RC300-CS

Railway Fan-less Box PC
User's Manual

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Changes after the publication's first release will be based on the product's revision. The website will always provide the most updated information.

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FCC and DOC Statement on Class A

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

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

Notice:

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

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About this Manual

An electronic file of this manual can be obtained from the DFI website at www.dfi.com. To download the user's manual from our website, please go to Support > Download Center. On the Download Center page, select your product or type the model name and click "Search" to find all technical documents including the user's manual for a specific product.

Warranty

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

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

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

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

Static Electricity Precautions

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

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface.

4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or con nectors by their ends.

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

Safety Measures

To avoid damage to the system:
• Use the correct AC input voltage range.

To reduce the risk of electric shock:
• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

Battery:
• Danger of explosion if battery incorrectly replaced.
• Replace only with the same or equivalent type recommend by the manufacturer.
• Dispose of used batteries according to local ordinance.

Safety Precautions

- Use the correct DC input voltage range.

- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

- Danger of explosion if battery incorrectly replaced.

- Replace only with the same or equivalent type recommend by the manufacturer.

- Dispose of used batteries according to local ordinance.

- Keep this system away from humidity.

- Place the system on a stable surface. Dropping it or letting it fall may cause damage.

- The openings on the system are for air ventilation to protect the system from overheating. DO NOT COVER THE OPENINGS.

- Place the power cord in such a way that it will not be stepped on. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and that it matches the voltage and current marked on the system's electrical range label.

- If the system will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

- If one of the following occurs, consult a service personnel:

  - The power cord or plug is damaged.

  - Liquid has penetrated the system.

  - The system has been exposed to moisture.

  - The system is not working properly.

  - The system dropped or is damaged.

  - The system has obvious signs of breakage.

- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.

- Disconnect the system from the DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

About the Package

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

- 1 RC300-CS system unit

- 1 Counter Part Power connector

- 1 Wall-mount bracket

Optional Items

Optional Items	Part Number	Description
2.5" SSD	"785-S251TBG 785-S25512G 785-S25256G 785-S25128G"	"2.5"" SATA SSD, 1TB MLC, -40 to 85°C, RoHS 2.5"" SATA SSD, 512GB MLC, -40 to 85°C, RoHS 2.5"" SATA SSD, 256GB MLC, -40 to 85°C, RoHS 2.5"" SATA SSD, 128GB MLC, -40 to 85°C, RoH"
M.2 SATA SSD	785-M2SATA64G	64GB, M.2 2280 SSD, SATA3 B+M Key, MLC, Wide Temp.
M.2 SATA SSD	785-M2SATA128G	128GB, M.2 2280 SSD, SATA3 B+M Key, MLC, Wide Temp.
M.2 SATA SSD	785-M2SATA256G	256GB, M.2 2280 SSD, SATA3 B+M Key, MLC, Wide Temp.
M.2 SATA SSD	785-M2SATA512G	512GB, M.2 2280 SSD, SATA3 B+M Key, 3D TLC, PE: 3K, 30u" -20~75
Memory	138-580004-104G	8GB DDR4 2666Mhz SO-DIMM 1Rx8 IND 1Gx8 CL19 1.2V
Memory	138-540002-121G	4GB DDR4 2666Mhz SO-DIMM, '-40 to 85C
WiFi/BT module kit	761-AP1235-000G	WiFi/Bluetooth Module AP12356, antenna *2, 200mm SMA cables*2, Mini PCIe Bracket, screws
LTE module kit	761-RC3000-001G	Quectel EG25GGB CAT4 miniPCIe module, antenna*2, 300mm SMA cables*2
5G module kit	761-RC3000-100G	SIM8202G-M2 M.2 module, antenna*4, 184mm SMA cables *4
M12 Cable	A81-005038-054G	8-pin M12 X-coded to RJ45 PoE cable
CAN bus module	770-MPE21-100G	MPE-CAN2 MiniPCIe Full CAN Module Card Asssembly

Chapter 1 - Introduction

Specifications

SYSTEM	Processor	8th/9th Generation Intel® Core™ Processors, LGA 1151
		Intel® Core™ i7-9700TE Processor, 8C/8T, 12MB Cache, 1.8GHz, TDP 35W
		Intel® Core™ i7-8700T Processor, 6C/12T, 12MB Cache, 2.4GHz, TDP 35W
		Intel® Core™ i5-9500TE Processor, 6C/6T, 9MB Cache, 2.2GHz, TDP 35W
		(Other CPU support upon request)
	Chipset	Intel® Q370 Chipset
	Memory	Dual Channel DDR4 2666/2400 MHz by SODIMMs up to 64GB
	BIOS	AMI SPI 128Mbit
GRAPHICS	Controller	Intel® HD Graphics
	Display	1 x VGA (display out by DB15 connector)
		1 x HDMI (with screw lock)
		1 x DP++ (Standard Display Port Connector DIP
		type with screw lock)
		Support NIVIDIA Optimus
		technology
		VGA: resolution up to 1920x1200 @ 60Hz
		HDMI: resolution up to 4096x2160 @ 24Hz
		DP++: resolution up to 4096x2304 @ 60Hz
	GPU	Support MXM 3.1 Type A/B/C: P2000, T1000, RTX2060, RTX2070, RTX3000 GPU modules
		Maximum package power 120W, inrush current 150W
		PCIe x16
STORAGE	External	4 x Swappable 2.5" 7mm SSD storage bays (RC300H-CS)
		2x Swappable 2.5" 7mm SSD storage bays with lock (RC300L-CS, RC300H-CS-UPS)
EXPANSION	Interface	1 x Half-size Mini PCIe for WiFi/BT modules, with PCIe x1 & USB signal
		2 x Full-size Mini PCIe support PCIe x1 & USB 2.0 signal with SIM of each
		1 x M.2 B key supports 3042, 3052 devices or 5G module on PCIe x1, USB2.0, USB3.0 signal with SIM slot (SIM card can be external accessible with cover)
		1 x M.2 2280 M key supports 2242, 2260 & 2280 devices (PCIe x4 & SATA signal, support boot up function)
		All SIM cards can be accessed from external with cover protection not only for M.2 but also mPCIe slots.
AUDIO	Audio Codec	Realtek ALC262
ETHERNET	Controller	5 x Intel® I210IT NIC (10/100/1000Mbps)
		1 x Intel® I219LM with iAMT11.0 PCIe (10/100/1000Mbps)
		(only Core i7/i5 supports iAMT)
	Interface	2 x RJ45 GbE
		4 x M12 X-coded 802.3af 15.4W PoE ports
LED	Indicators	1 x Power LED (Green)
		5 x Storage LED (Red)
		4 x PoE LED

Front I/O	PoE	4 x M12 X-coded 802.3af PoE
		Support 802.11af, max 15.4W (PSE side)
		NOT support wake on Lan
	Ethernet	2 x GbE (RJ-45) support Wake on Lan
	Serial	2 x BIOS selection RS-232/422/485 by 2x DB-9
	USB	4 x USB 3.0 (type A)
	Display	1 x VGA display out by DB15 connector
	DIO	1 x 8bit isolated DI port by DB-9 connector
		1 x 8bit isolated DO port by DB-9 connector
		2KV isolation
	Power-in	RC300H-CS : 1 x 6pin 5.0mm terminal block
		RC300L-CS : 1 x 9pin 5.0mm terminal block
Rear I/O	USB	2 x USB 2.0 (type A)
	Display	1 x HDMI
		1 x DP++
	Audio	1 x Mic-in
		1 x Line-out
		by 3.5mm 3P Phone Jack
	Buttons	1 x Power Button
		1 x Reset Button
	SIM	3 x SIM sockets (external accessible with cover)
Watchdog Timer	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
Security	TPM	TPM 2.0
Power	Type	RC300H-CS: 110VDC nominal power input (77VDC~137.5VDC power range)
		RC300L-CS: 12/24VDC nominal power input (9VDC~36VDC power range)
	Connector	RC300H-CS : 1 x 6pin 5.0mm terminal block
		RC300L-CS : 1 x 9pin 5.0mm terminal block
	Battery (UPS)	Optional UPS battery kit for at least 5min operations at full loading max. 300W (will occupy two SSDs space), RC300H-CS only (RC300H-CS-UPS)
OS Support	OS Support	Windows 10 IoT Enterprise 64 Bit
		Ubuntu 18.04
Environment	Temperature	-25°C to 70°C with when CPU+GPU<100W, up to +85°C for 10min
		-25°C to 55°C with when CPU+GPU<160W, up to +70°C for 10min
		Turboboost is disabled and CPU&GPU will be throttling at high temperature.
	Storage Temperature	-40 to 85°C
	Relative Humidity	10% to 90% (non-condensing)

Mechanism	Dimensions	340.5(W) x 223(D) x 132(H) mm
		(3U height, excluding rubber foot)
	Construction	Metal + Aluminum
	Mounting	Wall mount
	Weight	9.85 kg
Standards and Certifications	Shock	EN61373: 2010, Category 1 Class A & Class B
	Vibration	EN61373: 2010, Category 1 Class B
	Certifications	CE, FCC Class B (Tested with Adapter)
		EMC: EN50121-3-2
		Safety: EN50153, EN50124-1
		Fire Proof: EN45545
		Railway Regulation: EN50155 (Class S1: for RC300H-CS)
Country of Origin	Country of Origin	Taiwan

Power Consumption

RC300H-CS System Configuration

CPU	Intel Core i7-9700TE 8C/8T 1.8GHz 12MB cache, TDP 35W
Memory	DDR4-2666 SO-DIMM 260pin 16GB *2
Graphics card	MXM module NVIDIA GeForce RTX 2070 (115W)
Storage	SSD 2.5" SATAIII 128GB *4

Mode	DC Power Source (110V)
Boot up	78.4W
Idle	36.1W
Max App Load	209W
Worse Case Load	232W
3D Mark Load	168W
S3	8W
S5	7.6W

Note:
Power Consumption is based on MXM module NVIDIA GeForce RTX 2070 8GB GDDR6(RTX2070M8D6, AETINA)

RC300L-CS System Configuration

CPU	Intel Core i7-9700TE 8C/8T 1.8GHz 12MB cache, TDP 35W
Memory	DDR4-2666 SO-DIMM 260pin 8GB
Graphics card	MXM module NVIDIA GeForce RTX 2060 (80W)
Storage	SSD 2.5" SATAIII 64GB DES25-64G

Mode	DC Power Source (12V)		Mode	DC Power Source (24V)	
Boot up	6.50A	78.00W	Boot up	3.16A	75.84W
Idle	2.94A	35.28W	Idle	1.31A	31.44W
Max App Load (With PoE load)	15.26A	183.12W	Max App Load (With PoE load)	7.14A	171.36W
Worse Case Load (With PoE load)	16.00A	192.00W	Worse Case Load (With PoE load)	7.90A	189.60W
3D Mark Load (With PoE load)	27.37A	328.44W	3D Mark Load (With PoE load)	12.70A	304.80W
S5	0.51A	6.12W	S5	0.27A	6.48W

Power Consumption Test Procedure

1. Examine basic function using Burn-In Test.

2. Install the external devices and loopback into System.

3. Use Device Manager to examine devices.

4. Use Chroma 62012P-80-60 DC to measure the power consumption modes : (please see below.)

Mode	Test Procedure
Boot up	Turn on the mainboard into operating mainboard desktop. (No external devices attached)
Idle	No run any applications, the mainboard use low CPU usage even when it is idle under operating mainboard. Exactly 15 minutes after the initial boot.
Max App Load	Burn in 100% maximum loading.
Worse Case Load	TAT(CPU,GPU load:100%)+Burn-In(I/O load:100%).
3D Mark Load	3Mark+Burn in(I/O load:100%)
S5	Select WOL enable & disable mode in BIOS menu, Power off the system. (No external devices attached)

5. Recode the power usage (in watts).

Getting to Know the RC300H-CS

Front View

COM   DIO   GbE1~2   USB 3.0   VGA

DC-in 77~137V,   M12 POE
9~36V
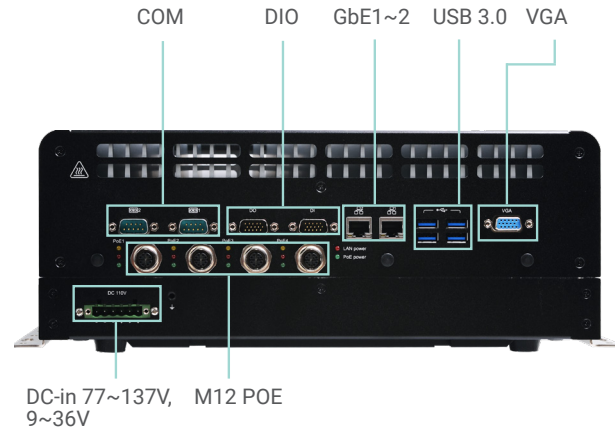
DC-in Jack

Connects a DC-in power adapter. Please note the acceptable power range: 77-137V, 9~36V.

USB Ports (3.0)

Connect USB 3.0/2.0/1.1 devices. They comply with USB 3.0 which supports data transmission rate up to 5 Gbits.

LAN Ports

Connect the system to a local area network.

VGA Port

Connects to the VGA port of an LCD monitor.

DIO

Supports 8-bit digital output and input.

COM

Used to connect serial devices.

M12 PoE

Connect to PoE receivers.

Rear View

Power Button   HDMI DP++ USB 2.0

SSD 1~4   Line-out Mic-in

Power Button

Press to power-on or power-off the system.

USB Ports (2.0)

Connect USB 2.0/1.1 devices.

Line-out

Connect the audio output devices.

Mic-in

Connect the microphone or audio input devices.

HDMI Port

Connects to the HDMI port of an LCD monitor.

DisplayPort

Connects to the DisplayPort of an LCD monitor.

SSD

2.5" slots for SSD hard disks.

9
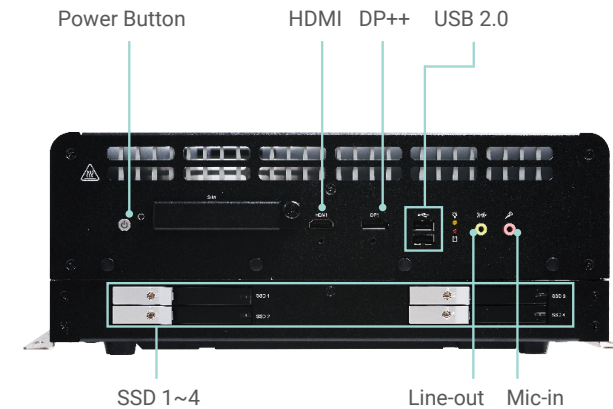
Getting to Know the RC300L-CS

Front View

COM   DIO   GbE1~2   USB 3.0   VGA

DC-in 9~36V   M12 POE
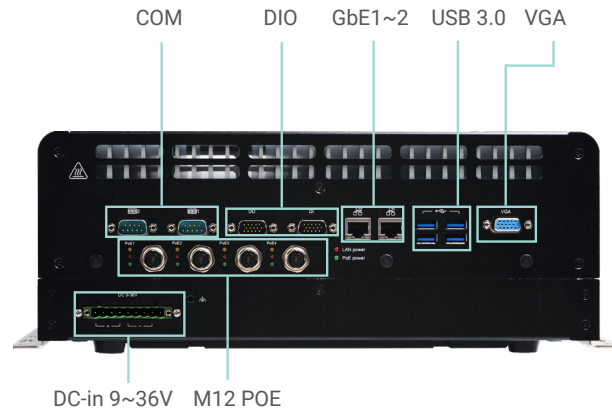
DC-in Jack

Connects a DC-in power adapter. Please note the acceptable power range: 9~36V.

