Administrator Password	3 to 20 characters
User Password	3 to 20 characters

■ Location: Security > Secure Boot

Setting Name	Available Options
Secure Boot	Enabled, Disabled
Secure Boot Mode	Standard, Custom
Restore Factory Keys	Yes, No

8. BIOS Boot Tab



■ Location: Boot

Setting Name	Available Options
Setup Prompt Timeout	0 - 9999
Bootup Num Lock State	On, Off
Quiet Boot	Enabled, Disabled
OS Selection	Windows, Linux, Real Time OS
Boot Option #1	UEFI: Built-in EFI Shell, Disabled

Appendix

Accelerator Compatible List:

	APEX-X100	APEX-P100 (MXM Type B)	APEX-P200 (MXM Type A)	APEX-E100
NVIDIA RTX	NVIDIA RTX 4000 SFF Ada NVIDIA RTX 4000 Ada NVIDIA RTX 4500 Ada NVIDIA RTX 5000 Ada NVIDIA RTX 6000 Ada NVIDIA L4 (support up to dual L4) NVIDIA A2 NVIDIA A10 NVIDIA A30	NVIDIA Quadro RTX 3000 NVIDIA Quadro RTX 5000 NVIDIA RTX A4500 NVIDIA RTX 5000 Ada NVIDIA RTX 3500 Ada	NVIDIA Quadro T1000 NVIDIA RTX A500 NVIDIA RTX A1000 NVIDIA RTX A2000 NVIDIA RTX 2000 Ada	N/A

Note: The above product may reach End of Life (EOL) in accordance with the supplier's Life Cycle Management policy

Headquarters

5F., No. 237, Sec. 1, Datong Rd., Xizhi
 Dist., New Taipei City, 221, Taiwan
T +886-2-7703-3000
E sales@innodisk.com



Branch Offices

USA
T +1-510-770-9421
E usasales@innodisk.com

Europe
T +31-(0)40 3045 400
E eusales@innodisk.com

Japan
T +1-510-770-9421
E jpsales@innodisk.com

China
T +86-0755-2167-3689
 +86-0755-2167-3690
E sales_cn@innodisk.com