USB Ports (3.0)

Connect USB 3.0/2.0/1.1 devices. They comply with USB 3.0 which supports data transmission rate up to 5 Gbits.

LAN Ports

Connect the system to a local area network.

VGA Port

Connects to the VGA port of an LCD monitor.

DIO

Supports 8-bit digital output and input.

COM

Used to connect serial devices.

M12 PoE

Connect to PoE receivers.

Rear View

Power Button   HDMI DP++ USB 2.0

SIM Socket   Line-out

Mic-in

SSD

Power Button

Press to power-on or power-off the system.

USB Ports (2.0)

Connect USB 2.0/1.1 devices.

Line-out

Connect the audio output devices.

Mic-in

Connect the microphone or audio input devices.

HDMI Port

Connects to the HDMI port of an LCD monitor.

DisplayPort

Connects to the DisplayPort of an LCD monitor.

SSD

2.5" slots for SSD hard disks.

Mechanical Dimensions

378.10
340.50
367.10
160.00
120.00
60.00
2.00
16.00
180.00
223.00
135.60
131.50
125.10
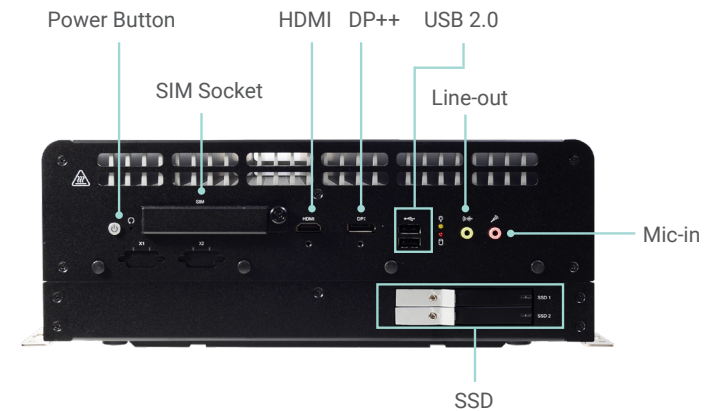
Chapter 2 - Getting Started

Preparing the System

Before you start using the system, you need the following items:

- SATA hard drive
- DC Power connector
- Screwdriver
- Memory modules

Installing Devices

The following devices can be installed in the system.

- All the optional items.

- SATA HDD is not supported.

Configuring the BIOS

To get you started, you may need to change configurations such as the date, time and the type of hard disk drive.

1. Power on the system.
2. After the memory test, the message "Press DEL to run setup" will appear on the screen. Press the Delete key to enter the BIOS setup utility.

Installing the Operating System

Make sure that a SATA drive is already installed.

1. Refer to the following chapters for information on installing a SATA drive
2. Refer to your operating system manual for instructions on installing an operating system.

Compatible MXM Modules

GPU	MXM Type	Architecture	Memory	TFLOPS	TGP
T1000	A	Turing	4GB GDDR6	2.6	50W
RTX 3000	B	Turing	6GB GDDR6	5.3	80W
RTX A500	A	Ampere	4GB GDDR6	6.54	35W
RTX A1000	A	Ampere	4GB GDDR6	6.66	60W
RTX A2000	A	Ampere	8GB GDDR6 with ECC	8.64	60W
RTX A4500	B+	Ampere	16GB GDDR6 with ECC	17.66	115W

Chapter 3 - Installing Devices

> **Import:**
> To prevent damage to the system board, power down the system and remove all power cords before opening the chassis cover.

Preface

RC300-CS is combined by two parts: Power part and main body. By deviding the power parts you can install so-dimm / m.2 / mini-PCIe modules.

Main Body ↓

Power Part ↑

Devide the power parts

1. Turn over the machine to let the bottom side become the top.

2. Remove two screws circled by red in each corner.
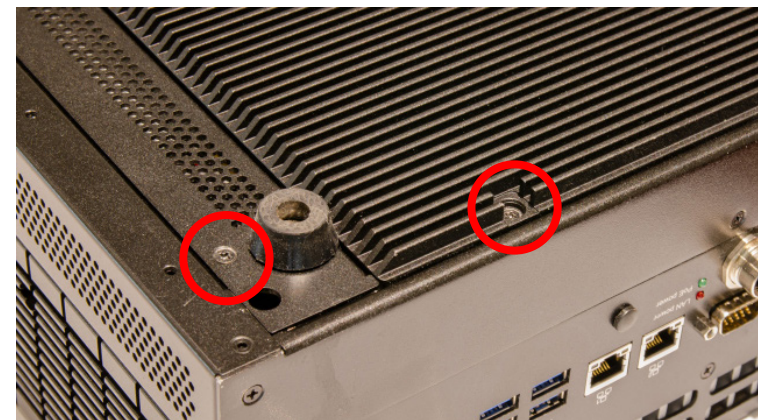
3. Remove the bottom case

4. The power part appears.

RC300H-CS

RC300L-CS

5. There're two 2.5" hdd slots for harddisk/SSD installation.

5. If you want to change/remove/install other components, please remove the power part first.Remove the 4 screws in each corner circled by red.
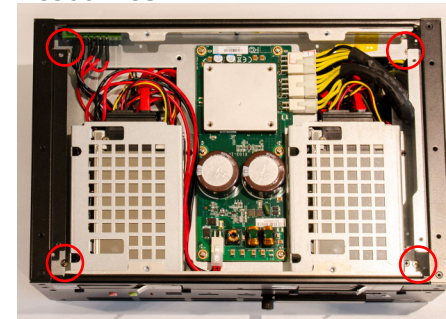
RC300H-CS

RC300L-CS
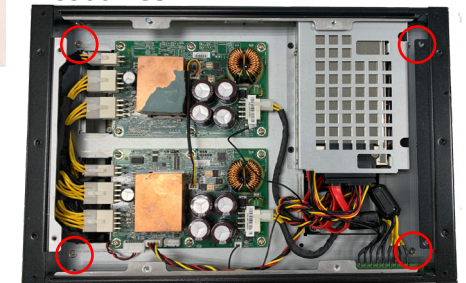
6. Tilt up to remove the power part carefully and slowly. Please unplug these cables first.
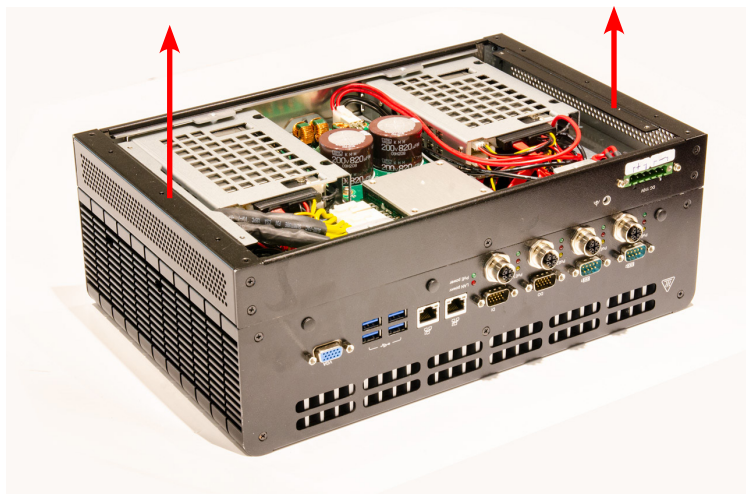
7. The main body appears.
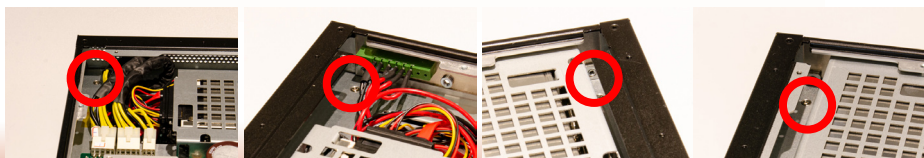
8. Remove each component by the screws circled in red.
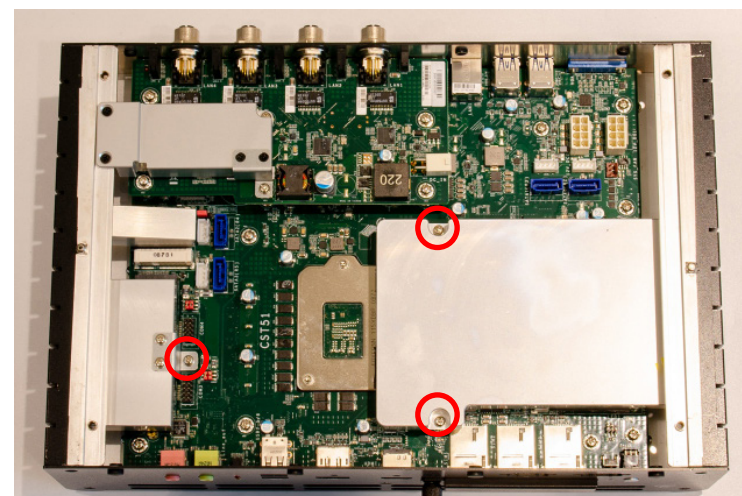
9. The expansion slots appear.
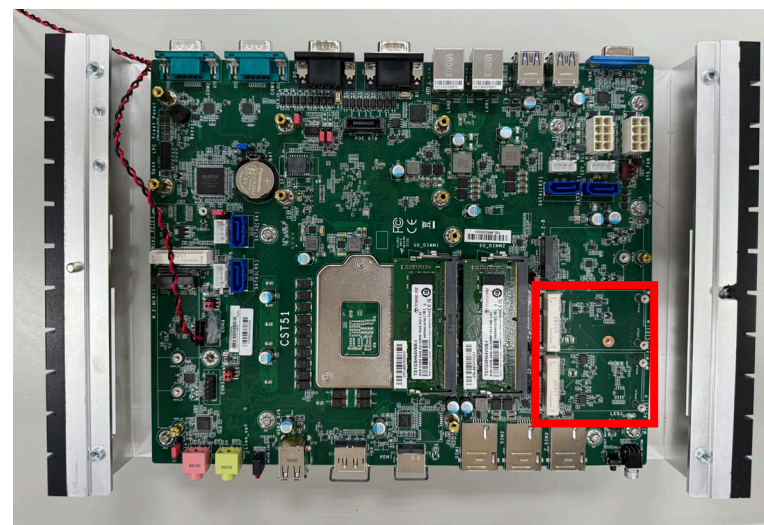
Installing an MXM Card

Before installing an MXM card, please make sure that the following safety cautions are wellattended.
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.

Step 1:

To locate a MXM card socket, please follow the **Devide the power parts** section and lift the cover to open the system.

Step 2:

Remove the screws/standoffs marked in red circle on the main board.
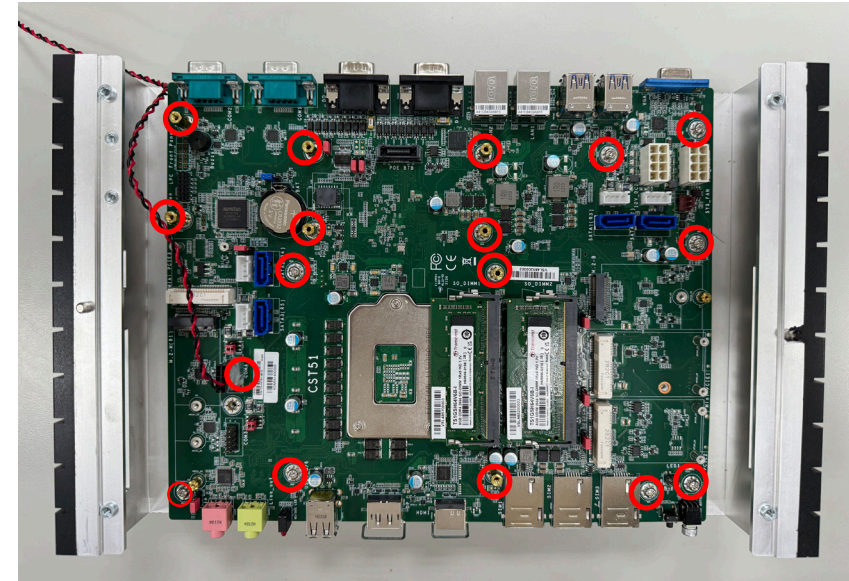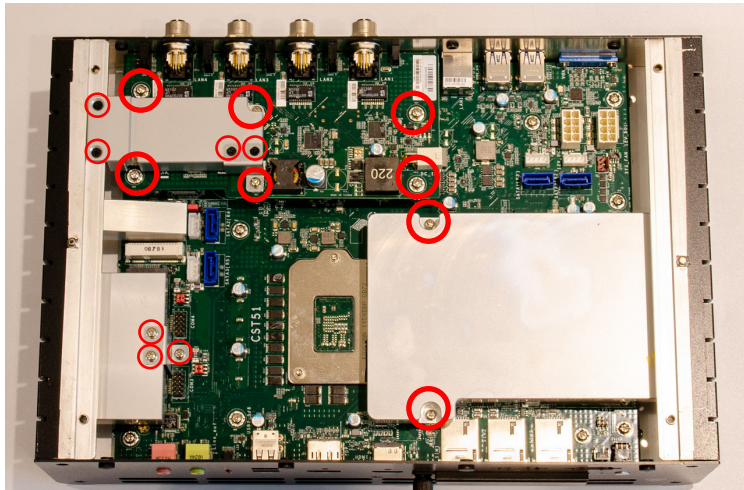
Step 3:

Remove the screws/standoffs marked in red circle on the left/right/front side of the chassis.

Remove all 10 standoffs
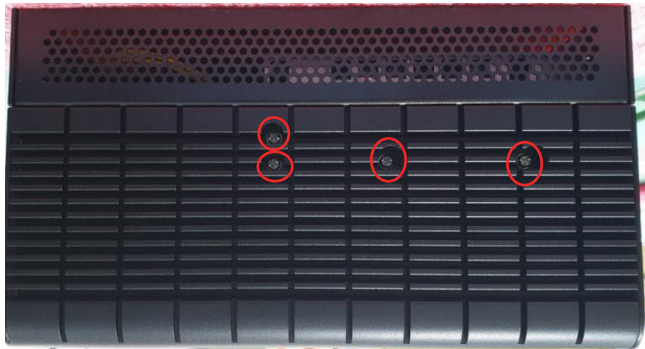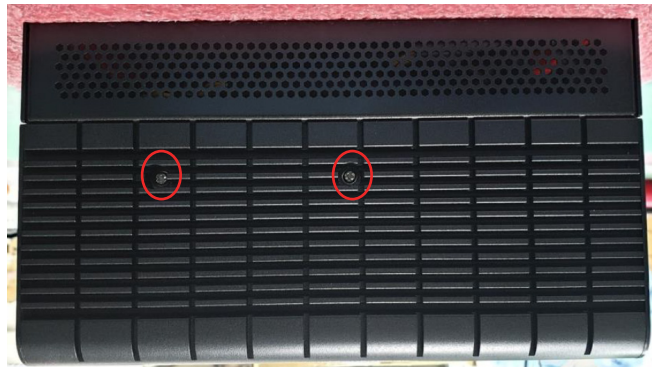
Step 4:

Gently lift the main board and turn it to the other side.

A MXM card socket is on the back side of the main board.
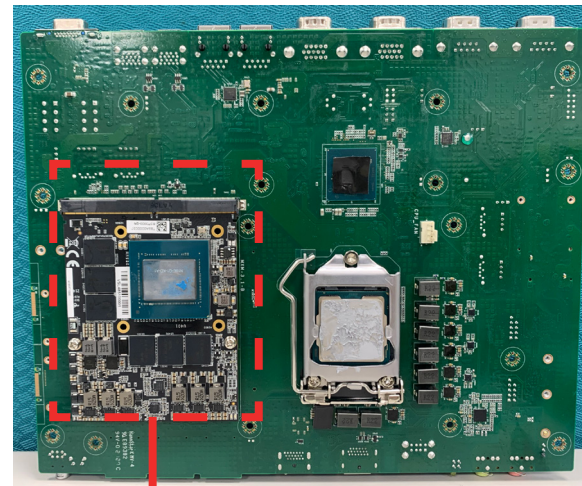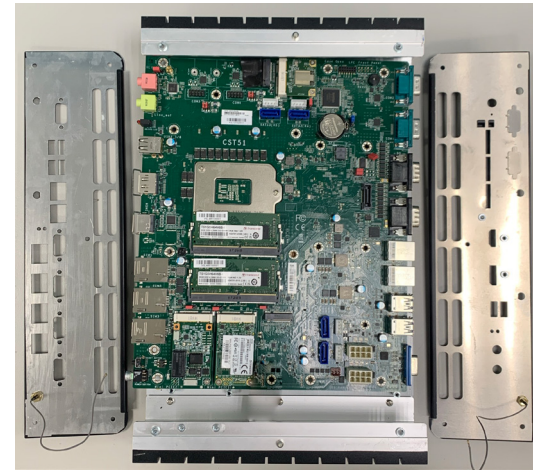
MXM Card Socket

Step 5:
A heat sink will differ depending on the module of MXM card installed.

Pin Define of M12 PoE

Network cable -

Circuit diagram

M12

M12 pin	Wire color
1	WH/OG
2	OG
3	WH/GN
4	GN
5	WH/BN
6	BN
7	WH/BU
8	BU

M12CON_H14

M1 M2

Signal	Pin
1MX1+	1
1MX1-	2
1MX2+	3
1MX2-	4
1MX4+	5
1MX4-	6
1MX3-	7
1MX3+	8

M12-8P
CN17

G1 M3 M4
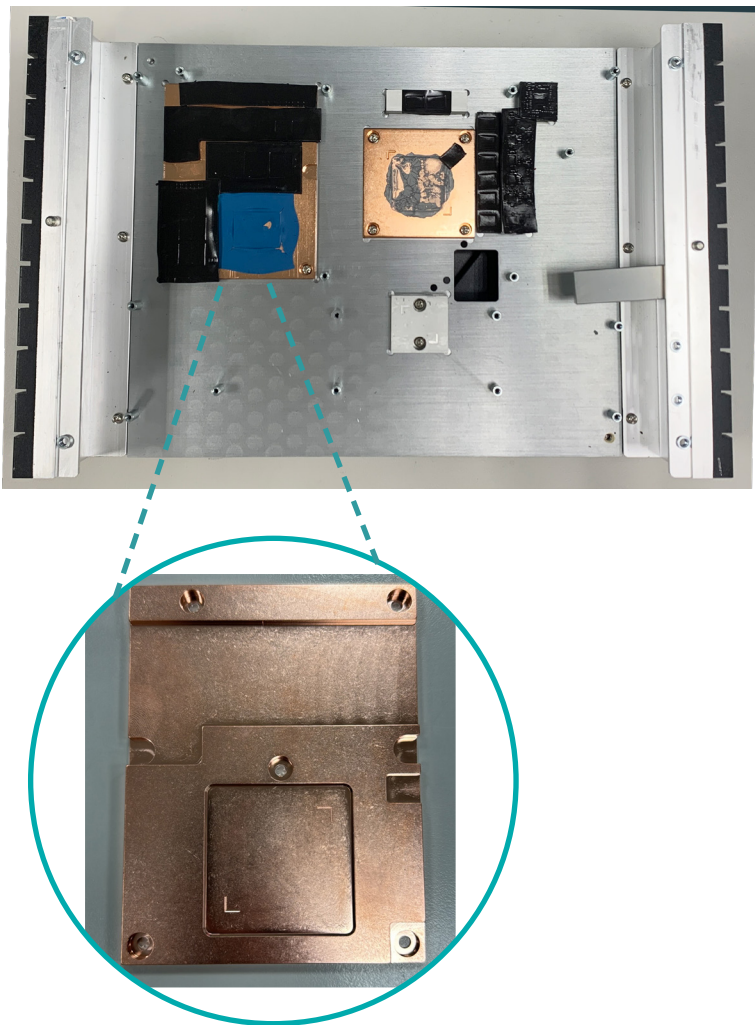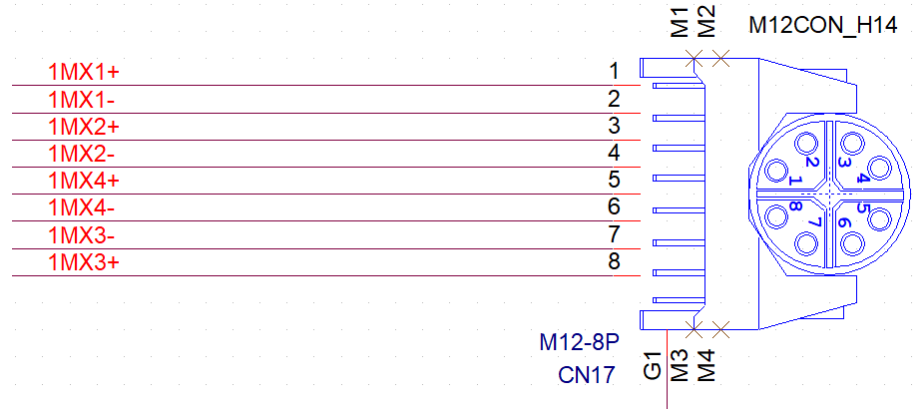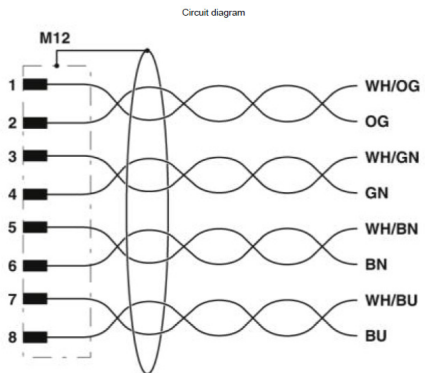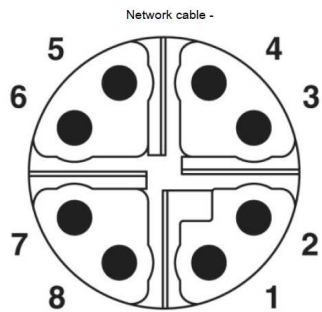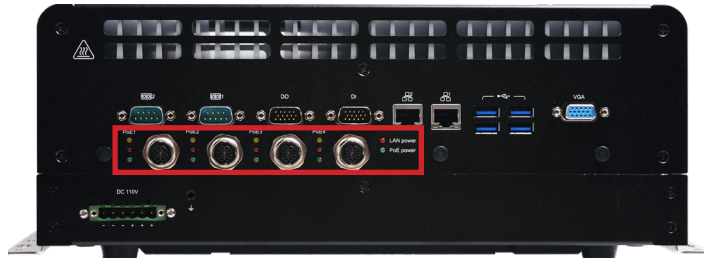
Pin	1000 Mbps Assignment	POE
1	MDI 0+	POE V+/ P
2	MDI 0-	POE V+/ P
3	MDI 1+	POE V-/ N
4	MDI 1-	POE V-/ N
5	MDI 3+	
6	MDI 3-	
7	MDI 2-	
8	MDI 2+	

x1 / x2 slots for CANbus or MVB connectors

On the back panel between SIM and SSD there are two slots for MVB or CANBus Connectors.
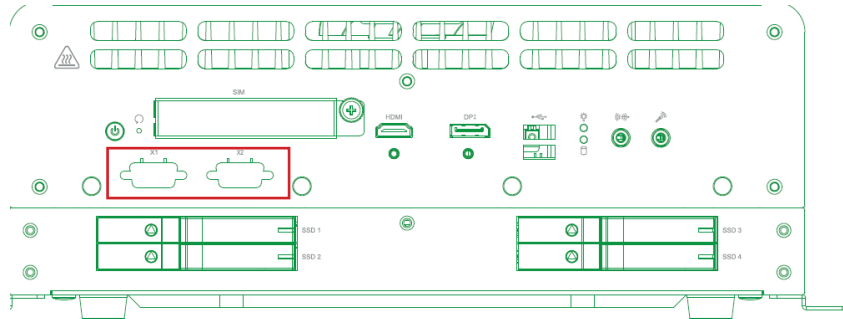
Please use a solid metal screwdriver or plier to push the metal plates attached to remove them.

Connect to internal ports.

Fix them on the back plate.
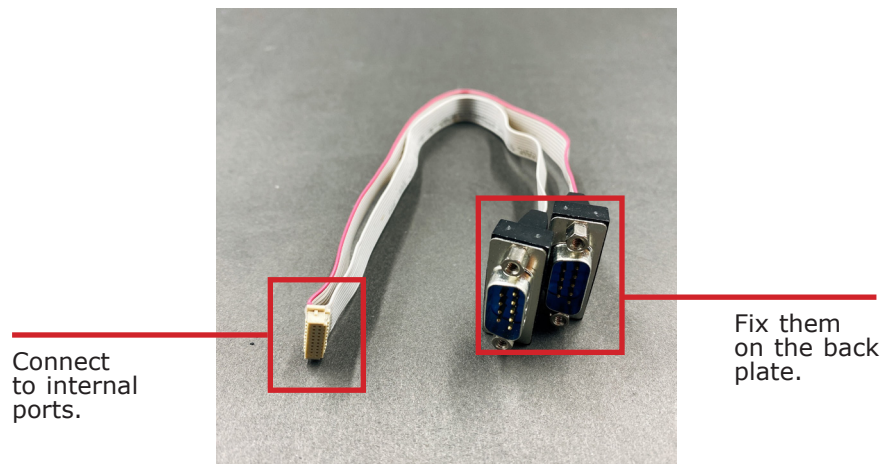
Pin Define of DI/DO
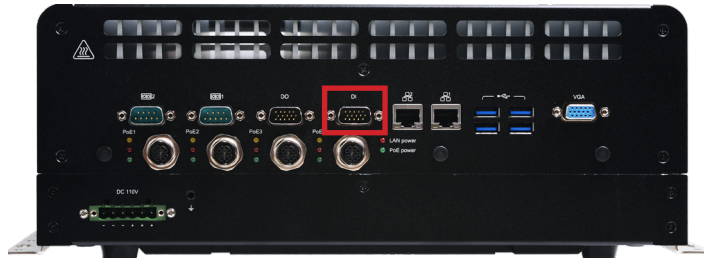
DI
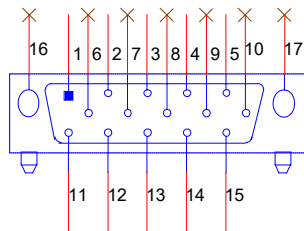
Pin	Assignment	Pin	Assignment
1	GPI0_ISO	10	NA
2	GPI2_ISO	11	GPI1_ISO
3	ISO_POWER	12	GPI3_ISO
4	GPI4_ISO	13	GPI5_ISO
5	GPI6_ISO	14	GPI7_ISO
6	NA	15	GND_ISO
7	NA	16	--
8	NA	17	--
9	NA	18	--
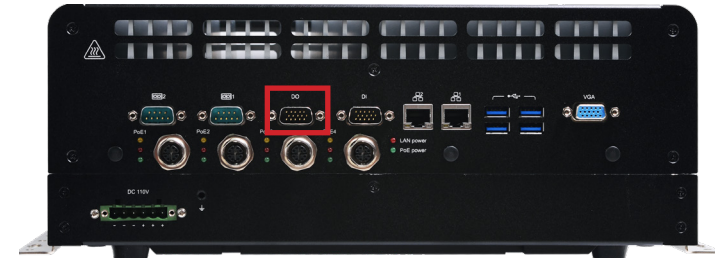
DO
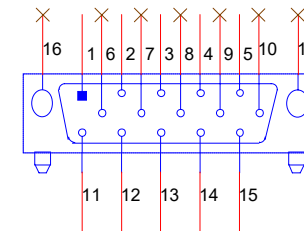
Pin	Assignment	Pin	Assignment
1	GPO0_ISO	10	NA
2	GPO2_ISO	11	GPO1_ISO
3	ISO_POWER	12	GPO3_ISO
4	GPO4_ISO	13	GPO5_ISO
5	GPO6_ISO	14	GPO7_ISO
6	NA	15	GND_ISO
7	NA	16	--
8	NA	17	--
9	NA	18	--

Pin Define of COM1/2

COM1
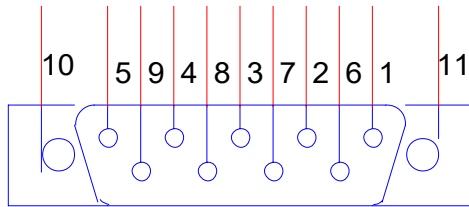
Pin	Standard RS232	RS422 Full Duplex	RS485
1	DCD-	TXD-	Data-
2	RD	TXD+	Data+
3	TD	RXD+	N.C
4	DTR-	RXD-	N.C
5	GND	GND	GND
6	DSR-	N.C	N.C
7	RTS-	N.C	N.C
8	CTS-	N.C	N.C
9	RI-	N.C	N.C
10	N.C	N.C	N.C

COM2
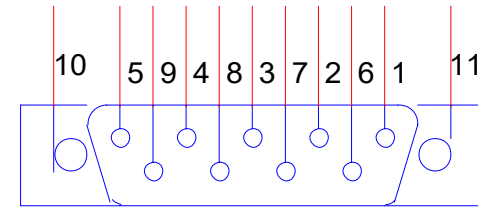
Pin	Standard RS232	RS422 Full Duplex	RS485
1	DCD-	TXD-	Data-
2	RD	TXD+	Data+
3	TD	RXD+	N.C
4	DTR-	RXD-	N.C
5	GND	GND	GND
6	DSR-	N.C	N.C
7	RTS-	N.C	N.C
8	CTS-	N.C	N.C
9	RI-	N.C	N.C
10	N.C	N.C	N.C

10. The 2.5" SSD slots are located in the rear panel. Push the silver metal marked in red to eject the buffle.

11. After the buffle has been ejected, you can insert or remove/replace the 2.5" storage devices by pulling or pushing them out/into the slots.

12. Four slots follow the same procedure.

Pin Define of DC110V
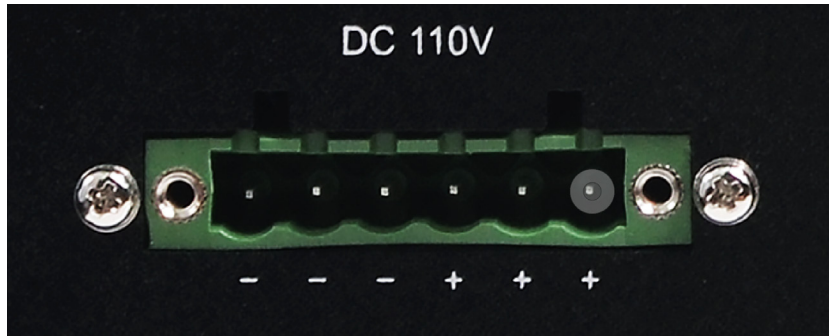
Pin Define of DC 9-36V

DC 110V

− − − + + +

DC 9-36V

+   -   NC
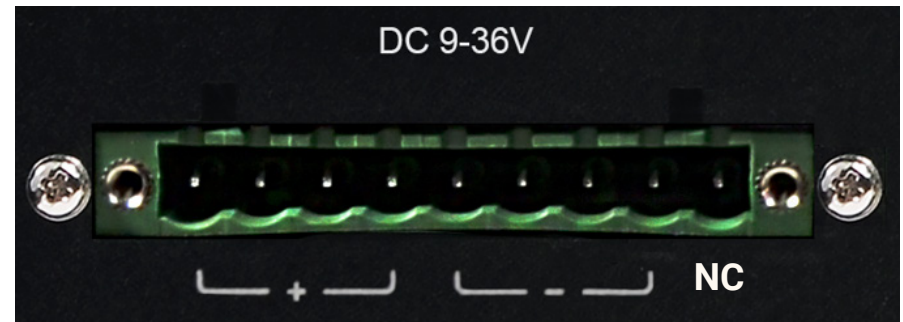
Board Layout

TOP
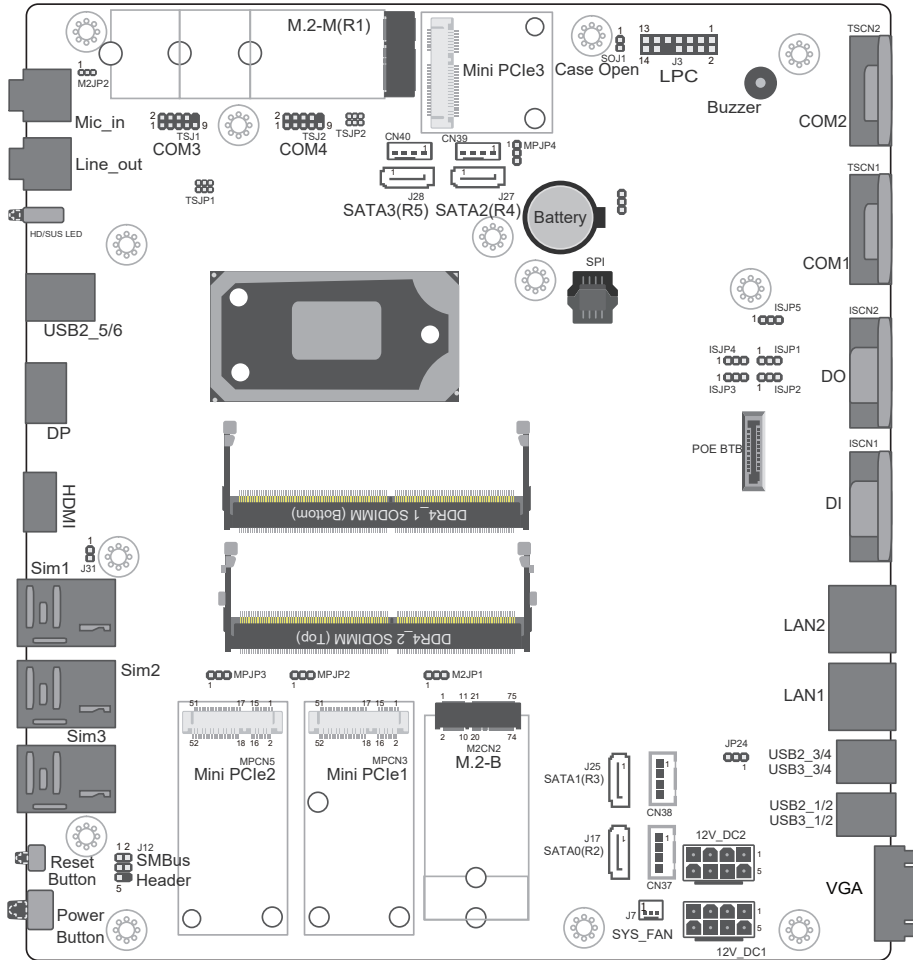
BOTTOM
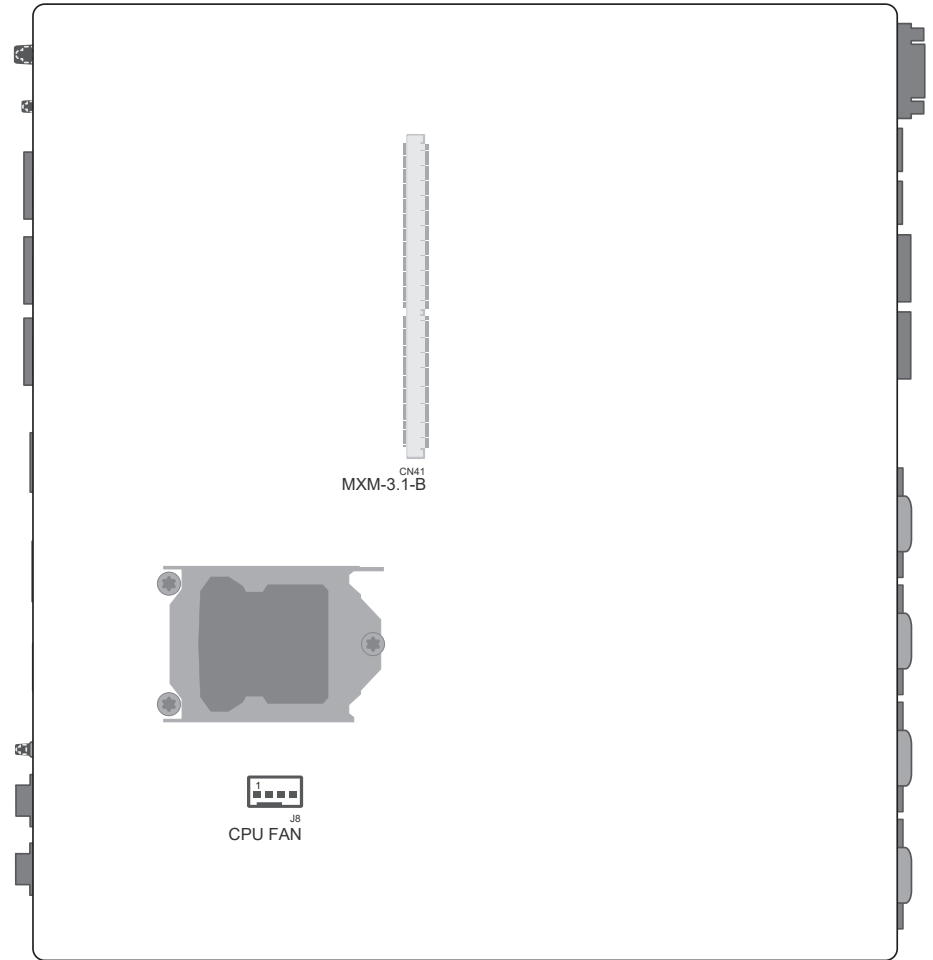
Jumper Settings

M2JP2 M.2 Socket (M key SATA only) Power

Switch the power of M.2 Socket.
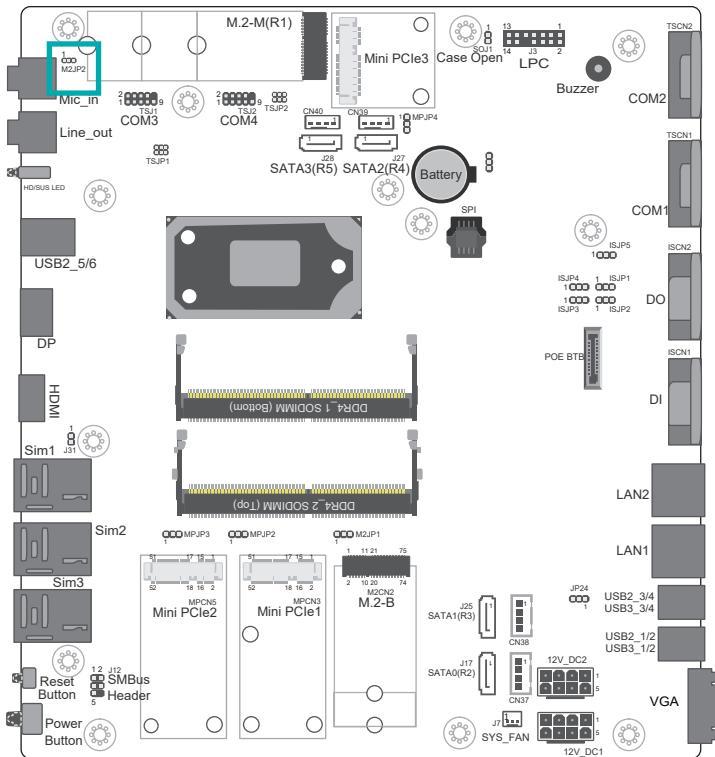
M.2 Socket Power	M2JP2
3V3 (default)	1-2 On
3V3SB	2-3 On

MPJP4 Mini PCIe Power

Switch the power of Mini PCIe.
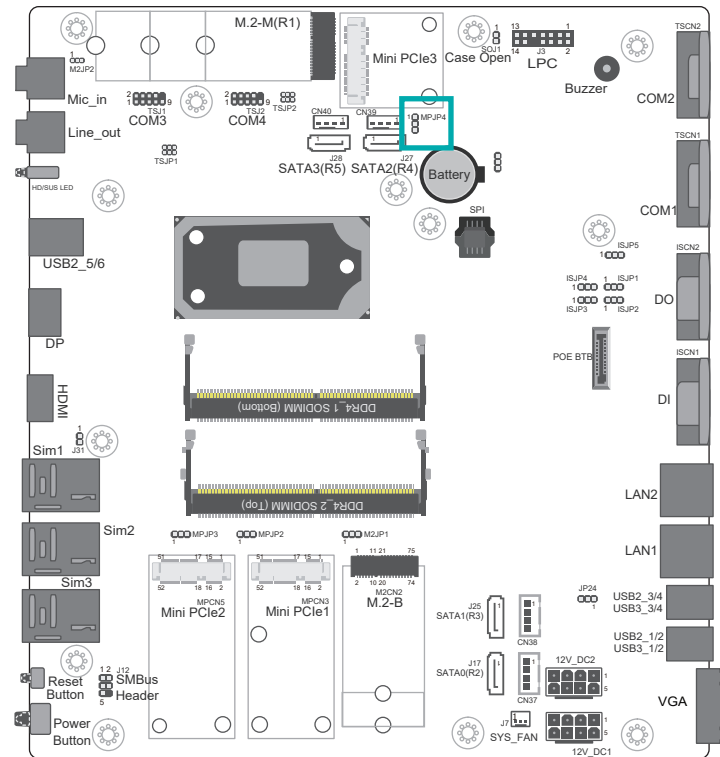
Mini PCIe Power	MPJP4
3V3SB (default)	1-2 On
3V3	2-3 On

ISJP5 DIO Power

Switch the power of DIO.
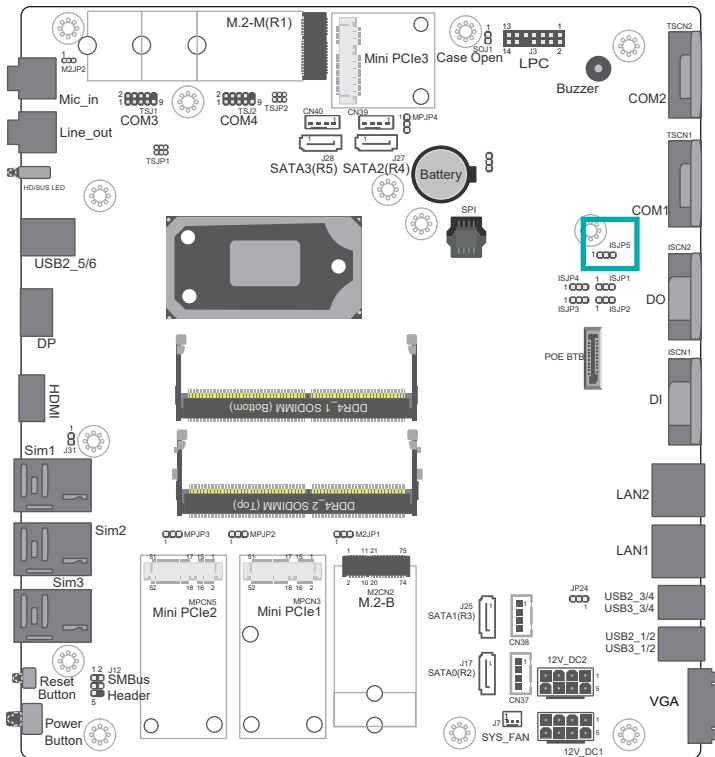
DIO Power	ISJP5
5VSB (default)	1-2 On
5V	2-3 On

ISJP3 DI 4~7 Power

Switch the power of DI 4~7.
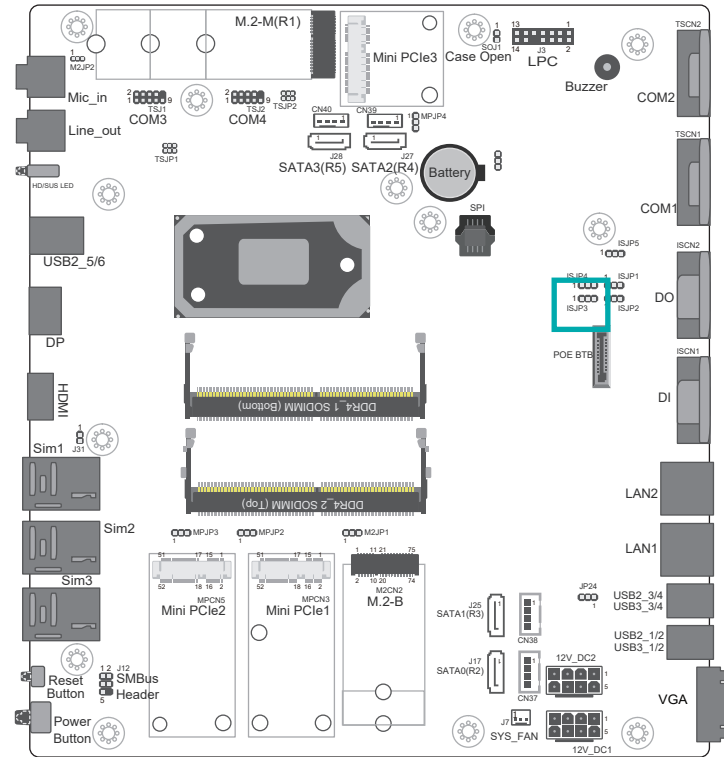
DI 4~7 Power	ISJP3
DIO PWR (default)	1-2 On
GND	2-3 On

ISJP4 DI 0~3 Power

Switch the power of DI 0~3.
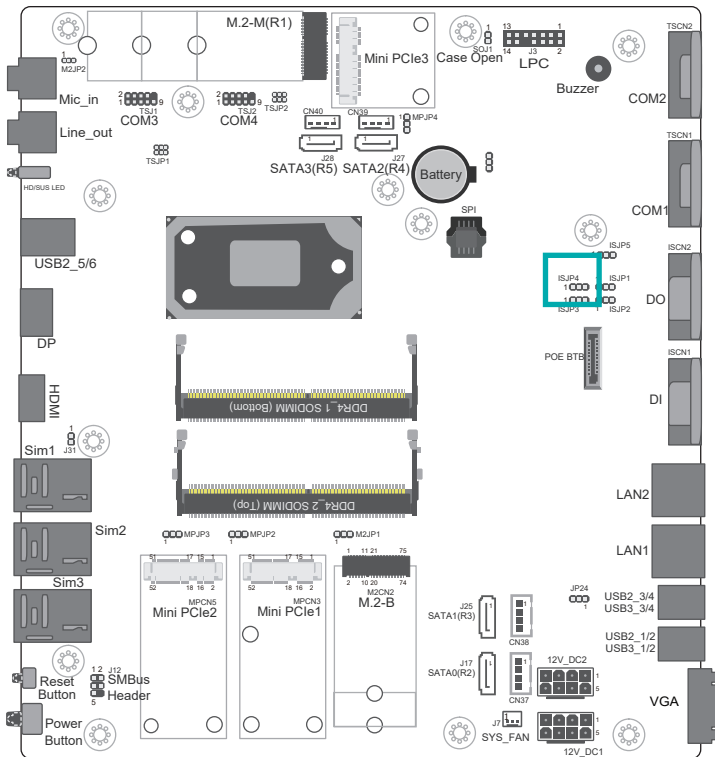
DI 0~3 Power	ISJP4
DIO PWR (default)	1-2 On
GND	2-3 On

TSJ1 COM3
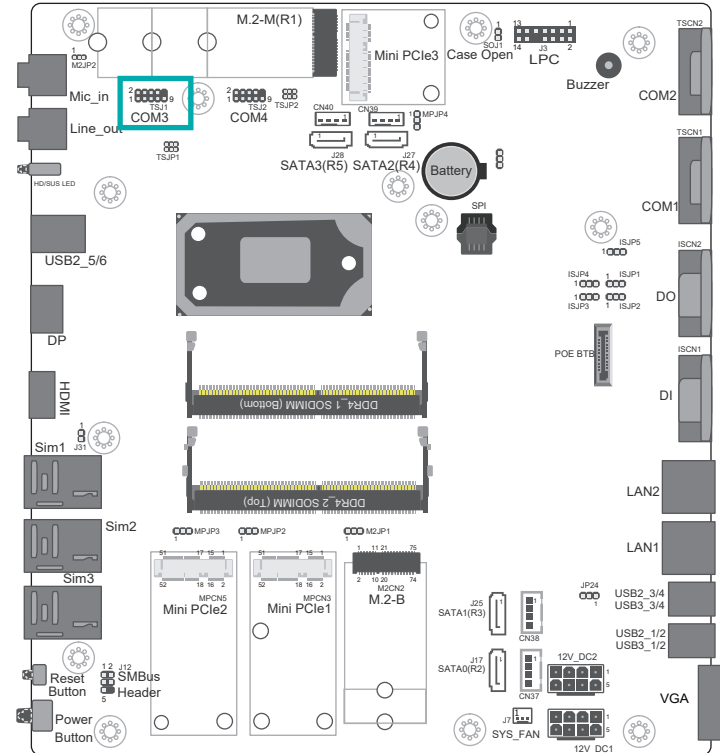
COM3 Power Selection	TSJP1
RS232 Standard (default)	1-3, 2-4 On
RS232 with Power	3-5, 4-6 On

M2JP1 M.2 B KEY Power

Switch the power of M.2 B KEY.

1

M.2 B KEY Power	M2JP1
3V3SB (default)	1-2 On
3V3	2-3 On

MPJP2 Mini PCIe1 Power

Switch the power of Mini PCIe.

1

Mini PCIe1 Power	MPJP2
3V3SB (default)	1-2 On
3V3	2-3 On

MPJP3 Mini PCIe2 Power

Switch the power of Mini PCIe.

Mini PCIe2 Power	MPJP3
3V3SB (default)	1-2 On
3V3	2-3 On
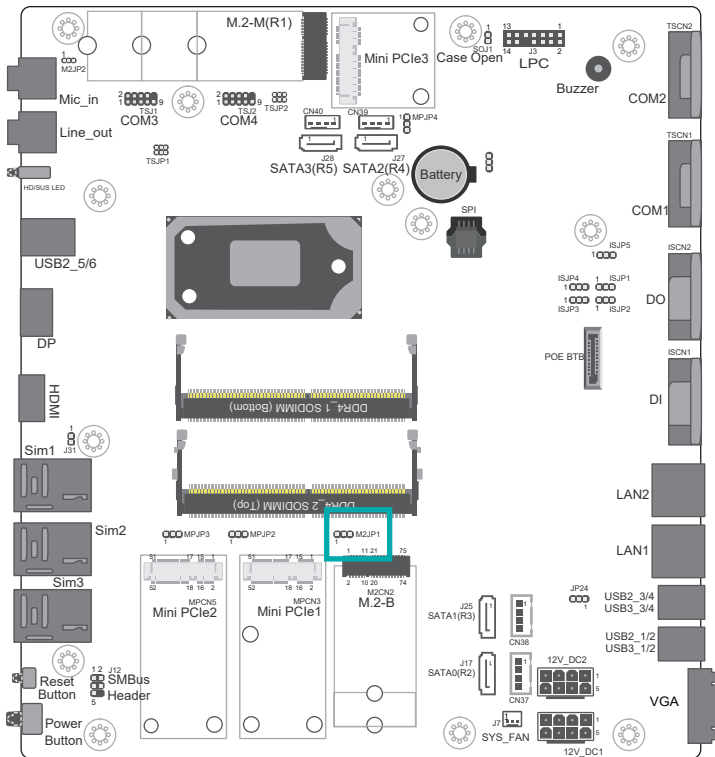
Internal Connectors

TSJ1 COM3 & TSJ2 COM4
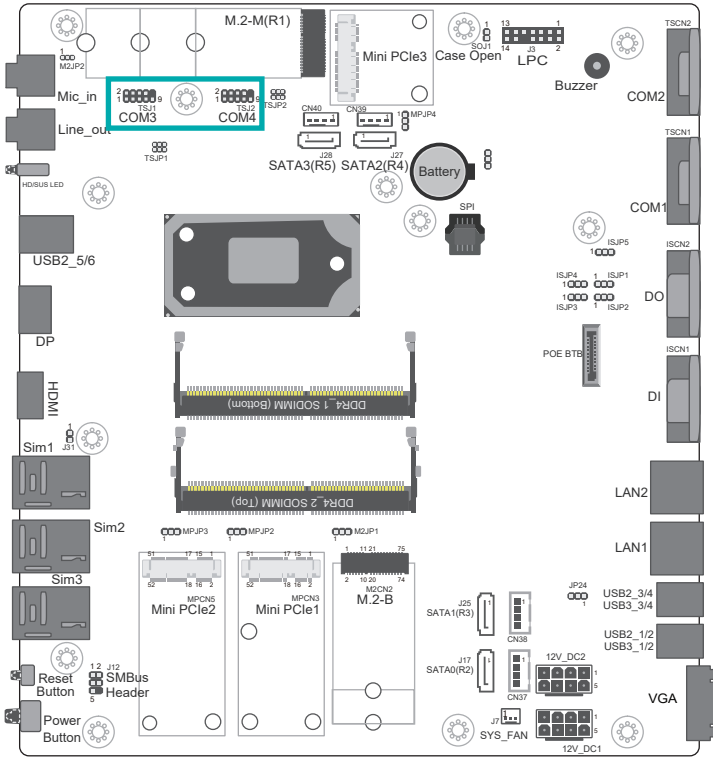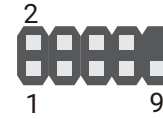
TSJ1 COM3

Pin	Function
1	X_MDCD3-
2	MSIN3
3	MSOUT3
4	MDTR3-
5	GND
6	MDSR3-
7	MRTS3-
8	MCTS3-
9	X_MRI3-

TSJ2 COM4

Pin	Function
1	X_MDCD4-
2	MSIN4
3	MSOUT4
4	MDTR4-
5	GND
6	MDSR4-
7	MRTS4-
8	MCTS4-
9	X_MRI4-

Pin	Standard RS232	RS232 with Power	RS422 Full Duplex	RS485
1	DCD-	12V	TXD-	Data-
2	RD	RD	TXD+	Data+
3	TD	TD	RXD+	N.C
4	DTR-	DTR-	RXD-	N.C
5	GND	GND	GND	GND
6	DSR-	DSR-	N.C	N.C
7	RTS-	RTS-	N.C	N.C
8	CTS-	CTS-	N.C	N.C
9	RI-	5V	N.C	N.C
10	N.C	N.C	N.C	N.C

CN39 SATA2 Power

Pin	Function
1	+12V_SATA2
2	GND
3	GND
4	5V_SATA2

CN40 SATA3 Power

Pin	Function
1	+12V_SATA2
2	GND
3	GND
4	5V_SATA2

J3 LPC
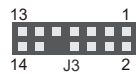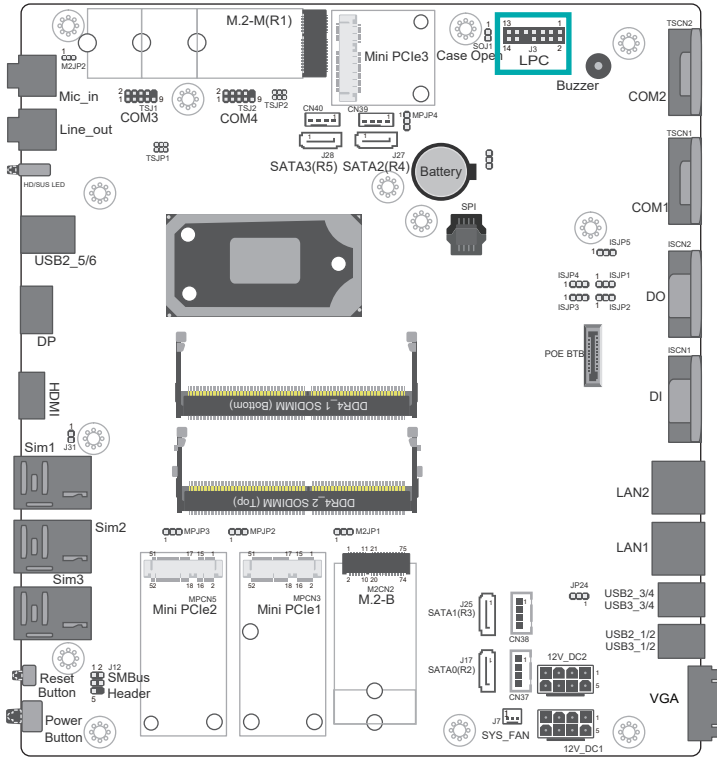
Pin	Function	Pin	Function
1	CLK	2	LAD1
3	RST#	4	LAD0
5	FRAME#	6	VCC3
7	LAD3	8	GND
9	LAD2	10	N.C.
11	SERIRQ	12	GND
13	5VSB	14	5V

CN38 SATA1 Power

Pin	Function
1	+12V_SATA1
2	GND
3	GND
4	5V_SATA1

CN37 SATA0 Power

Pin	Function
1	+12V_SATA1
2	GND
3	GND
4	5V_SATA1

J7 SYS FAN
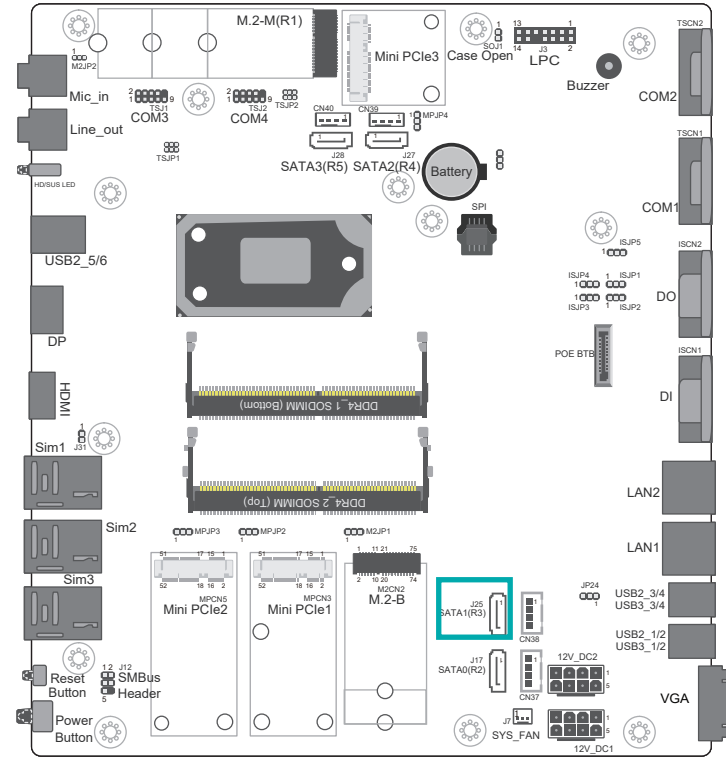
Pin	Function
1	GND
2	PWM
3	TACH

M2CN2 M.2-B
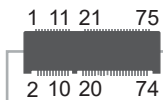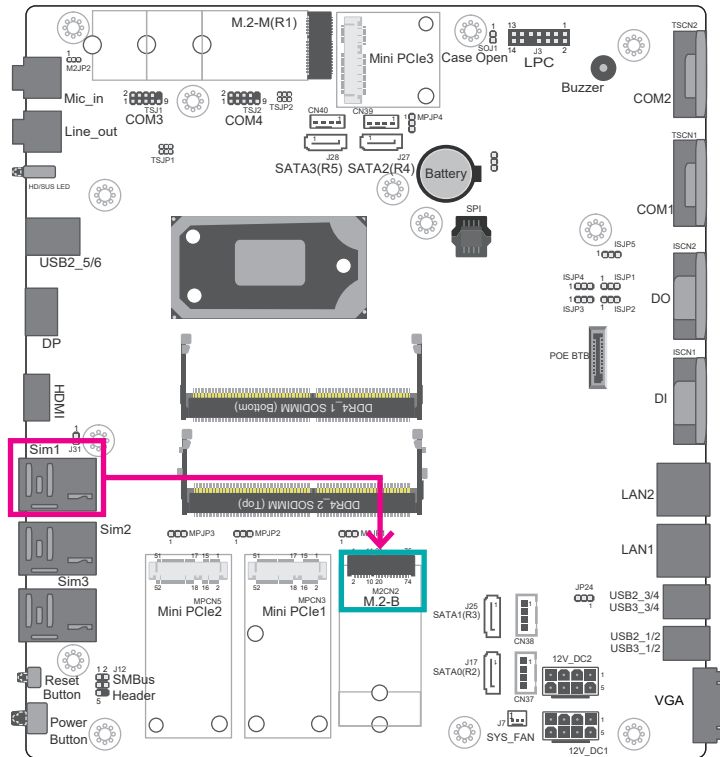
Pin	Function	Pin	Function
1		2	3V3_M2
3	GND	4	3V3_M2
5	GND	6	
7	M2B_CMC_USB2P	8	
9	M2B_CMC_USB2N	10	M2B_LED#
11	GND		

Pin	Function	Pin	Function
20	N.C.	21	
22	N.C.	23	
24	N.C.	25	
26	N.C.	27	GND
28	N.C.	29	M2B_USB3_RXN
30	M2B_UIMRST#	31	M2B_USB3_RXP
32	M2B_UIMCLK	33	GND
34	M2B_UIMDATA	35	USB3_TX_DN
36	SIM_PWR_1	37	USB3_TX_DP
38	M2B_DEVSLP	39	GND
40	M2BSMBCK_R	41	M2B_HSI_N
42	M2BSMBDAT_R	43	M2B_HSI_P
44	M2BSMBALERT#_R	45	GND
46	N.C.	47	M2B_HSO_N
48	N.C.	49	M2B_HSO_P
50	mPCIE_RST-	51	GND
52		53	CLKOUT_mPCIE_N
54	M2B_WAKE#	55	CLKOUT_mPCIE_P
56	N.C.	57	GND
58	N.C.	59	N.C.
60	N.C.	61	N.C.
62	N.C.	63	N.C.
64	N.C.	65	N.C.
66	M2B_SIM_DET	67	M2B_RESET#_R
68	N.C.	69	
70	3V3_M2	71	GND
72	3V3_M2	73	GND
74	3V3_M2	75	

MPCN3 Mini PCIe1

Pin	Function	Pin	Function
17	N.C.	18	GND
19	N.C.	20	N.C.
21	GND	22	mPCIE_RST-
23	HSI_N_	24	3V3_MINI2
25	HSI_P_	26	GND
27	GND	28	1V5_MINI
29	GND	30	SMB_CLK_RESUME
31	HSO_N_	32	SMB_DATA_RESUME
33	HSO_P_	34	GND
35	GND	36	USB2_N
37	GND	38	USB2_P
39	GND	40	GND
41	GND	42	
43	GND	44	
45	N.C.	46	
47	N.C.	48	1V5_
49	N.C.	50	GND
51	N.C.	52	3V3_
53	GND	54	GND
55	N.C.	56	GND
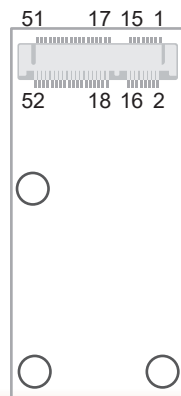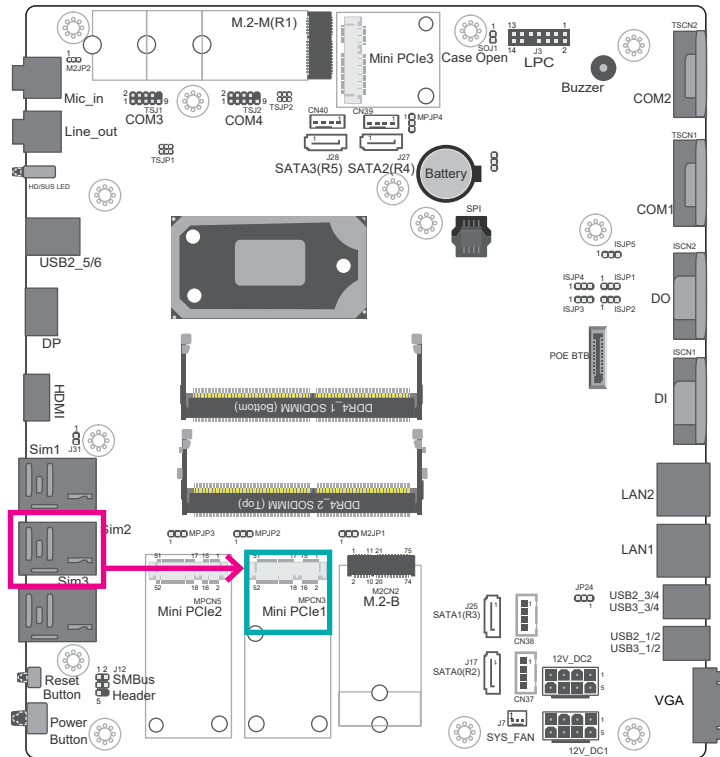
Pin	Function	Pin	Function
1	mPCIE_R_WAKE#	2	GND
3	N.C.	4	GND
5	N.C.	6	GND
7	N.C.	8	SIM_PWR_
9	GND	10	SIM_IO_
11	CLKOUT_mPCIE_N	12	SIM_CLK_
13	CLKOUT_mPCIE_P	14	SIM_RESET_
15	GND	16	SIM_VPP_

MPCN5 Mini PCIe2

Pin	Function	Pin	Function
17	N.C.	18	GND
19	N.C.	20	N.C.
21	GND	22	mPCIE_RST-
23	HSI_7N_C	24	3V3_MINI3
25	HSI_7P_C	26	GND
27	GND	28	1V5_MINI
29	GND	30	SMB_CLK_RESUME
31	HSO_7N_C	32	SMB_DATA_RESUME
33	HSO_7P_C	34	GND
35	GND	36	USB2_9_C_N
37	GND	38	USB2_9_C_P
39	GND	40	GND
41	GND	42	MPTP7
43	GND	44	MPTP8
45	N.C.	46	MPTP9
47	N.C.	48	1V5_MINI
49	N.C.	50	GND
51	N.C.	52	3V3_MINI3
53	GND	54	GND
55	N.C.	56	GND

Pin	Function	Pin	Function
1	mPCIE_3_R_WAKE#	2	GND
3	N.C.	4	GND
5	N.C.	6	GND
7	N.C.	8	SIM_PWR_3
9	GND	10	SIM_IO_3
11	CLKOUT_mPCIE_N3	12	SIM_CLK_3
13	CLKOUT_mPCIE_P3	14	SIM_RESET_3
15	GND	16	SIM_VPP_3

J12 SMBus Header
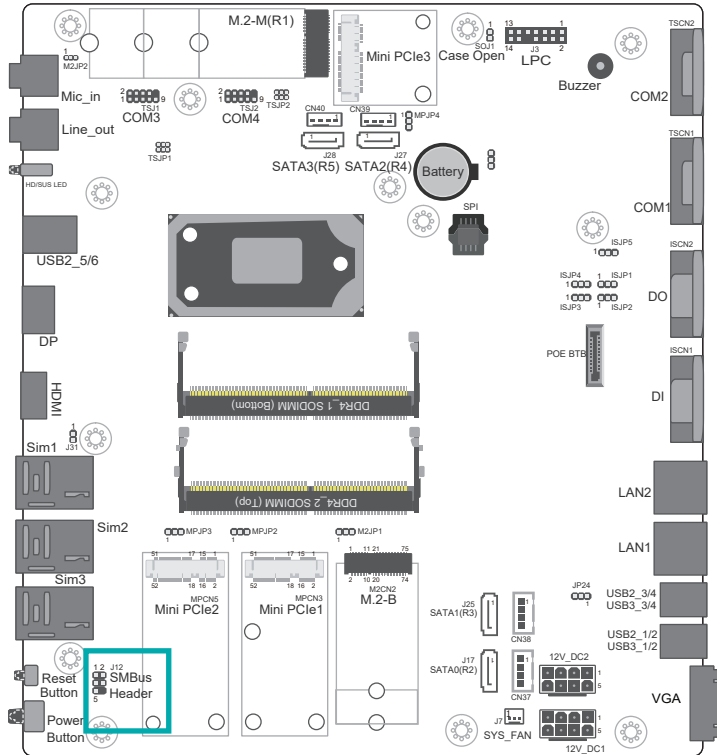
Pin	Function	Pin	Function
1	3V3SB	2	GND
3	SMB_CLK_RESUME	4	SMB_DATA_RESUME
5	SMBALERT_PCH-		

Chapter 4 - BIOS Setup

Overview

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

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

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

Default Configuration

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

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Move the highlight left or right to select a menu.
Up and Down arrows	Move the hightlight up or down between submenu or fields.
+ (plus key)	Scroll forward through the values or options of the highlighted field
- (minus key)	Scroll backward through the values or options of the highlighted field
<Esc>	Return to previous menu
<F1>	Display general help
<F2>	Display previous values
<F9>	Optimized defaults
<F10>	Save and Exit
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

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

Submenu

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

Aptio BIOS Setup Utility

Main

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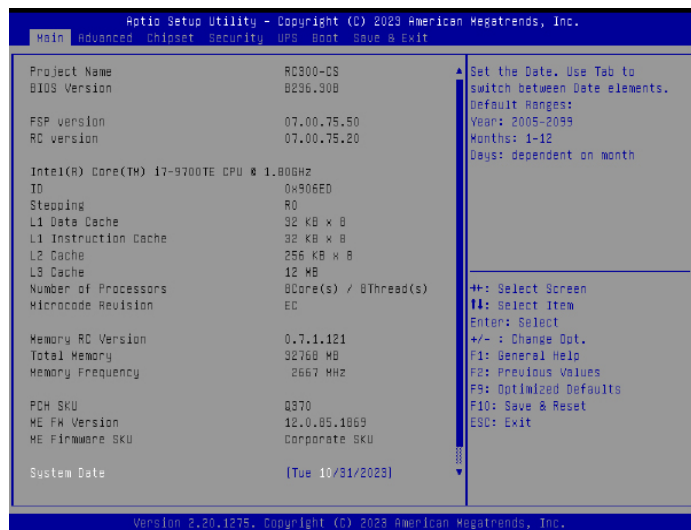
System Date

The date format is <month>, <date>, <year>. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 2005 to 2099.

System Time

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

Advanced

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

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

RC ACPI Settings

Configure power management related settings in this page.

```
              Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
    Advanced

  RC ACPI Settings                                            Enable or disable Sys-
                                                              tem  wake  on  alarm
  Wake system from S5 via RTC          [Disabled]             event.  When  enabled,
  State After G3                       [S0 State]             System will wake on the
  Virtual Battery                      [Enabled]              hr::min::sec specified




                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/- : Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F9: Optimized Defaults
                                                              F10: Save & Exit
                                                              ESC: Exit

        Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```

```
              Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
    Advanced

  RC ACPI Settings                                            Select  0-23  For example
                                                              enter  3  for  3am  and  15
  Wake system from S5 via RTC          [Enabled]              for 3pm
      Wake up hour                     0
      Wake up minute                   0
      Wake up second                   0
  State After G3                       [S0 State]




                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/- : Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F9: Optimized Defaults
                                                              F10: Save & Exit
                                                              ESC: Exit

        Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```

Wake system from S5 via RTC

When Enabled, the system will automatically power up at a designated time every day from the Real-time clock (RTC) battery. More settings will be displayed once it's switched to [Enabled] as detailed in the next page.

State After G3

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

Virtual Battery

Enable or disable virtual battery, it's for MXM RTX20xx and its above versions. If enabled, the system supports S4(Suspend to disk mode) if WIN10 PCH driver installed.
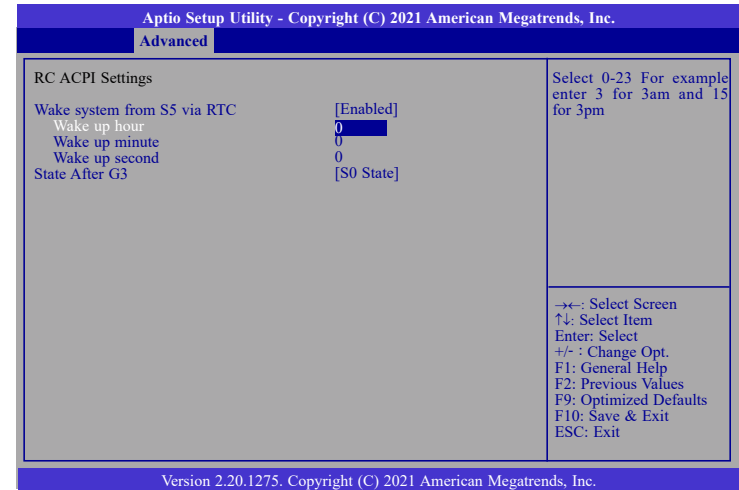
When "Wake system from S5" is enabled, the following fields will appear.

Wake up hour

Press +/- to set the hour from 0 to 23.

Wake up minute

Press +/- to set the minute from 0 to 59.

Wake up second

Press +/- to set the second from 0 to 59.

CPU Configuration

This section configures the CPU.

```
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    Advanced

    CPU Configuration                                            When enabled, a VMM
                                                                 can utilize the additional
    Intel (VMX) Virtualization          [Enabled]                hardware capabilities
    Technology                                                   provided by Vanderpool
    Active Processor Cores              [All]                    Technology.
    Hyper-Threading                     [Enabled]




                                                                 →←: Select Screen
                                                                 ↑↓: Select Item
                                                                 Enter: Select
                                                                 +/- : Change Opt.
                                                                 F1: General Help
                                                                 F2: Previous Values
                                                                 F9: Optimized Defaults
                                                                 F10: Save & Exit
                                                                 ESC: Exit

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```

Intel (VMX) Virtualization Technology

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

Active Processor Cores

Select number of cores to be enabled in each processor package.

Hyper-Threading

Enable or disable Hyper-threading. When it is enabled, a physical core will perform as two logical processors, and the user may experience better computational efficiency of the system. Please make sure that the OS operating on your system is optimized for Hyper-Threading, e.g. Windows and Linux. This field is not available when the equipped CPU does not support Hyper-threading.

Power & Performance

Configure the power and performance settings in this page.

```
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    Advanced

    Power & Performance                                          Allows more than two
                                                                 frequency ranges to be
    Intel(R) SpeedStep(tm)              [Enabled]                supported.
    Turbo Mode                          [Enabled]
    C states                            [Enabled]

    Configurable TDP Settings
    Power Limit 1                       35.0W (MSR:35.0)
    Power Limit 1                       0
    Power Limit 2                       92.0W (MSR:92.0)
    Power Limit 2                       0

                                                                 →←: Select Screen
                                                                 ↑↓: Select Item
                                                                 Enter: Select
                                                                 +/- : Change Opt.
                                                                 F1: General Help
                                                                 F2: Previous Values
                                                                 F9: Optimized Defaults
                                                                 F10: Save & Exit
                                                                 ESC: Exit

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```

Intel(R) SpeedStep(tm)

Enable or disable Intel Enhanced SpeedStep Technology. Voltage and frequency are switched between high and low levels in response to processor load when this field is enabled, and the Turbo Mode field will appear.

Turbo Mode

Enable or disable processor turbo mode, which allows the processor core to automatically run faster than the base frequency when the processor's power, temperature, and specification are within the limits of TDP. This field is only available when "Intel(R) SpeedStep(tm)" is enabled.

C states

Enable or disable CPU Power Management. When enabled, the CPU is allowed to go to C states when it's not 100% utilized.

Configurable TDP Settings

Configure PL1 and PL2 range.

PCH-FW Configuration

Configure the parameters of Management Engine Technology.

```
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     Advanced

       ME State                        [Enabled]           When Disabled ME will
       Manageability Features State    [Enabled]           be put into ME Temporar-
       AMT BIOS Features               [Enabled]           ily Disabled Mode.
  ►    AMT Configuration
       ME Unconfig on RTC Clear        [Enabled]

  ►    Firmware Update Configuration



                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/- : Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit

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```

ME State

Enable or disable Management Engine. When this field is set to Disabled, ME will be put into ME Temporarily Disabled Mode. The following fields will only appear when ME State is enabled.

Manageability Features State

Enable or disable Intel(R) Manageability features. This option disables/enables Manageability Features support in FW. To disable, support platform must be in an unprovisioned state first.

AMT BIOS Features

When disabled, AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup. This option does not disable manageability features in FW.

► AMT Configuration

This section is used to configure Intel(R) Active Management Technology Parameters. Please refer to the following pages.

ME Unconfig on RTC Clear

When disabled, ME will not be unconfigured on RTC Clear.

► Firmware Update Configuration

Please refer to the following pages.

► AMT Configuration

```
              Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
     Advanced

       USB Provisioning of AMT         [Disabled]          Enable/Disable of AMT
  ►    Secure Erase Configuration                          USB Provisioning.
  ►    OEM Flags Settings



                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/- : Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit

              Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```
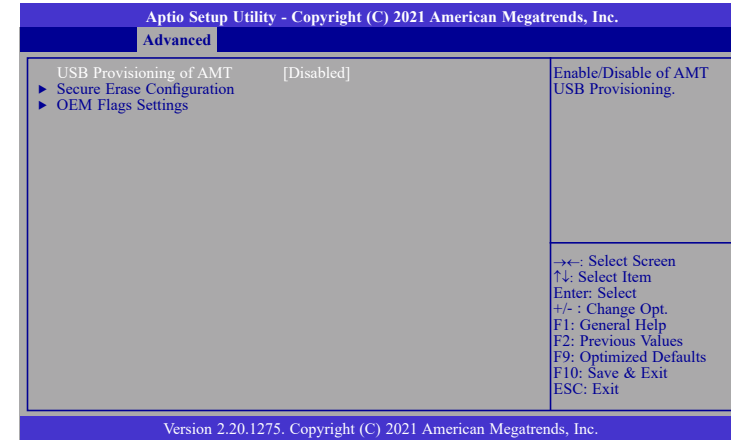
USB Provisioning of AMT

Enable or disable AMT USB Provisioning.

► Secure Erase Configuration

Please refer to the following pages.

► OEM Flags Settings

Please refer to the following pages.

► AMT Configuration ► Secure Erase Configuration

This section is used to configure Secure Erase.

```
                Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
   Advanced

   Secure Erase mode          [Simulated]        Change Secure Erase
   Force Secure Erase         [Disabled]         module behavior:
                                                 Simulated: Performs SE
                                                 flow without erasing SSD
                                                 Real: Erase SSD.




                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/- : Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

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```

Secure Erase Mode

Select Secure Erase module behavior: Simulated or Real.

Force Secure Erase

Enable or disable Force Secure Erase on next boot.

► AMT Configuration ► OEM Flags Settings

```
                Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
   Advanced

   Hide Unconfigure ME Confirmation   [Disabled]    OEMFlag Bit 6:
   Prompt                                           Hide Unconfigure ME
   Unconfigure ME                     [Disabled]    confirmation prompt when
                                                    attempting ME uncon-
                                                    figuration.




                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/- : Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

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```

Hide Unconfigure ME Confirmation Prompt

Enable or disable to hide unconfigure ME confirmation prompt when attempting ME unconfiguration.

Unconfigure ME

Enable or disable to unconfigure ME with resetting MEBx password to default.

► Firmware Update Configuration

```
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    Advanced

    Me FW Image Re-Flash          [Disabled]           Enable/Disable Me FW
                                                        Image Re-Flash function.








                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit
                                                        ESC: Exit

                Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```
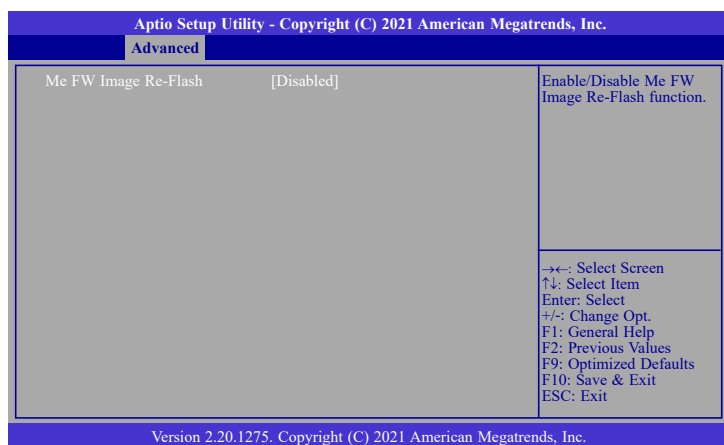
Me FW Image Re-Flash

This field is used to enable or disable the Me FW Image Re-Flash function.

Trusted Computing

Configure Trusted Computing settings.

```
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     Advanced

  TPM20 Device Found                                    Enables or Disables
  Firmware Version:           5.63                      BIOS support for secu-
  Vendor:                     IFX                       rity device. O.S will not
                                                        show Security Device.
  Security Device Support     [Enable]                  TCG EFI protocol and
  Pending operation           [None]                    INT1A interface will not
                                                        be available.



                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/- : Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit
                                                        ESC: Exit

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```

Security Device Support

This field is used to enable or disable BIOS support for the security device. A security device will not be shown on the OS. TCG EFI protocol and INT1A interface will not be available.

Pending operation

Schedule an opeartion for the security device. Your computer will reboot during restart in order to change state of the security device.

NCT6116D Super IO Configuration

TThis section is used to configure the I/O functions supported by the onboard Super I/O chip.

```
                  Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
    Advanced

    NCT6116D Super IO Configuration                          WatchDog Timer Unit
                                                             Selection
    Super IO Chip                    NCT6116D

    WatchDog Timer Unit              [Second]
       SuperIO WatchDog Timer        0

  ► Serial Port 1 Configuration
  ► Serial Port 2 Configuration
  ► Serial Port 3 Configuration
  ► Serial Port 4 Configuration

                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/- : Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F9: Optimized Defaults
                                                             F10: Save & Exit
                                                             ESC: Exit

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```

WatchDog Timer Unit

Select WatchDog Timer Unit: Second or Minute.

SuperIO WatchDog Timer

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

► Serial Port 1/2/3/4 Configuration

Configure the parameters of serial port 1 (COM 1) to serial port 4 (COM 4) as detailed later.

► Serial Port 1/2/3/4 Configuration

```
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    Advanced

    Serial Port 1 Configuration                              Enable or Disable Serial
                                                             Port (COM)
    Serial Port                      [Enabled]
    Device Settings                  IO=3F8h; IRQ=4;
    Electrical Interface Mode        [RS232]




                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/- : Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F9: Optimized Defaults
                                                             F10: Save & Exit
                                                             ESC: Exit

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```

Serial Port

Enable or disable the serial COM port.

Electrical Interface Mode

Determine the electrical interface mode.

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RC300-CS

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NCT6116D HW Monitor

This section displays the hardware health monitor.

```
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  Advanced

  Pc Health Status                                     Smart Fan function
                                                       setting
▶ Smart Fan Function

  Case Open                         [Disabled]

  System temperature              : +29 ºC
  CPU temperature                 : +36 ºC
  SYS_FAN1 Speed                  : N/A
  CPU_FAN Speed                   : 2626 RPM
  VBAT                            : +3.072 V
  VCORE                           : +0.864 V
  VDDQ                            : +1.200 V           →←: Select Screen
  5V                              : +5.116 V           ↑↓: Select Item
  +12V                            : +12.056 V          Enter: Select
                                                       +/- : Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit

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```

► Smart Fan Function

Please refer to the following pages.

Case Open

Enable or disable the case open detection function.

► Smart Fan Function

```
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  Advanced

  Pc Health Status                                     CPU smart Fan Mode
                                                       select
  CPU Smart Fan Control             [Enabled]
      Boundary 1                    30
      Boundary 2                    40
      Boundary 3                    50
      Boundary 4                    60
      Speed Count 1                 35
      Speed Count 2                 60
      Speed Count 3                 80
      Speed Count 4                 100

  System Smart Fan(1) Control       [Enabled]
      Boundary 1                    30                 →←: Select Screen
      Boundary 2                    40                 ↑↓: Select Item
      Boundary 3                    50                 Enter: Select
      Boundary 4                    60                 +/- : Change Opt.
      Speed Count 1                 35                 F1: General Help
      Speed Count 2                 60                 F2: Previous Values
      Speed Count 3                 80                 F9: Optimized Defaults
      Speed Count 4                 100                F10: Save & Exit
                                                       ESC: Exit

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```

Smart Fan Control

Enable or disable the smart fan.

Boundary 1 to Boundary 4

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

Speed Count 1 to Speed Count 4

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

Serial Port Console Redirection

This section configures settings relevant to serial port console redirection.

```
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    Advanced

       COM1                                            The settings specify how
       Console Redirection          [Enabled]          the host computer and the
    ▶  Console Redirection Settings                     remote computer (which
                                                        the user is using) will ex-
       COM2                                             change data. Both comput-
       Console Redirection          [Enabled]           ers should have the same
    ▶  Console Redirection Settings                     or compatible settings.

       COM3
       Console Redirection          [Enabled]
    ▶  Console Redirection Settings                    →←: Select Screen
                                                       ↑↓: Select Item
       COM4                                            Enter: Select
       Console Redirection          [Enabled]          +/- : Change Opt.
    ▶  Console Redirection Settings                    F1: General Help
                                                       F2: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit

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```

Console Redirection

This field is used to enable or disable the console redirection function. When console redirection is set to enabled, console redirection settings are available as instructed below.

► Console Redirection Settings

```
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    Advanced

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


                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/- : Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit

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```

Terminal Type

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

Bits per second

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

Data Bits

Select data bits: 7 bits or 8 bits.

Parity

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

Stop Bits

Select stop bits: 1 bit or 2 bits.

Flow Control

Select flow control: None or Hardware RTS/CTS.

USB Configuration

This section is used to configure the USB settings.

```
                Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
   Advanced

 USB Configuration                                         Enables Legacy USB
                                                           support. AUTO option
 Legacy USB Support              [Enabled]                 disables legacy support if
 XHCI Hand-off                   [Enabled]                 no USB devices are con-
 USB Mass Storage Driver Support [Enabled]                 nected. DISABLE option
                                                           will keep USB devices
                                                           available only for EFI
                                                           applications.


                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/- : Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit

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```

Legacy USB Support

Enabled   Enable Legacy USB support.

Disabled   Keep USB devices available only for EFI applications.

Auto   Disable Legacy support if no USB devices are connected.

XHCI Hand-off

Enable or disable XHCI Hand-off.

USB Mass Storage Driver Support

Enable or disable USB Mass Storage Driver Support.

CSM Configuration

This section is used to configure the CSM settings.

```
                Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
   Advanced

 Compatibility Support Module Configuration               Enable/Disable CSM
                                                          Support.
 CSM Support                     [Enabled]


 Boot option filter              [UEFI only]

 Option ROM execution

 Network                         [Do not launch]
 Storage                         [UEFI]
 Video                           [UEFI]                   →←: Select Screen
 Other PCI devices               [UEFI]                   ↑↓: Select Item
                                                          Enter: Select
                                                          +/- : Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit

                Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```

CSM Support

This section is used to enable or disable CSM Support. When CSM Support is set to enabled, several options will appear for configuration.

Boot option filter

This field controls Legacy/UEFI ROMs priority.

Network

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

Storage

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

Video

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

Other PCI devices

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

USB Power Control

Configure USB port power voltage.

```
              Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
   Advanced

USB2_1/2/ USB3_1/2            [5V_Dual]            5V_Dual: Support system
USB2_3/4 USB3_3/4            [5V_Dual]            wake up from S3/S4 by
USB2_5/6                     [5V_Dual]            USB KB&MS
                                                 5V: No support system
                                                 wake up from S3/S4 by
                                                 USB KB&MS


                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/- : Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

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```

USB3_1/2/3/4&USB2_1/2/3/4/5/6

Select the power voltage for USB 1-8 — 5V_Dual or 5V.

Network Stack Configuration

This section is used to configure the Network Stack settings.

```
              Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
   Advanced

Network Stack                [Enabled]            Enable/Disable UEFI
Ipv4 PXE Support             [Disabled]           Network Stack
Ipv6 PXE Support             [Disabled]
PXE boot wait time           0
Media detect count           1



                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/- : Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

              Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```
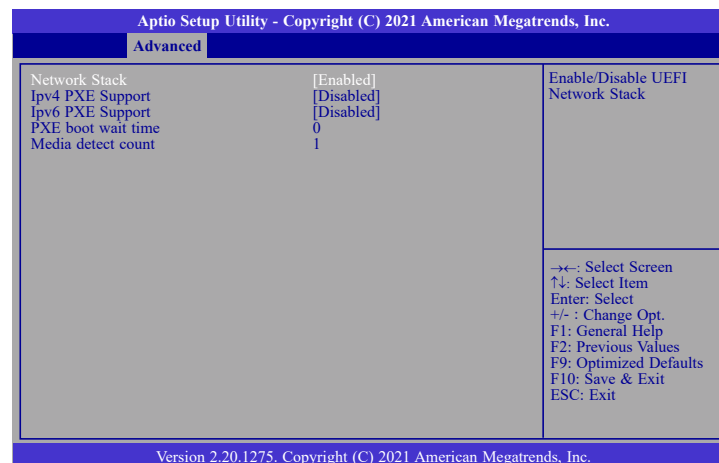
Network Stack

This section is used to enable or disable UEFI network stack. When Network Stack is enabled, the following fields will appear.

Ipv4 PXE Support

Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

Ipv6 PXE Support

Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

PXE boot wait time

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

Media detect count

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

Chipset

This section configures relevant chipset functions.

Graphics Configuration

This section is used to configure the Network Stack settings.
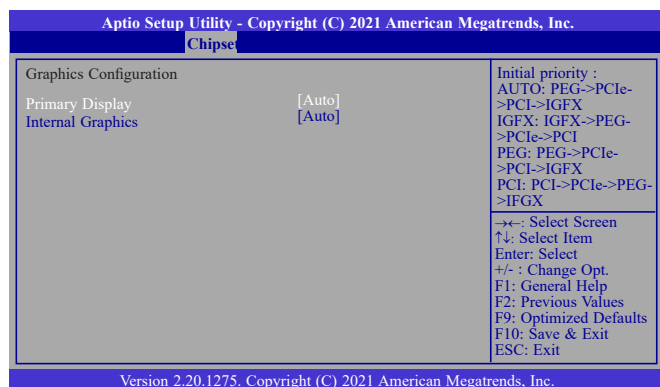
Primary Display

Select a Graphics device to be the primary display — Auto, IGFX, SG

Please choose SG for MXM vendor applications. (**Switchable Graphics = Optimus**)

Internal Graphics

Keep IGFX enabled based on the setup options.

PEG Port Configuration

Configure the internal MXM3.1-B.

Enable Root Port

Enable or disable the root port.

Max Link Speed

Configure Max Link Speed: Auto, Gen1, Gen2 or Gen3.

► PEG Port Feature Configuration

This section configures the PEG port.

```
          Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
                    Chipset

 PEG Port Feature Configuration                          Detect Non-Compliance
                                                         PCI Express Device
 Detect Non-Compliance Device        [Disabled]          in PEG




                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/- : Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F9: Optimized Defaults
                                                         F10: Save & Exit
                                                         ESC: Exit

          Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```

Detect Non-Compliance Device

Enable or disable this field to detect non-compliance PCIe devices in the PEG.

PCH-IO Configuration

```
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                    Chipset

    PCH-IO Configuration                                 PCI Express Configuration
                                                         settings
 ►  PCI Express Configuration
 ►  SATA And RST Configuration
 ►  HD Audio Configuration

    LAN1(I219)                       [Enabled]
       Wake on LAN Enable            [Enabled]
    Above 4GB MMIO BIOS assignment   [Disabled]
    Max TOLUD                        [Dynamic]


                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/- : Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F9: Optimized Defaults
                                                         F10: Save & Exit
                                                         ESC: Exit

          Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```
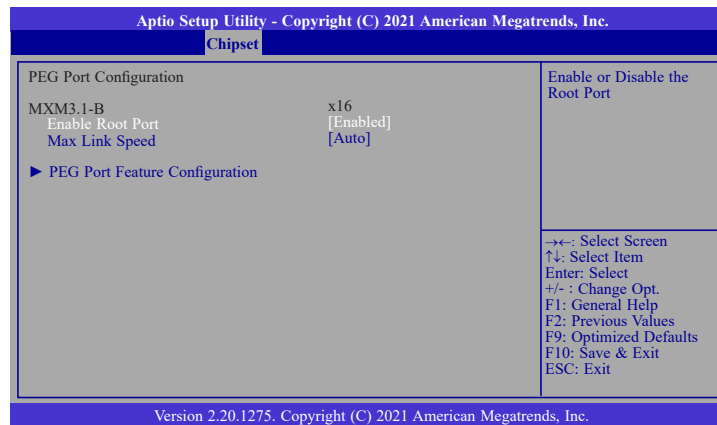
► PCI Express Configuration

Please refer to the following pages.

► SATA And RST Configuration

Please refer to the following pages.

► HD Audio Configuration

Please refer to the following pages.

LAN1(I219)

Enable or disable onboard NIC.

Wake on LAN Enable

Enable or disable integrated LAN to wake the system.

Above 4GB MMIO BIOS assignment

Switch MemoryMappedIO BIOS assignment above 4GB.

Max TOLUD

Assign a value or set "Dynamic" to automatically adjust TOLUD based on largest MMIO length.

► PCI Express Configuration

Select a PCIe root port.

```
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 Chipset

 PCI Express Configuration                          PCI Express Root Port
                                                    Settings.
  ► M.2-B
  ► Mini PCIE2
  ► Mini PCIE3
  ► Mini PCIE4
  ► M.2-M
  ► LAN2

                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/- : Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

       Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```
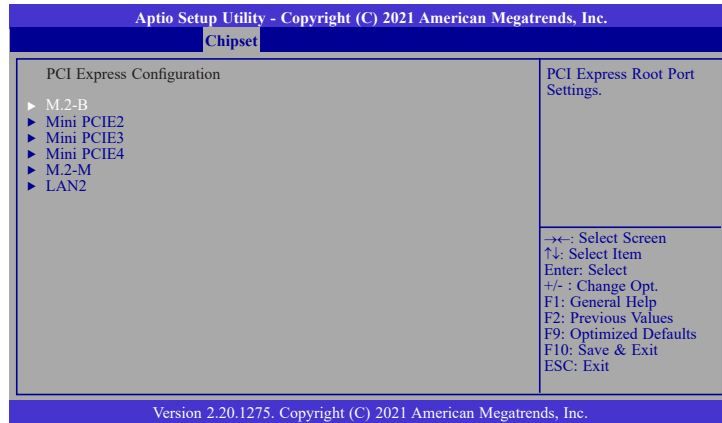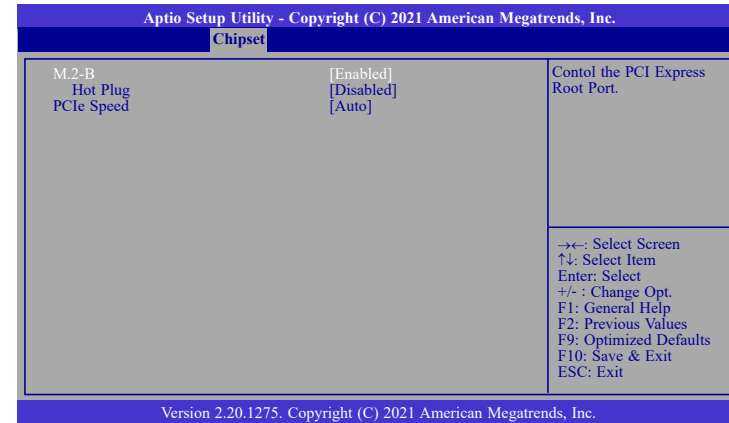
► PCI Express Configuration ► Devices

```
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 Chipset

 M.2-B                          [Enabled]           Contol the PCI Express
    Hot Plug                    [Disabled]          Root Port.
 PCIe Speed                     [Auto]

                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/- : Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

       Version 2.20.1275. Copyright (C) 2021 American Megatrends, Inc.
```

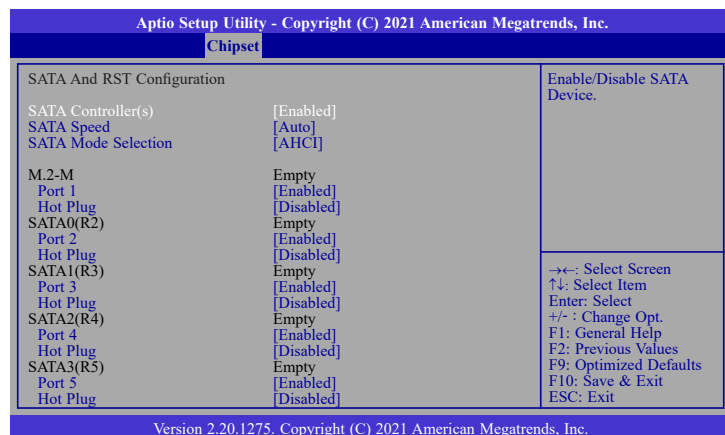This field is used to enable or disable the PCI express root port.

PCIe Speed

Select the speed of the PCI Express root port: Auto, Gen1, Gen 2 or Gen3. This field will not appear when the root port does not support speed configuration.

Hot Plug

To enable or disable Hot Plug functions.

► SATA and RST Configuration

```
              Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
                                    Chipset

 SATA And RST Configuration                            Enable/Disable SATA
                                                       Device.
 SATA Controller(s)            [Enabled]
 SATA Speed                    [Auto]
 SATA Mode Selection           [AHCI]

 M.2-M                         Empty
   Port 1                      [Enabled]
   Hot Plug                    [Disabled]
 SATA0(R2)                     Empty
   Port 2                      [Enabled]
   Hot Plug                    [Disabled]
 SATA1(R3)                     Empty            →←: Select Screen
   Port 3                      [Enabled]        ↑↓: Select Item
   Hot Plug                    [Disabled]       Enter: Select
 SATA2(R4)                     Empty            +/- : Change Opt.
   Port 4                      [Enabled]        F1: General Help
   Hot Plug                    [Disabled]       F2: Previous Values
 SATA3(R5)                     Empty            F9: Optimized Defaults
   Port 5                      [Enabled]        F10: Save & Exit
   Hot Plug                    [Disabled]       ESC: Exit

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```

SATA Controller(s)

Enable or disable the Serial ATA controller. When theis field is enabled, the following fields will appear.

SATA Speed

Select the speed of the Serial ATA controller: Auto, Gen1, Gen 2 or Gen3.

SATA Mode Selection

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

AHCI   This option allows the Serial ATA controller(s) to use AHCI (Advanced Host Controller Interface).

Intel RST Premium With Intel Optane System Acceleration

This option allows you to create RAID or Intel Rapid Storage configuration with Intel® Optane™ system acceleration on Serial ATA devices.
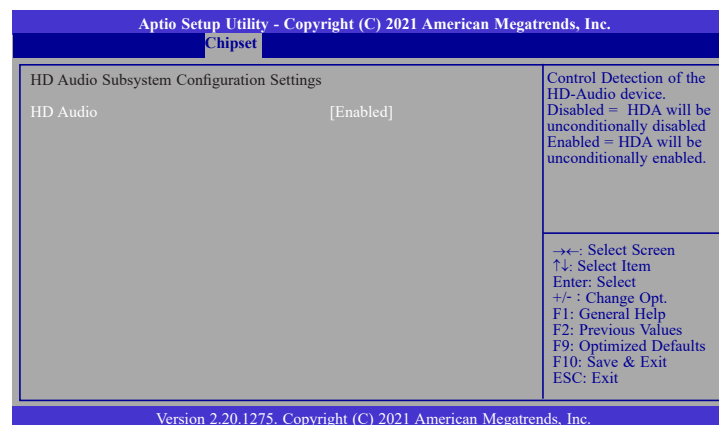
Use RST Legacy OROM

This field is only available when SATA Mode Selection is set to "Intel RST Premium With Optane System Acceleration." It is used to enable or disable to use RST Legacy OROM.

Serial ATA Ports

Enable or disable the Serial ATA port and its hot plug function.

► HD Audio Configuration

```
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                                    Chipset

 HD Audio Subsystem Configuration Settings             Control Detection of the
                                                       HD-Audio device.
 HD Audio                      [Enabled]               Disabled =  HDA will be
                                                       unconditionally disabled
                                                       Enabled = HDA will be
                                                       unconditionally enabled.



                                                →←: Select Screen
                                                ↑↓: Select Item
                                                Enter: Select
                                                +/- : Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F9: Optimized Defaults
                                                F10: Save & Exit
                                                ESC: Exit

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```
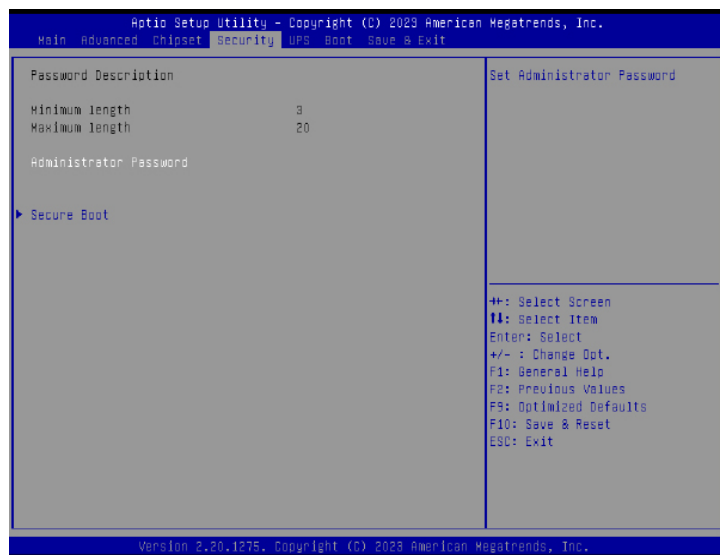
HD Audio

Control the detection of the HD Audio device.

Disabled HDA will be unconditionally disabled.

Enabled HDA will be unconditionally enabled.
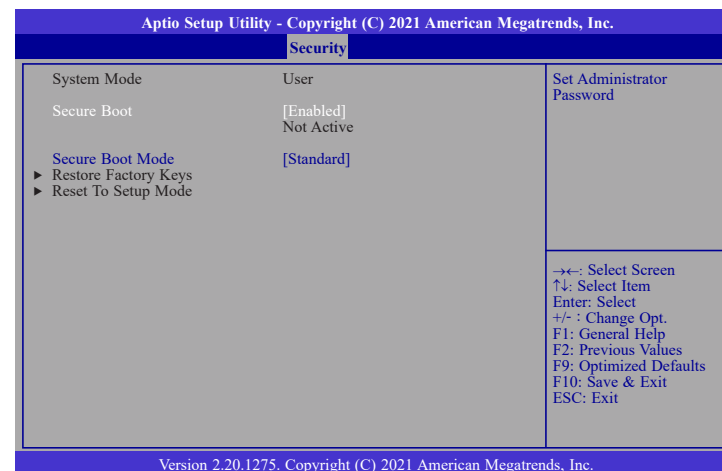
Security

Administrator Password

Set the administrator password. Input the password, press Enter, and then input the same character string again to confirm. To remove the password, input no character.

Secure Boot

Secure Boot is used to verify that your boot loader is not tampered by malware.

System Mode

This field displays whether the system is in User or Setup mode.

Secure Boot

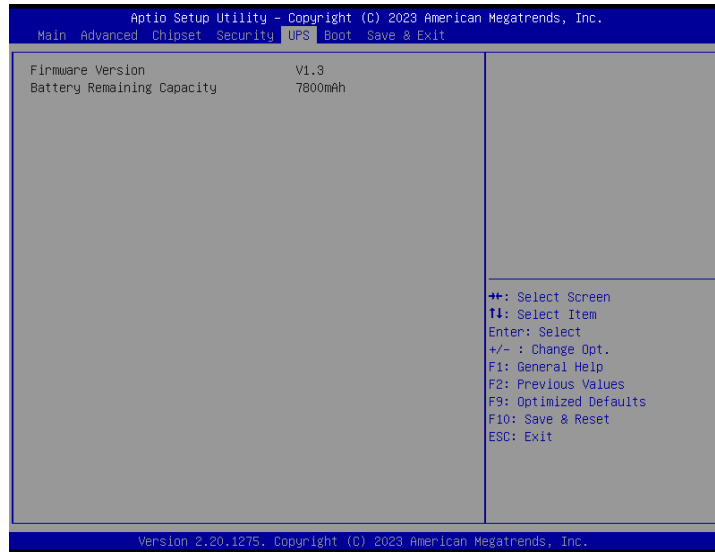Enable or disable Secure Boot. Please reset the platform after changing the setting.

Restore Factory Keys

Force System to User Mode and install factory default Secure Boot key databases.

Return to Setup Mode

This command is only available when the system mode is in User mode and Secure Boot Mode is set to Custom.

UPS

```
                    Aptio Setup Utility - Copyright (C) 2023 American Megatrends, Inc.
          Main  Advanced  Chipset  Security  UPS  Boot  Save & Exit

       Firmware Version                    V1.3
       Battery Remaining Capacity          7800mAh




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/- : Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Reset
                                                        ESC: Exit




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```

UPS

This page shows the information about UPS such as firmware version and battery remaining capacity.

Boot
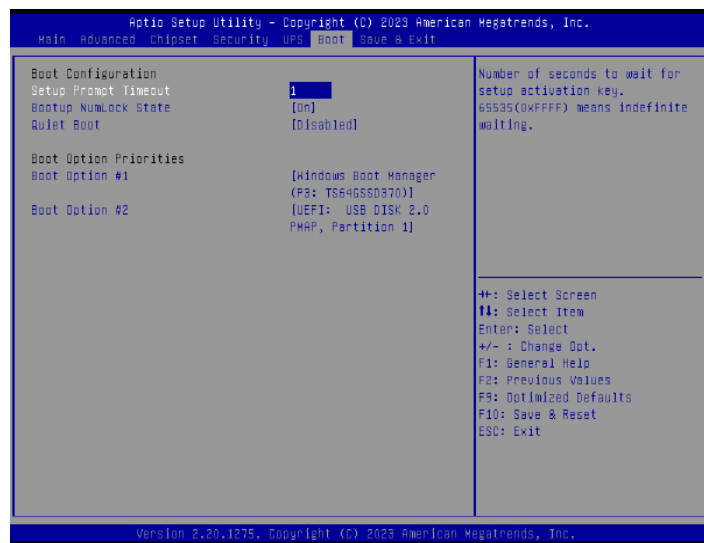
Setup Prompt Timeout

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

Bootup NumLock State

Select the keyboard NumLock state: On or Off.

Quiet Boot

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

Boot Option Priorities

Select the system boot order.

BGRT Logo

It is used to enable or disable to support display logo with ACPI BGRT table.

Driver Option Priorities

Select the driver boot order.

Save & Exit

Save Changes and Reset

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

Discard Changes and Reset

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

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values.

Boot Override

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

Save Setting to file

Select this option to save BIOS configuration settings to a USB flash device.

Restore Setting from file

This field will appear only when a USB flash device is detected. Select this field to restore setting from the USB flash device.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files. You may refer to the how-to video "How to update AMI BIOS in UEFI mode on DFI products?" at https://www.dfi.com/Knowledge/Video/5 for updating the BIOS steps.

Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to

the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.

2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.

3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

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